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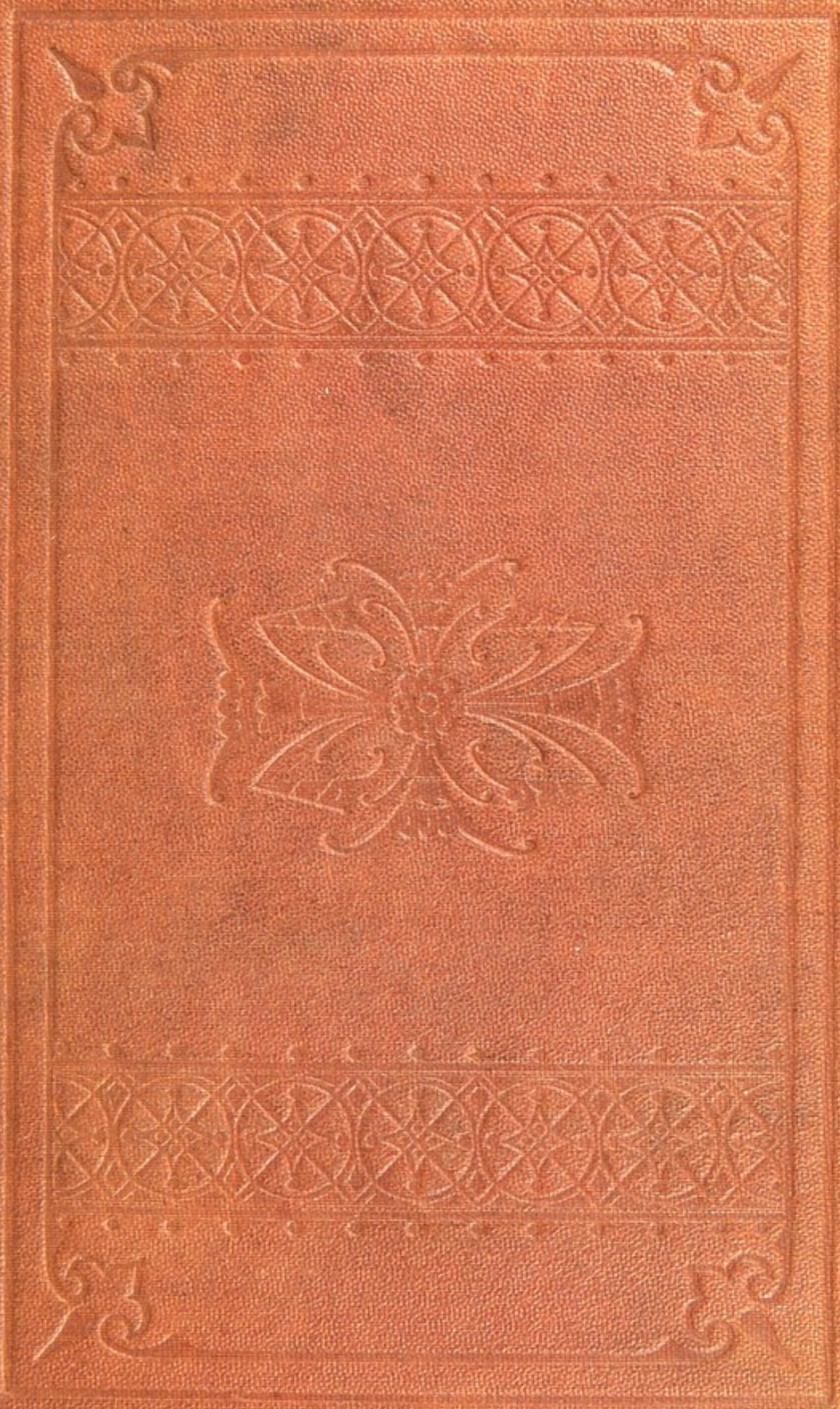
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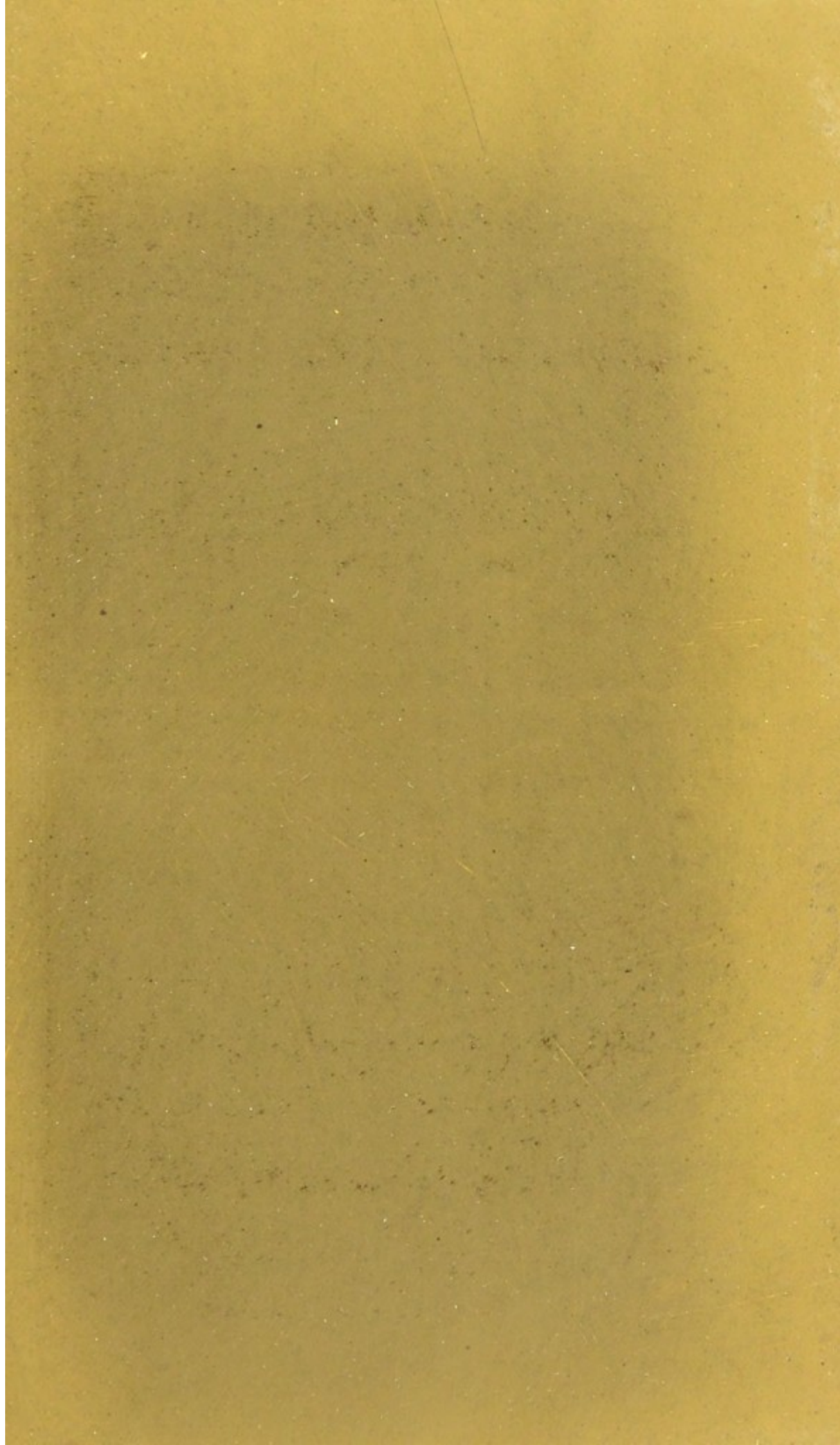
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W O R M S.

