long enough to allow of their having contracted the malady after their previous visit to the Sick House; and when thus admitted, abundant vesicles were visible in each case. After this time no particular record was kept on this head, although vesicles were noted in every case of influenza, and every boy in whom they were observed was at once sent to bed and treated as an influenza patient, however slight his symptoms appeared at first; nor did any of these patients fail to justify the diagnosis thus made. This sign has now been noted in many hundreds of cases of influenza, comprising persons of both sexes and of every age, and it has often proved of service in settling the question in a case otherwise doubtful.

The vesicles show themselves abundantly in all forms of the malady, though they are, perhaps, apt to be rather more conspicuous in that variety of influenza in which the respiratory passages are specially implicated, than in those forms distinguished by gastro-intestinal irritation, or by "neuralgic" or "rheumatic" symptoms. They persist throughout convalescence, gradually becoming dwindled in numbers, and less conspicuous individually. This fact may possess a special value now that we have so often to deal with a form of the disease considerably modified in the intensity of its more distinctive symptoms, but still apt to leave the patient considerably weakened, and making special precautions desirable during a rather tedious recovery. Quite in accordance with the histories of previous epidemics, influenza is now tending to assume a less overbearing type, doubtless in consequence of successive reimplantations on the same soil, as it were, and is often not readily to be distinguished, in its earlier stages, from what the sufferer is wont to regard as merely a bad "cold" or an ordinary "bilious attack." The detection of these vesicles on the palate may hence prove of real service, both for diagnosis and by giving a valuable hint as to the true *fons et origo* of those cases of prolonged and seemingly disproportionate debility after apparently slight ailments which are in so many instances nothing more nor less than a heritage from the degenerating form of influenza. Many cases might be quoted in illustration, but the following will suffice as an instance in which the hint derived from an inspection of the palate proved of some practical value.

A. H., a young unmarried woman, was sent into hospital as a case of severe gastric ulcer, for which she had been under treatment for more than a week, with a history of hæmatemesis. On admission she complained of pain, described as being especially severe in the epigastrium, thence striking through to a corresponding point in the back, and always aggravated by food; of vomiting, preceded by pain and induced by food; and of great and increasing debility. The temperature was slightly subnormal. Inspection revealed the soft palate still plentifully studded with the minute vesicular elevations already described; and further inquiries showed that about a fortnight before she had been seized with sudden shivering and general pains; that a slight epistaxis (no uncommon symptom in many cases of influenza) had preceded by a few hours the single instance of hæmatemesis; the epigastric pain appeared to be but a slight topical exaggeration of a general girdle pain, which was repeated serially throughout the length of the trunk, and which was much aggravated by pressure along the tender spine; there were typical *points douloureux* in the course of each intercostal nerve, and, beyond a double mitral murmur (accounted for by an attack of acute rheumatism twelve years previously), no evidence of organic disease was made out. The case was diagnosed as one of post-influenzal neurasthenia; the patient was placed on full diet, and was ordered a tonic mixture with a liniment of belladonna and bromide of potassium, to be rubbed twice daily into the spine. In ten days she was discharged well.

More than two years' continued experience of the practical usefulness of this sign has prompted me to publish these observations in the hope that they may prove of service to others.

MEDICAL MEN IN THE SPANISH SENATE.—At the elections for the Spanish Senate which have just taken place, the following members of the medical profession were returned: Professor Basilio Sanmartin (for the Royal Academy of Medicine); Professor Calleja (for the University of Zaragoza); Professor Gimeno Cabañas (for the University of Valencia); Professor Maximino Teijeiro (for the University of Santiago); and Professor Juan Magaz (for the University of Barcelona). In addition to these academic Senators, Dr. Martinez Pacheco has been elected by the city of Santander; Dr. Justo Martinez, by Orense; Dr. Fernandez-Caro, by Alicante; and Dr. Pertierra, by Cienfuegos. Thus, with Drs. Alonso Rubio and Calvo, who are life-Senators, the medical profession is represented in the Upper Chamber of the Spanish Legislature by eleven members.

ON THE PRODUCTION OF ARTIFICIAL ECDYSIS IN THE FILARIA SANGUINIS HOMINIS NOCTURNA, AND THE SIGNIFICANCE OF THE SHEATH AND CEPHALIC ARMATURE OF THIS PARASITE.

