in their staining reactions, may result from the development of a thick hyaline envelope around one of the coccus elements.

The coccus and filamentous forms are the active vegetative elements of the parasite; and as regards the part played by each in the growth of a colony, they appear to be of nearly equal value. On the other hand, I believe it probable that the cocci are the more important as regards the formation of metastatic new centres. I have already stated that around the actively growing colonies single and small groups of cocci are frequently to be found within the leucocytes. Doubtless some of these perish through the agency of the cells, but not rarely a small group of cocci may be seen within the cell body or even inside the nucleus, affording evidence that the cell has not been able to restrain the growth and multiplication of the coccus which it has ingested.

It may, of course, be surmised that precisely the same thing may occur in the case of short segments of the thread forms, but the larger size of these would be less favourable for their transportation. Moreover, certain points in connection with the structure of the colonies may be interpreted as evidence that the filaments offer a slighter resistance to the attacks of the animal cells than the cocci do. Thus, in all the larger colonies of the tumour previously described, the central and intermediate zones contain both filaments and cocci; but at the periphery of the colony, where the struggle between the parasite and the cells is chiefly carried on, it generally happens that only an occasional thread succeeds in shooting out between the dense masses of apparently actively multiplying cocci.

Another point of very considerable interest and importance in this connection is that I could never discover even a small clump composed entirely of filamentous forms; while, on the other hand, there are to be found commencing colonies without any other elements than cocci, and many others showing a great preponderance of these.

It has been suggested that the coccus elements originally described by Israël were probably accidental pyogenic organisms; but I have shown that they may be found abundantly where there is absolutely no suppuration. Moreover, that they are in any sense accidental organisms growing side by side with the actinomyces is negatived by their almost constant relationship to the filamentous forms, and by the fact that the latter can be seen in the act of resolving themselves by segmentation into cocci. Nor can they be regarded as spores. The extremely dense heaps in which they are frequently found are not explainable on any other supposition than that they actively multiply after the manner of ordinary cocci. I am inclined to think that these cocci are present in the earliest stage of every colony, but it may well happen that in some cases they soon become overshadowed by a rapid development of filamentous forms. Cultivation experiments may be expected to throw light on the at present obscure point as to what special circumstances determine the parasite to assume at one time coccus forms, and at another to grow mainly in the form of leptothrix or cladotrix filaments.

I purposely refrain from expressing any opinion as to the precise position of the actinomyces among the schizomycetes, as that is a matter which may be fittingly left to botanists to decide, but the history of an actinomyces colony I would venture to summarise somewhat as follows:

1. It has its starting-point in one or more cocci transported by the plasma currents or by the agency of a carrier cell (leucocyte).
2. The cocci multiply by elongation and subsequent fission. When undisturbed by the surrounding leucocytes, their growth and multiplication are after the manner of a streptococcus, but frequently they become irregularly grouped together (staphylococcus heaps).
3. By elongation some of the cocci give rise directly to short bacillary forms, and through these to long filaments.
4. The further extension of the colony is effected by the growth and multiplication of both threads and cocci. The former multiply by segmentation into bacillary elements, which may again elongate to leptothrix forms.
5. The leptothrix filaments may give rise by close segmentation to coccus forms.
6. The formation of clubs and such forms is evidence of diminished vegetative power of the filaments (possibly also cocci) in connection with which they originate.
7. The growth of a colony may be arrested at any stage by the agency of the animal cells (leucocytes), or by failure in the supply of the necessary pabulum. In that event the majority of the

threads tend to develop clubs at their outer ends (involution forms). The central cocci and the remainder of the filaments then disintegrate; but the clubs, which offer a greater (passive) resistance to the surrounding cells, may persist for an indefinite period.

ON THE ADULT MALE FILARIA SANGUINIS HOMINIS.¹

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THE life-history of this form of filaria is of great interest, especially to medical men in Africa, India, Ceylon, the Straits Settlements, China, Australasia, the Pacific, and South America, as certain forms of hæmaturia, chyluria, elephantiasis, lymph scrotum, with other forms of lymph obstructions and the disease known in Africa as "craw craw," appear to be connected with its presence and development in the human body.