A Series of Lectures

ON

PRACTICAL HELMINTHOLOGY.



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W O R M S.

A Series of Lectures

ON

PRACTICAL HELMINTHOLOGY

DELIVERED AT THE

MEDICAL COLLEGE OF THE MIDDLESEX HOSPITAL;

*With Cases illustrating the Symptoms, Diagnosis, and
Treatment of Internal Parasitic Diseases.*

BY

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OF PHILADELPHIA.



LONDON :

J. AND A. CHURCHILL, NEW BURLINGTON STREET.

1872.

P R E F A C E.

IN these Lectures I have not attempted to cover the whole ground of Practical Helminthology; nevertheless, with the exception of hydatids, I have more or less fully considered all those forms of internal parasitism which ordinarily come under the notice of the physician.

The first six of these discourses have appeared in the pages of the *Medical Times and Gazette*; the remainder are entirely new, and have been only very recently delivered.

To any rightly constituted mind the process of self-assertion is always a painful operation; yet there are circumstances which not merely justify, but actually necessitate such a step in the interests of truth.

As I have remarked at the close of the chapter on *Trichina spiralis*, in the supplement to my larger treatise, there are authors "on this side the Channel who systematically ignore the labours of their own countrymen." Acting for myself, therefore, I can only meet such puerile negations of home-work by pointing to the several papers I have contri-

buted to this department of Medical Science and Biology. The titles of these fragments and more sustained efforts I have thrown together in an *Appendix*, and in this shape they will at least have the advantage of expressing the sum of my felt indebtedness to editors and to other learned and liberal-minded persons who, throughout a period of nearly twenty years, have generously and persistently encouraged me in these researches.

As it is now too late for me to allude to the subject elsewhere in these pages, I wish particularly to call attention to the very recently issued "Seventh Annual Report of the Sanitary Commissioner with the Government of India."

From Dr. Cunningham's Report it appears that Dr. Oliver, of the Royal Artillery, at Jullunder, has succeeded in experimentally rearing the *Tænia mediocanellata* in a low class Mahomedan syce and in a Hindoo boy, by the ingestion on their part of beef-measles; thus affording most interesting confirmation of the truth of certain practical conclusions which I have enforced on other grounds in my Cantor Lectures and in the earlier pages of the present treatise.

T. S. C.

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ON
PRACTICAL HELMINTHOLOGY.

LECTURE I.