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In the present state of pathology any new fact connected with parasites—particularly with blood parasites—deserves attention, even though for the time being it may seem devoid of practical bearing. This is my excuse for placing on record the following curious observations.

Last year M. A. J. Zune, in an interesting *Mémoire sur la Filariose*, made the statement that whilst some specimens of the common blood worm, *filaria s. h. nocturna*, are enclosed in a sheath, as hitherto generally believed, others, on the contrary, are not so provided, but swim about naked in the blood. As M. Zune's observations had evidently been made with great care, they led me to suspect that, in common with many others, I possibly had made a blunder in describing the "sheath" as an invariable feature of *filaria nocturna*. Accordingly I took an early opportunity to reinvestigate this point. After a great many observations I assured myself that M. Zune was wrong, and that the accepted description was correct, viz., that in newly-drawn blood the filaria is invariably enclosed in a loose sheath. I therefore concluded that M. Zune had unwittingly subjected his preparations to some as yet unknown conditions which had deprived the filariæ in his slides of their sheaths, and I set about trying to reproduce and to find out what these conditions were.

In the course of my experiments I found in a particular batch of filaria-charged slides which I had placed overnight in frosty weather near a window, that many of the filariæ, when I came to examine them next day, had quitted their sheaths. I could see the naked worms moving about in the blood, and I could also see, lying at a short distance from many of them, the sheaths which they had quitted empty and collapsed, and more or less crumpled up like so many discarded garments (Fig. 1). Doubtless the conditions which in

Fig. 1.

my slides had caused this ecdysis were the same as those which had produced M. Zune's sheathless filariæ. I remarked in the slides that the hæmoglobin had left the red blood corpuscles, and had become diffused through the plasma, which in consequence had become thick and viscid. I could see also that some of the filariæ which had not yet left their sheaths were either vigorously at work endeavouring to do so, retiring towards the tail end of their sheaths, and anon charging and butting the head end in frantic effort to escape; whilst others again, having succeeded in effecting an opening, were wriggling about and trying to squeeze their bodies through the rent they had made in the sheath (Fig. 2), and

in more than one instance I actually saw the little animal creep out and effect its own complete delivery.

It was evident that the thickening the blood had undergone from the diffused hæmoglobin was the condition—an entirely mechanical one—which enabled the filariæ thus to cast their sheaths; the viscid blood held the sheath, so to speak, whilst the little animal inside, being not so restrained, could effectually charge, ram, and burst through the sheath, and then squeeze its body through the rent, much in the same way that a snake rids itself of its slough by travelling through grass or brushwood. From the conditions under which the slides were placed it was evident that the escape of the hæmoglobin from the corpuscles had been brought about, as in the well-known laboratory experiment, by the chilling and thawing the blood had undergone. Acting on this supposition I have many times reproduced these conditions as an experiment, and always with the same result. I can therefore confidently state that if a filaria-charged blood slide is chilled and thawed several times (I employed a few ounces of a salt and ice freezing mixture, but a freezing microtome would probably answer equally well) and is examined some twelve or eighteen hours afterwards, the hæmoglobin will be found diffused in the plasma and the filariæ either all out of their sheaths or busily endeavouring to escape from them. In twenty-four hours all the filariæ will have effected their escape, and their empty sheaths will be seen scattered about the slides. The chilling does not kill the worms. This experiment is very easily made, and with such simple means as I have indicated, and it is only necessary to chill the slides two or three times, and for a few minutes at a time, to ensure the results I have described.

Fig. 2.

Sonsino, many years ago,¹ remarked the presence of empty sheaths in some of his filaria-charged blood slides, and supposed that this form of ecdysis was a normal feature in the life-history of the parasite while it was in the circulation; but my experiments conclusively prove that this is not so; that, on the contrary, it is an artificially-induced phenomenon. Doubtless both Sonsino and Zune had made their observations on chilled slides, which had been unwittingly exposed during cold weather. I find that actual freezing is not desirable for the induction of ecdysis; although it may hurry the process very much in a few instances, it generally kills the filariæ. A temperature of from 40° F. to 50° F. for some hours brings it about in many filariæ if they are exposed to it for some hours at a time, and several times during one or two days.