These drawings of portions of the male and female filaria were

Fig. 1.—Anterior portion of female: *m*, mouth; *ph*, pharynx; *g*, *p*, genital aperture; *x*, enigmatic body; *a*, broken extremity.

Fig. 2.—Posterior portion of male: *a*, broken extremity; *f*, testicular products showing through the cuticle; *b*, caudal extremity (? anus); *s*, spicula.

Fig. 3.—Caudal region of same specimen; one of the spicula is drawn *in situ*; *a*, the free extremity.

Fig. 4.—The other spiculum from the same specimen which became dislodged during manipulation; *a*, the portion which becomes the free extremity when the spicula is *in situ*.

exhibited at the Pathological Section of the annual meeting in August last. They were very kindly made for me by my friend, Professor A. G. Bourne, of the Presidency College, Madras, and a

¹ Read before the South-Eastern Branch.

description was sent by him to the JOURNAL at the time (vol i, 1888, p. 1,050). They were found active, wriggling in lymph on the cut surface of a scrotal elephantoid tumour which was removed by me from a native Christian cook on March 24th, 1888. He was a fairly nourished man of intemperate habits, aged 47, who had resided most of his life in a part of Madras in which elephantiasis was very common amongst his poorer neighbours. He had enjoyed fairly good health until ten years before the operation, when he was first attacked with periodic fever, attended with swelling of the scrotum; these attacks returned monthly for about two years, and the scrotum became enlarged to the size it was at the time of operation, or about that of a large cocoa-nut. It was rough, blackened, and covered with small nodules, which occasionally exuded a sticky fluid; his blood was examined under the microscope for embryos, and two were found. He made a good recovery after the operation. As already stated, these two worms were found wriggling in lymph on the cut surface of the tumour. Surgeon J. Smyth, Professor of Pathology, Madras Medical College, kindly mounted them for me; but, unfortunately, bent the male worm in the process, on account of its great tendency to coil—a fact noted by the late Professor Lewis in the portion he found.

The following is Professor Bourne's description of the specimens with which he kindly furnished me:

Specimen I. This is the cephalic extremity of a female (Fig. 1). The body is capillary, smooth, nearly uniform in thickness. The mouth is simple and circular, and the head is devoid of papillae. In many members of the family of *Filaridæ* the head presented six oral papillae. The vaginal aperture (Fig. 1, *g. p.*) is placed immediately behind the pharynx; the whole vagina in this specimen is everted or simply protruded, it is difficult to say which. In Cobbold's figure the vagina is not protruded, and I think that very probably protrusion may take place normally during life. There is a curious structure projecting (Fig. 1, *x*) from the side of the body. It is impossible to make out the exact relations of this body structure, or to determine definitely its nature. I am inclined to think it is due to some injury.

Specimen II. This is of great interest, as it belongs to a male and exhibits the caudal extremity, which has never been described. (Figs. 2, 3, and 4). The specimen measures about one inch and a quarter in length. It is thinner than the female worm, and exhibited, while living, a great tendency to coil. Testicular structures are visible in various places; it is difficult to be sure of the exact position of the anus; it appears to be sub-terminal. Immediately in front of the anus are a pair of spiculæ; these are shown in Fig. 24, in their normal position. As a matter of fact, one remains *in situ* in the specimen, the other has been displaced in the mounting. The single spicula remaining *in situ* is shown in Fig. 3. The proximal extremity is broad, while the distal extremity is capillary; but while *in situ* the spicula is bent upon itself, as shown in the figure—that is, the actual arrangement is shown by the appearance of the spicula, which has been displaced (Fig. 4) as it has become sharpened out. Whether the spicula ever becomes straightened out during life it is impossible to say, probably not; but the arrangement is peculiar, and, as far as I am able to tell from the literature at command, unlike that obtained in the spiculæ of any other nematoid. It, however, is dangerous to formulate specific characters upon the examination of a single specimen, especially when that has been somewhat injured, and we must await the finding of other specimens.