Parasitism offers a new Field of Research—Life, History, and Economy of the Entozoa—Teleological Inferences—Serious Maladies produced by Helminths—Demand for a Special Recognition of this Class of Diseases—General Structure of the Tapeworms—Diagnostic and Prognostic Value of a Knowledge of the Major Facts of Development—Case I.—Tapeworms are derived from Mutton, Beef, and Pork.

GENTLEMEN,—As the science and practice of our calling advances, it necessarily follows that new avenues of knowledge are continually opening up to our view, and those of us who are not afraid of “toil and trouble” may rest assured that a bold entry into any one of these hitherto unbeaten paths will not only bring to the professional investigator a rich increase of pleasant (and sometimes of unpleasant) knowledge, but will enable him to point out the means of checking, if not of entirely eradicating a variety of formidable diseases.

The truth of this general statement cannot be

better enforced than by an appeal to the record of our recent experiences in regard to the life-history and economy of the entozoa. Here, be pleased to observe, we have a group of creatures (hitherto mysterious to us in respect of their varied modes of origination and entry into the human body) showing peculiarities in their organization and displaying migratory habits, associated with metamorphic changes altogether unique; and so strange are these phenomena, when viewed in reference to the ends accomplished, that I believe I am not going too far in stating that their fair consideration is certain to overthrow the ordinarily received opinions of teleologists respecting the why, how, and wherefore of their mere existence.

This, however, is not the place to enter upon speculations which can tend to little practical good; nevertheless I will venture to remark in passing that I still think it possible to entertain conceptions of original causation in harmony with the doctrine of final causes, provided only you express that doctrine in terms sufficiently wide.

Be that as it may, gentlemen, it is perhaps sufficient for you to concern yourselves with the fact that the entozoa, the helminths, the intestinal worms, or call them what you will, are capable, both individually and collectively, of producing the gravest of maladies. Thus a single parasite, no

larger than a pea, and whose presence in the human body shall never have hitherto occasioned the slightest inconvenience to the "bearer" of it, may, without a moment's warning, give rise to instantaneous death; whilst, on the other hand, collections of parasites, each individually so small that thousands of them might be placed in a nutshell, are capable of producing equally fatal results, sometimes affecting a whole community.

Surely then, at a time when chairs are founded to promote the knowledge of dermatology, when societies are created to discuss questions of epidemiology, and when associations are formed solely with the benevolent purpose of advancing the interests of public health, I am not going out of the way in insisting more precisely than has hitherto been done on the claims of helminthology.

With these preliminary remarks, let us attack our subject by treating of those human parasites which, though not the most common, are perhaps the best known—I mean the tapeworms. In respect of their general structure and development, it is important to remind you that in a separate specimen, such as is ordinarily obtained from the hospital, you have to deal with a multiple sort of creature, whose various "joints" or segments, whether sexually mature or otherwise, represent so many individual-like beings arranged in single file. A fully developed beef tapeworm numbers

about eleven hundred of these "joints." Towards the so-called tail-end of the tapeworm the segments become more and more perfectly formed, until the lowermost—so to speak—breaks off from the colony in order to assume a semi-independent existence. These separated joints are the "cucurbitini" of old writers, and I would urge you particularly to familiarize yourselves with the appearances presented by them, especially whilst they are still alive. I have known the most erroneous statements made and published respecting their true nature, and have repeatedly received specimens from professional gentlemen, by post, for determination. Serious errors of practice have also occasionally arisen from this source. Sometimes you may be enabled, merely by a naked-eye examination of the segments, to determine the particular species or form of tapeworm from which your patient may be suffering; unfortunately, however, most of the eggs have usually escaped from the "joints" passed by stool, and in this way the distinctive form of the uterine cavity, constituting under these circumstances the best diagnostic mark of the species, is practically lost. A much more important point for you to remember in any case that may present itself, lies in the circumstance that "joints" only pass where the worm is fully developed. In the instance of the beef tapeworm you may reckon upon thirteen weeks as the extreme time necessary for the

full growth and maturation of the parasite, and the recollection of this statement, which is based upon interesting facts occurring within my own experience, will often prove of service to you in practice. Let me illustrate it by a case in point.

CASE I.—C. B. was formerly a patient under the care of a physician residing in the city. On two separate occasions, with the request or sanction of his medical adviser, he called to ask my opinion respecting the nature of the parasite he had passed, chiefly with the view, I presume, of forming a correct prognosis. On the first occasion the specimen proved to be an incomplete example of *tænia mediocanellata*. As the head was not present I advised him to submit himself to the same excellent course of treatment (that had been previously adopted) should the parasite return, adding that he need not look for its return until the expiration of about three calendar months. On the occasion of his second visit (June 17, 1865) he brought me a perfect specimen of the beef tapeworm with the head attached, and what was equally satisfactory to me, he at the same time expressed his astonishment that the reappearance of the worm should have occurred on the very day when the interval of thirteen weeks had elapsed. The patient's mind being now completely relieved by my assurances to the effect that he had no other parasite left behind, and that it was impossible for the

present tapeworm to redevelop itself, the cure was pronounced to be in all respects complete.