An interesting feature about these chilling experiments is that they reproduce in an artificial manner, and also explain the rationale of what actually happens in a natural way at a later period of the history of the filaria. It is now accepted that the first step in development of this parasite is made in the stomach of the mosquito. Therein the filaria casts its sheath preliminary to penetrating the walls of the viscous, and travelling into the thoracic muscles of the insect. If we ex-

amine the contents of the stomach of a filaria-charged mosquito shortly after it has fed, we find that the hæmoglobin of the ingested blood has left the blood corpuscles, and that the blood is of the same viscid character as in the chilled and thawed blood of our experiment, and that the filariæ have either escaped from their sheaths, or are actively endeavouring to do so. The gastric secretions of the mosquito act on the hæmoglobin of the corpuscles exactly in the same way as the cold and heat in the experiments do, and so bring about the necessary thickening of the blood, which provides the mechanical condition that enables the filaria to quit its sheath.

I would further remark that in filariæ artificially deprived of their covering we can make out with great distinctness the organs by which the parasite pierces the tissues of the mosquito, as is its habit, and works its way to the thoracic cavity of that insect. Selecting in a chilled slide a slow moving sheathless filaria lying isolated in a lakelet of clear serum untinged as yet with hæmoglobin and unobscured with corpuscular debris, and watching its head very carefully through an oil or water immersion lens and in a good illumination, we remark at once that the extreme end of the head is in constant and very active movement. By careful watching and focussing after a time we make out that the animal is provided with a thick stumpy tongue or proboscis

Fig 3

Fig 4

(a, Fig. 3), which is alternately rather slowly uncovered and then with a sudden snapping movement covered (Fig. 4) by a six-lipped retractile prepuce (b, Fig. 3); that occasionally a short and extremely delicate filament (c, Fig. 3) is shot out and retracted from the tip of this tongue-like organ; and that occasionally, especially when the parasite is moribund, the tongue is vigorously moved from side to side. If we look carefully at the little lips of the retracted prepuce when one of them happens to be in exact profile, we discern that they stand out from the periphery of the worm, and that they are everted like the petals of an overblown flower. The interpretation of these delicate organs I take to be as follows: The filament (c) is a feeler or sense organ of some sort; the tongue (a) is a borer; the lipped prepuce (b) is a dilator and hold-fast. They operate in this way: When a gap or weak point in the tissues of the mosquito has been discovered by the sense filament, the tongue is thrust out and a shallow pit formed; the tongue is then withdrawn, the prepuce being slipped over it; the prepuce-covered tongue is then thrust into the shallow pit, and the prepuce forcibly opened out and drawn back in such a way that the little lips with which it is provided hook on to the circumference of the hole in the tissues, and thereby provide a firm purchase by which the animal may drag its body forward and further expand the hole, and also afford a firm foothold for further ramming and drilling by the tongue, and renewed advance.

Another matter, which hitherto had always been a puzzle to me, these observations and experiments have made clear, and that is the purpose Nature has in view in providing the filaria with a sheath. In what way can such a clumsy covering subserve the interests of the parasite? As I have elsewhere pointed out, the sheath in which the filaria lies and moves about is really the remains of the egg-shell of intrauterine life. Why, then, is it not discarded before the birth of the embryo and its appearance in the blood stream as a free, swimming, and independent organism? I believe the reason

¹ Med. Times and Gaz., May 27th, 1882, p. 554.

for this anomaly in development is that the loose trailing sheath is intended to prevent the filaria from using its formidable boring apparatus on the walls of the blood vessels of its human host. This, which I may describe as a muzzling arrangement, is not made in the interests of the human host, but with a view to the wellbeing and future of the parasite itself; for, were the latter permitted to ply its weapons on the blood vessels and escape thus into the perivascular tissues, it would miss its chance of being transferred to the stomach of a friendly mosquito, and of thus obtaining an opportunity to advance in development.

I have shown the things I describe to several medical friends who can bear me out as to the accuracy of this description of facts, and who also agree with me in the interpretation I place upon them.

I am indebted to Mr. H. B. Bristow, H.M.'s consul, Wanchow, for the beautiful microphotographs of the discarded sheath of the filaria, and of the filaria struggling out of its sheath, from which the engravings were prepared.

MEMORANDA:

MEDICAL, SURGICAL, OBSTETRICAL, THERAPEUTICAL, PATHOLOGICAL, ETC.

ULCERATIVE COLITIS.