The presence of this nematoid worm has been constantly proved in all the diseases enumerated, but in India it is by no means always found in all cases of elephantiasis. In the so-called lymph scrotums and elephantoid legs which exude lymph, one is nearly always certain to be able to demonstrate the embryos, though they are by no means always as numerous as Dr. Manson has found them in similar cases in China. There are many cases of elephantiasis in which there is no lymph exuded externally, in which I have, after repeated examination of the blood, been unable to find any embryos. Whether the disease was primarily due to the presence of this worm and it had disappeared, or whether the proximate cause of the disease is some other, requires further investigation.

MEDICAL MAGISTRATE.—Mr. John N. Moore, surgeon, of Moreton-in-Marsh, has, on the recommendation of Earl Ducie, been placed on the commission of the peace for the county of Gloucester.

THERAPEUTIC MEMORANDA.

INTOLERANCE OF ANTIPYRIN.

As antipyrin is at the present time so frequently prescribed for numerous ailments, I think it may be interesting to describe a case of intolerance of the drug, which in some respects differs from any which I have seen recorded.

On May 31st last, I prescribed for a case of sciatica, occurring in a man aged about 50 years, five-grain doses of antipyrin, to be taken three times daily. He took the first dose (which, he says, was not quite a full one) at about 11.30 A.M. He instantly experienced a sensation of tingling and burning in his gums, which rapidly extended to the throat and nose, accompanied by sneezing, running from the eyes and nostrils, dizziness, complete loss of vision, a feeling of numberless pins pricking him down each side of the neck, tightness in the throat, and dyspnoea. His wife came to his assistance about one minute after he had taken the dose, and saw that his face was much swollen and "black." The pin-pricking sensation extended rapidly down the right side of his chest and abdomen, and was particularly severe in the right side of the scrotum and right testicle, and was also felt in the legs and feet—severely in the right and slightly in the left.

He next experienced a sensation as if the contents of his thorax and abdomen were being forcibly drawn upwards towards his throat, and the right testicle towards the abdomen; so that, he says, he "was drawn in a ruck," and, being no longer able to stand, he fell on the floor. He trembled violently all over, and had cramp in his right arm and hand.

I was hurriedly summoned, and arrived at 11.45 A.M., fifteen minutes after he had taken the dose. I found him sitting on a chair with his head resting on the back of it, declaring he was unable to remain in a recumbent posture. His face was of a dusky red colour; his nose, lips, and eyelids were so swollen as to render his features quite unrecognisable; eyes suffused and running, breathing hurried and difficult; he was trembling violently all over, and the fingers of his right hand were clenched in the form of a claw. Pulse scarcely perceptible.

I at once gave him some brandy, when he immediately expressed himself as better. He spoke in a thick, husky tone of voice, and complained of dizziness and a fulness in the throat. I looked into his mouth and found the soft palate red and swollen, the uvula swollen to an enormous size and cedematous; the back of the pharynx was also swollen and red. No rash appeared on the skin.

The symptoms gradually subsided, with the exception of soreness and a sense of fulness in the throat, difficulty of swallowing, huskiness of the voice, and dizziness—all of which continued, more or less, till bedtime. He complained for some hours of a peculiar taste in his mouth, coming on at intervals, which he compared to "the sulphur gas in the chemical works" in which he had been employed. The following day, with the exception of a slight headache and loss of appetite, he had completely recovered.

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A CASE OF IODOFORM ERUPTION.

MR. A., aged 39, who had been under my care for syphilis contracted about a year before, came to London on January 6th, on account of a sloughing phagedænic sore on the penis. The sore was dressed with iodoform, and the patient confined to bed. A mixture containing five-grain doses of iodide of sodium was prescribed. On Jan. 8th, Mr. A. complained of having had a bad night, on account of irritation of the skin. The whole of the penis and scrotum were greatly swollen, infiltrated, and of a dusky red colour, with some abortive vesicles scattered over the latter. The abdomen downwards from a point a little above the umbilicus, and the front and sides of the upper halves of both thighs, were covered with a bright red punctiform rash, closely resembling that of scarlet fever. The rash caused severe itching, and was accompanied by headache, loss of appetite, and general malaise. The temperature in the afternoon was 99.4°, and in the evening 100° F. Part of the sore looked healthy, but the edges were still phagedænic. The iodoform was washed away, and the immersion plan of treatment carried out, a lotion of boric acid and glycerine being applied when the patient was in bed. The iodide