In this connexion I have further to observe that a careful examination of the "joints" of several different tapeworms will convince you of their liability to vary in character, so that the same sets of segments, thus to speak, are not always alike. In the examples before you some are characterized by a few and others again by many branchings of the uterine cavity. In well-marked types, therefore, you would experience no difficulty in referring some to the tapeworm derived from beef and others to the form derived from pork. Here, you perceive, is an extreme form which I believe to be characteristic of the tapeworm obtained from the ingestion of imperfectly cooked mutton. "Measly mutton" and "measly beef" are terms which will sound strange to those who know of no other "measled meat" than pork; but my investigations (as you see in part by the specimens of "measly beef" before you) have incontestably proved and verified the fact of the existence of larval tapeworms in the most esteemed kinds of animal food.

LECTURE II.

Necessity of distinguishing the various kinds of Tapeworm—Means of Identification—Diseases often produced by the Larvæ of Parasites—Cerebral Symptoms from Cysticerci—Natural Cures effected by Calcareous Degeneration of the Larvæ—Duration of the Life-epoch of the Beef-measle—Hydatids apt to be confounded with Cysticerci—Degree and Variety of Symptoms produced by Tapeworm—The worst Symptoms may remain after a Cure has been effected—Case II.

GENTLEMEN,—At the close of my opening lecture you will remember that I was more particularly insisting upon the necessity of distinguishing three of the various tapeworms liable to infest the human body; but in addition to the facts already mentioned in that connexion, let me also remind you that the *heads* of these tapeworms are severally distinct, as are also the so-called “heads” of the measles or *cysticerci* whence they are developed. The head of the beef tapeworm is destitute of hooks, and has four large suckers, besides a central supplementary fifth (so-called), whilst the head of the pork tapeworm is a trifle smaller, and furnished with a slightly prominent proboscis armed with a double row of hooks. The mutton tapeworm is also armed; at least the “measle” is supplied with

hooks, as was also the head of the tapeworm whence I procured those extreme types of segments already brought under your notice. Other minor characters, yet equally distinctive as between the beef and pork varieties, may be seen in the microscopic preparations on the table.

In the course of practice you may meet with disorders produced both by the larval and adult conditions of the tapeworm. It is true that the first-mentioned cases are extremely rare ; nevertheless I am confident that they are not so uncommon as is usually supposed. The symptoms produced by larval tapeworms, or cysticerci, in the human body, are liable to be overlooked, especially when these parasites have taken up their residence within the brain. Probably not fewer than one hundred such instances have occurred within medical experience ; at all events, fifty such cases have been collected or placed on record by a single author (Griesinger). It has been shown by these cases that you may have a variety of cerebral symptoms, from simple giddiness and headache up to the most severe and alarming epileptiform seizures, solely brought about by the presence of one or more larval tapeworms in the human brain. It does not appear, indeed, that any of the symptoms are sufficiently characteristic to enable you to distinguish them from mental perturbations caused by other lesions or disorders ; nevertheless, it is just

possible, taking the history of the patient into consideration, that you might be able to diagnose such a case successfully. Undoubtedly also your suspicions would be very naturally roused if in any person suffering under cerebral disturbance you should have previously obtained evidence of the existence of *cysticerci* in other parts of the body—say, for example, in the eye or beneath the skin. As to the possibility of a cure being effected in the case of a cerebral *cysticercus*, I for one (supposing a correct diagnosis had been arrived at) should not entirely despair; for in this particular relation my experimental investigations have taught me an important practical lesson. I have found and demonstrated that the larvæ of the beef tapeworm, if left to themselves, will perish and calcify within a period of about eight months. From actual observation I have ascertained that the same pathological process, tending in all cases to a natural cure, is sooner or later accomplished in other forms of larval tapeworms, whether encountered in the human body or elsewhere. In true hydatids the time requisite for a natural cure is necessarily much longer than obtains in the case of ordinary *cysticerci*; consequently it may be doubted if any cure of this sort has ever followed in the instances where these larger kinds of larvæ have gained access to the human brain. Knowing what cures are effected by the veterinarian in cases of “gid,” I should not at all despair of

such a result. In severe cases of cerebral cysticercus, shown to have been such by post-mortem appearances, the epileptic fits were commonly succeeded by torpor and loss of consciousness, gradually terminating in death. In autopsies resulting from brain affections, should any cysticercal-like productions be found, be on your guard. In several cases recorded as hydatids the authors have really been dealing with examples of the ordinary *cysticercus*, whilst in others the observers (like Frédault) have referred common cysticercal developments to distinct and hitherto undescribed species of entozoa. A little attention to the facts I have placed before you, coupled with an inspection of the specimens, should be sufficient to prevent the recurrence, on your part, of any similar error.