ON March 30th, 1893, in the presence of Sir Joseph Fayrer, who attended the case throughout together with myself, an examination was made of the body of Miss M., aged 23, who died on the previous night of ulcerative colitis, presumably due to an attack of influenza some four or five weeks previously. The symptoms were diarrhoea and hæmorrhage from the bowel, the discharges during the last fortnight or so containing shreddy sloughs and putrilage. Towards the end there was an absence of bleeding for some days, but on the day of her death a severe hæmorrhage recurred, containing putrescent shreds of mucous membrane. Five days before death the parotid glands suddenly enlarged and became very painful; and the temperature, which at first was uniformly normal, rose to 102° F. in the night, and remained more or less high until the close.

The disease was characterised throughout by a total absence of tenesmus or pain anywhere (except on the parotids) even on pressure. There was absence of sweating and rigors, and although at first there was a good deal of vomiting, necessitating very frequent feeding, yet she afterwards, and up to the date of her death, took nourishment freely and well. Her pulse soon after the commencement of the attack became very quick and feeble, rising to 130 to 140.

The treatment consisted mainly of opiates; at first ipecacuanha and Dover's powder, and afterwards the liquid extract of opium. Injections were given of hamamelis, alum, and opium, and poultices were kept applied to the abdomen. She was fed carefully and frequently with milk, meat juice, and brandy.

Post mortem (nineteen hours after death) the body was already presenting indications of discoloration and incipient decomposition. The stomach and intestine were distended with gas. The stomach and small intestine were healthy in appearance; the lower end of the ileum for 8 or 10 inches was found to be deeply congested, containing semifluid faecal matter; there was no ulceration of the mucous membrane. The large intestine from the cæcum to the rectum was extensively diseased; in many places it was thickened. The whole mucous surface was deeply and darkly congested, and contained semifluid faecal matter, which was very offensive. Extensive ulcerations from the size of a pin's head up to that of half a crown studded the surface, fewer in number and smaller in the cæcum, but more numerous and larger in the transverse and descending colon and rectum. Some of them had edges somewhat raised and bevelled, and even had the appearance of the commencement of cicatrisation. Some were covered with an ashy-grey slough, while in others the mucous membrane and muscular coat were completely destroyed and the peritoneal coat was laid bare. The cavity of the true pelvis was discoloured, but no perforation had taken

place, nor was there any sign of peritonitis. The liver was only superficially examined, but it appeared perfectly healthy. The lungs were exposed, but not removed; they were crepitant throughout, deeply congested hypostatically, but no infarcts were visible.

It is interesting to note that this young lady had been in continuous enjoyment of health and vigour up to the time of the attack. The diarrhoea itself had been preceded by a "cold" in the head. The diarrhoea which supervened had caused so little disturbance of the general health as not to be noticed or paid attention to for a week or ten days, until the appearance of blood gave rise to anxiety and the summoning of medical assistance.

In the absence of any more obvious explanation, we can only attribute the disease to the effects of influenza, which has in so many ways expressed its evil influence. Had such a case occurred in India or the tropics, it would no doubt have been regarded as an exceptional form of dysentery. The pathological conditions, indeed, seem to have been identical with those of low forms of sloughing dysentery. A septic condition was soon established, as manifested by the swelling of the parotids, the feeble, rapid pulse, the delirium and excitement at night, and an erythematous redness of the neck and face; but especially noteworthy was the complete absence of pain, rigors, or sweating at any period of the attack.

I beg to express my indebtedness to Sir Joseph Fayrer for his valuable co-operation throughout the case and for his assistance in the preparation of these notes.

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ERYTHEMA IN TYPHOID FEVER.

IN Mr. Manning's article in the BRITISH MEDICAL JOURNAL of April 1st on the skin eruptions which occur in septicæmia following scarlet fever and diphtheria, he mentions that similar rashes may occur in the third week of typhoid fever.

On February 2nd of this year a boy, aged 8 years, was admitted into the Royal Hospital for Children and Women under Dr. Haig during what seemed to be the third week of typhoid fever. The day after admission patches of erythema appeared on the face and legs. The position of those on the face is shown in the accompanying sketch, and as was frequent

in Mr. Manning's cases, the patches were most marked over the malar eminences, that on the right cheek being, however, much smaller than that on the left. The colour was pinkish-red. The patches, although not perceptibly raised, had fairly well defined margins. A few smaller red areas were present on the legs and thighs. After lasting two or three days the rash disappeared, but, as in some of the cases of Mr. Manning, again showed itself from time to time during the next fortnight, another large patch appearing on the right cheek in addition to those already present on the face.