Leaving for future consideration the subject of hydatids, which not only concerns the surgeon, but has important bearing on questions of public health, let us now consider the symptoms liable to result from the presence of tapeworms in the intestinal canal. Occasionally, indeed, the "bearer" is fortunate enough to experience no marked inconvenience; but, as I have elsewhere stated, such instances of immunity are rather apparent than real. The exemption is *apparent* only, "inasmuch as the parasite gradually, and to the patient, as it were, unknowingly, steals away a portion of his health. The trifling feelings of weariness and lassitude are

usually set down to other causes; and it is only when these indications are succeeded by restlessness, nervous irritability, and headache that proper attention is paid to the true source of the malady." Rather than take proper advice, many persons will endure the annoyances arising from the frequent passage of the segments *per vias naturales*. To refined and educated minds, however, the mere idea of harbouring such creatures as tapeworms is revolting in the extreme; consequently such patients display the greatest possible anxiety to be quickly rid of their "guests." Although the gravest symptoms are now and then encountered, it is fortunately not often that the disease proves dangerous to life. "In bad cases the headache is much increased, and often accompanied with giddiness; the sight and hearing may be affected; noises in the head, itchings at the nose and anus, obscure pains about the body and limbs, loss of appetite, and other dyspeptic symptoms show themselves in greater or less degree in different cases. One of the most common symptoms I have noticed is a tendency to faintness. This is occasionally so marked as to create alarm, and a person uninformed as to the true cause of the disorder might be led to treat this symptom as coming from a totally different source. In females the nervous phenomena display features more or less peculiar to the sex. The restlessness and anxiety are excessive, and at times accompanied

with chorea and fits of hysteria. In the worst cases of both sexes the cerebral disturbance may show itself in convulsions and epileptiform seizures; and I regret to add that in not a few instances even mania itself has been entirely attributable to the presence of these entozoa in the intestinal canal." In the "bibliography" of my larger treatise you will find references to several of these sad cases; and the worst of it is (when the cases are of long standing), the nervous accompaniments may remain even after you have cured your patient. In the briefest possible terms let me give you an instance of this kind from my own experience.

CASE II.—H. J., a lady, consulted me in regard to a tapeworm she had contracted eleven years previously. She had been most injudiciously treated abroad; amongst other things, taking constantly large draughts of tar-water. After a second interview, I satisfied myself not only that she had no tapeworm when she first came to me (Nov. 10, 1866), but that she and her guest had parted company fully five years previously. Notwithstanding my assurances, all efforts failed to convince the patient that a cure had been effected. She had been all along, and I believe still is, subject to the most distressing seizures, the sudden hysterical fits being accompanied with violent muscular contractions, rendering the body quite opisthotonic. These and other bad nervous symptoms were, I believe, origi-

nally due to the irritation set up by the tapeworm acting upon a morbidly sensitive constitution. It is one of those chronic cases in which our best efforts are necessarily baffled; but had a different method of treatment been adopted from the very first, I am of opinion that this patient would have been permanently cured.

LECTURE III.

Nervous Symptoms erroneously ascribed to Tapeworm—Case III.—Necessity of being free from Doubt as to the Presence or Absence of Parasites—The Patient's Mind must be fully informed and satisfied—Cases IV. to VIII. serve to illustrate this Point—Supreme Importance of a correct Diagnosis—Parasitic Diseases frequently overlooked—The Proper Remedies for Tapeworm—Anthelmintics to be employed with Discrimination—Prevalence of the Beef Tapeworm.

GENTLEMEN,—In my last discourse I dwelt especially upon the various symptoms to which patients are liable when infested by tapeworms; and you will remember that I laid particular stress on the nervous phenomena more commonly met with. Finally, I offered you an instance where some of the worst concomitants of this kind had remained, long after the parasite had been got rid of. Let me now offer you a case of a somewhat different character; in which, however, the persistent symptoms were again erroneously attributed to the actual presence of tapeworm.

CASE III.—A. L., a gentleman, from Hertfordshire, has long been treated for tapeworm by practitioners of distinction; but when I first saw him (March 27, 1869) he admitted, in the course

of a prolonged consultation, that he had not passed any portions of a worm (such as I described to him). Indeed, I almost doubt if he ever had tapeworm, though he appears to have had other entozoa. Headache, restlessness, with strange abdominal pains, were all ascribed to the presence of tapeworm; and it was in vain that I offered proofs of the non-existence of the parasite. Under these circumstances, I naturally recommended this hypochondriacal subject to repair to one of our English spas. Whilst enjoying the change, his general health received considerable benefit; but unfortunately he still entertains the idea that he is infested by a tapeworm.

In most of these spurious cases, where the symptoms have not been of very long duration, though in the first instance clearly attributable to a tapeworm, you will find no difficulty in relieving the mind of the patient. It is particularly necessary, however, that you should yourselves be utterly free from doubt as to the true state of affairs. Some patients will willingly undergo a fresh course of treatment, even though you may have been able to satisfy your own mind that such a step is unnecessary and may have been at some pains to explain your views. Here are several illustrative cases occurring in my practice.

CASE IV.—G. W. G., a gentleman, came direct from California to consult me (July 13, 1869)

respecting a tapeworm which has troubled him for six years past. For the cure of it he has taken large doses of turpentine and other drugs. The consideration that fully three months had elapsed since he last passed any of the worm (as a result of treatment), coupled with the circumstance that he was not at the time passing "segments," at once enabled me to express my belief that he was already relieved of his enemy. The correctness of this opinion was subsequently confirmed by the absolutely negative results obtained after a most vigorous course of treatment—a measure which I found necessary to adopt in order to dispel all doubt and difficulty in the patient's mind.

CASE V.—C. A., a gentleman, resident at Edinburgh, wished to go through a course of treatment for tapeworm. As he had not noticed the passage of "joints" for an interval of something like a year, I explained to him (June 15, 1868), that any remedial measures would probably only secure a negative result. Having taken certain medicines which I prescribed, without, of course, passing any tapeworm, this patient had also the good sense to rest satisfied as to the correctness of the opinion I originally offered.

CASE VI.—R. A. consulted me (September 11, 1869) in reference to obscure pains in the throat and other parts of the body, which he attributed to the presence of tapeworm. This gentleman's

case was not unlike that of the one marked No. III., the hypochondriacal symptoms being accompanied with anorexia, nausea, and vertigo. However, I was satisfied that this patient had really suffered from tapeworm some time previously; and when I fully explained to him that the depression under which he laboured was entirely due to other causes, he was satisfied to adopt a simple restorative treatment such as I then advised.

CASE VII.—R. J. J., a gentleman, residing at the west-end of London (November 22, 1867), contracted tapeworm about six years previously. He had been treated for the disease, and although he was not aware that he had passed any “segments” for five months past, he was nevertheless convinced that the creature was present internally. After a thorough trial of appropriate remedies, I here also fortunately succeeded in convincing the patient that he laboured under a delusion; and I have the satisfaction of knowing that he has had no return of the disorder.

CASE VIII.—H. H. W. is an Indian officer, who contracted tapeworm in the Punjaub between three and four years back. He consulted me (September 27, 1869), being at the time impressed with the belief (which was also shared by his usual Medical adviser), that he was still afflicted with the parasite. Though suffering from pulmonary disease, much of his debility was attributed to the tapeworm. In

this case it became necessary to adopt active remedial measures under circumstances of unusual difficulty; and the treatment succeeded in so far as it enabled me to satisfy my own mind and the patient's that he had been effectually cured by the last course of remedies adopted prior to the date of his asking my advice.

The foregoing cases should, I think, be sufficient to convince you that the knowledge necessary to give a correct opinion in cases of parasitic disease, is not so simple a matter as some would have you suppose. The above constitute only a very small proportion of the cases which have come under my attention where entozoa were suspected when there was no legitimate ground for such suspicions. On the other hand, it may be safely averred that cases of parasitic disease are not unfrequently overlooked by those who have not deemed the subject of sufficient importance to require their study.

Putting aside for the present these general truths, let us consider what are our resources in cases of undoubted tapeworm. I shall take occasion to enter more fully upon this subject in the next lecture (p. 22); but in the meantime I may remark that some practitioners seem to think that one vermifuge is as good as another, and administer all kinds indiscriminately. I suppose that the principle they go upon is based upon the notion that vermifuges in general act mechanically upon

the intestine and its contents, literally scouring the patient's bowels and driving everything before them. Now, to tell the truth, treatment on this pop-gun sort of principle is sometimes temporarily successful, and you may occasionally drive out ten or fifteen feet of a tapeworm merely by a vigorous dose of jalap or castor oil. In such cases, however, you must not expect to secure or dislodge the head of the parasite; the tapeworm will, therefore, certainly grow again. To be sure, I do not say that in every case where you employ the proper remedial agents that you must invariably succeed; indeed, in cases where you have to deal with the armed varieties of tapeworm you will rarely obtain the head. Fortunately, however, as my investigations and experiences have especially shown, the unarmed beef tapeworm is the particular species most commonly encountered in private practice.

LECTURE IV.

Illustrations of the Relative Value of Particular Drugs—Cases IX. and X.—Uselessness of Santonin in Tapeworm—Impropriety of giving Remedies which exert no Poisonous Action on the Parasite—Reasons for Discountenancing the Employment of the Oil of Turpentine—Case XI. affords an instance of the Anthelmintic Activity of Turpentine, the Head being dislodged under circumstances of peculiar interest—No necessity for long Fasting before taking Vermifuges—Relative Merits of Koussou and Male-fern—Case XII., in which the Head of the Worm was Found.

GENTLEMEN,—Towards the close of my last lecture I was speaking of the inappropriateness of certain remedies still commonly in vogue. Here are two cases bearing upon the point then raised.

CASE IX.—K. H., a captain in the Royal Fusiliers, consulted me on the 23rd of July, 1869. He had contracted tapeworm in India four years previously, and had taken the usual remedies without more than a partial success. He suffered from anorexia, nausea, vertigo, and general loss of health. By the male-fern method of treatment I brought away no less than sixteen feet of a pork-tapeworm, some of the lowermost neck-segments being present. No further treatment being at the time pursued, and there being no evidence that the head was expelled, this

seemed to me to be one of the cases in which I might have reason to believe that the worm would reappear; and I may so far anticipate what I have to say upon the subject of anthelmintics by remarking that this patient had previously taken kousso, kamala, and turpentine.

CASE X.—C. M., a delicately nurtured child, in her fourth year, was recommended to see me respecting a tapeworm which she also had contracted in India. The Medical gentleman who thus advised had himself successfully expelled fourteen feet of the parasite by means of a simple dose of calomel and jalap. At the time (May 20, 1869) it was evident that the head and greater part of the neck remained behind, but there were circumstances which induced me to attempt their separate expulsion. No result, however, having been directly obtained in this way, and it being clear that we had to deal with the pork-tapeworm, I awaited the return of the fully developed worm, segments of which appeared at the expiration of ten weeks. I now administered a suitable dose of male-fern and brought away twelve feet of the parasite. Though not so lengthily developed as the previously expelled specimen, it was a much more perfect individual—so to speak—the finer and uppermost neck-segments being among the dislodged fragments. As I had no opportunity of myself searching for the head, it appeared to me quite possible though scarcely probable that the

head was also dislodged. Eventually it turned out that a perfect cure had been accomplished, and that the head of the worm had been passed; doubtless, at the time the very fine neck-segments had come away. The child has since had no return of the parasite.

The above cases offer every encouragement to those who administer male-fern remedies in a proper manner; for although in the treatment of the pork and mutton tapeworms you may occasionally be baffled, it is satisfactory to know that, with proper care, you are not likely to be otherwise than successful with the unarmed variety derived from beef. This will be made more obvious immediately. Meantime, let me call your attention to all the more important drugs commonly employed. This I shall do in terms very similar to those I have adopted in the small treatise previously referred to. "The remedies for tapeworm are male-fern, kousso, kamala, turpentine, panna, pumpkin-seeds, and pomegranate-root bark. The right administration of any one of these is likely to produce the desired result; but many other drugs have been and still are employed with more or less success. Patients have consulted me after trying five or six of the above-named remedies, to say nothing of others not worth mentioning. Some Practitioners, as I have said, seem to think one vermifuge as good as another. Because they find santonin a useful remedy

in threadworm, and almost a specific in roundworm, it by no means follows that the same drug is effective, or even of the slightest value, in tapeworm. When so many excellent tapeworm vermifuges abound, it becomes a waste of time to dwell on the virtues of second- and third-rate drugs, such as oxide of silver, tin, scammony, jalap, and various other drastic purgatives which exert no poisonous influence upon the worm." Dr. Shapter, of Exeter, has employed chloroform with success; at least, speaking of one or more cases thus treated, he says, "The cure was effectual, and without distress of any kind." Now, supposing it were really necessary to try several drugs in succession, I would recommend their adoption separately in the order I have just placed them. Of course in no individual case will you ever be called upon to indulge in such a practice. Without asserting their actual relative value as tapeworm poisons, I give them a preference in the order in which they are here recorded. Probably, as I have elsewhere said, there is no better remedy for tapeworm than oil of turpentine, and yet its nauseous character, combined with the fact that it not unfrequently produces irregular and violent effects upon the nervous system, are circumstances always inducing me to substitute other drugs. From cases which have come under my notice I have no doubt whatever as to the great anthelmintic virtues of tur-

pentine. Here is a simple instance of its value and activity :—

CASE XI.—L. R. E., a Cambridge undergraduate, after and in consequence of listening to a paper of mine on the subject of entozoa, is impressed, correctly enough, with the belief that he is infested by a tapeworm. Having some knowledge of medicine, he resolved to subject himself to the ordeal of taking a large dose of turpentine, and very soon succeeded in bringing away the parasite. This gentleman subsequently sent me a full description of the specimen, accompanied with a pen-and-ink sketch of the head and neck. The data thus supplied enabled me to decide that the tapeworm was a fine example of the kind derived from beef.

The treatment in the case just given may be recorded as a “lucky hit,” for I have known similar steps adopted under proper medical care without any result whatever. One person will bear this drug with impunity, whilst another will complain that it “affects his head.” In any case the administration should be cautiously carried out, castor-oil, or some other cathartic, being added to ensure a rapid action. I may here mention that Mrs. Garrett Anderson informs me that she has treated between thirty and forty dispensary cases with turpentine and castor-oil, this remedy having “never failed to bring away the worm where it has been known to be present.” With other drugs

some preliminary steps may be advisable ; but long fasting prior to their administration is, in my judgment, a " great mistake." The important thing is to be sure that your pharmaceutical preparations are the very best that can be made. Inferior drugs will cause you much disappointment ; and, of course, some forms of the same drug are better than others. For example, I would say " rarely administer the powdered male-fern root if you can get a properly made ethereal extract. The powder is liable to lose its strength by long keeping, and it is perhaps more easily adulterated than the extract. This rule applies to other anthelmintics also. I have cured cases of tapeworm with the oil of male-fern where the powdered root was of little or no service." Herein also lies some hindrance to the employment of that really excellent drug kousso, and perhaps also to some extent with the powdered areca-nut. With this remedy I have had some experience in private practice ; and in hospital cases treated by Dr. John Barclay it has been prescribed with very remarkable success. I believe he first introduced this particular remedy into British practice. The large quantity of kousso required to be swallowed is highly objectionable, especially in the case of young children. Even the administration of decoctions, as in the instance of pomegranate-root bark, is not without some similar disadvantage as regards results. My own expe-

riences have given me great confidence in the so-called oil of male-fern when properly prepared; and in proof of the fact that I do not over-estimate its therapeutic value, I shall now direct your attention to a considerable series of instructive and highly successful cases:—

CASE XII.—S. G., a respectable young man, had suffered from tapeworm for a period of five years, during which time he had taken a variety of drugs. At the time I saw him (July, 1865) he was much emaciated, had marked cerebral symptoms, extreme depression, and a suicidal tendency. He had at length been successfully treated by an able medical practitioner, who, however, had sent him to me to pronounce upon the worm which had come away, and, in fact, to give a “prognosis” of the case. On careful examination of the materials brought by the patient I found all the parts, including the head, of a well-developed beef-tapeworm.

LECTURE V.

Caution to be Observed before definitely Pronouncing a Cure—
Case XIII., where Two Worms existed, and One Head only came away—Always Search for the Head of the Worm if possible—Case XIV. gives a Cure in which the Vision was Affected, the Head of the Worm not having been Sought For—Cases XV. to XIX. afford Instances of Cures where the Head of the Worm was either not Discovered, or not sufficiently Searched for—A Trichocephalus dislodged by the Action of Male-fern.

GENTLEMEN,—Ere I pass to the next case, let me caution you as to pronouncing definitely upon a cure in all cases where you may be fortunate enough to discover the head. Of course, if only one parasite be present your prognosis may be absolute in the patient's favour; but, like a good accoucheur, always consider the possibility of encountering twins. Here is a case which occurred to myself:—

CASE XIII.—S. S. W., an engineer, who had contracted tapeworm in India some three or four years previously, and who had frequently taken kousso and other drugs without success, placed himself under my care in April, 1867. Except some trifling discomfort arising from the escape of

the "joints" *per anum*, he had suffered nothing from its presence. In this instance a single administration of the male-fern extract, followed by a suitable purgative, brought away about ten feet of a tapeworm at the first movement of the bowels, the remainder of the parasite, including the head, not coming away until after the employment of a second dose of the drug.

Naturally one would have supposed a complete cure to have been effected, especially since there were no fragments of a second tapeworm detected at the time. However, very shortly afterwards—I think about five weeks—the "segments" reappeared, but as the patient now considered himself competent to undertake his own case, I do not know what result followed a repetition of the course of treatment I had previously pursued. It was quite clear, however, that at least two parasites were originally present, one of them having successfully resisted the poisonous effects of the drug. I have no doubt a foot or more of the second worm had been dislodged with the first. Had there been a larger proportion of the second parasite, it is not probable that it would have escaped my notice.

In all ordinary cases, where it is possible, a diligent search should be made for the head of the worm, otherwise it is impossible to clear your patient's mind as to the likelihood or otherwise of a return of the disease. Though in many cases

I have effected cures without these necessary examinations of the fæces, yet such cases are not altogether satisfactory.

CASE XIV.—P. P. For this respectable person, who resided at Cheltenham, I was induced, under peculiar circumstances, to prescribe, although I could ascertain results only through those who requested my professional aid. During a period of several years she had, I understood, been treated unsuccessfully, taking at times large doses of turpentine which had acted violently. In this case I prescribed three-quarters of a drachm of the ethereal extract, combined with abundance of mucilage, &c. This treatment effectually dislodged the parasite. As there has been no return of the disease, it is quite certain that the head passed either at the first or second movement of the bowels. This unhappy patient had suffered severely from nervousness, and was now gradually losing her sight. The cure in this case not only saved her vision, but also her life, which was jeopardized by her rapidly declining general health and consequent emaciation.

CASE XV.—M. M. R., a captain in the Royal Artillery, consulted me in January, 1866. He states that he has suffered for six years from tapeworm. Though previously robust, he has been gradually losing strength and flesh, being at the time above mentioned extremely debilitated. Faint-

ness, vertigo, occasional difficulty in "keeping the saddle," and consequent depression of spirits, are some of the more important symptoms. As happened in several of the foregoing cases, this patient had taken kousso and other remedies without success. My first administration in this obstinate case only dislodged a few feet of the worm, but, after allowing the creature to redevelop itself, I treated the "host" again, bringing away a well-nourished specimen of the beef-tapeworm measuring about ten feet in length. In this instance the head was not found at the time; but, as there appears to have been no return of the parasite, the head probably passed at an evacuation subsequent to those discharges immediately resulting from the employment of the drug. This patient contracted the disease in India.

The next case is in some respects similar; and in all probability was attended with an entirely satisfactory result:—

CASE XVI.—S. A., a gentleman from Peru, South America, has been infested by tapeworm for several years, having taken the usual remedies without success. Consulting me (in February, 1869), he complains chiefly of nausea, frequent gnawing pains at the pit of the stomach, rendering him at times almost hypochondriacal. He appears to have contracted the disease in England, before going abroad. Here, again, pursuing the male-fern method, I brought away, at the second dose, a

nearly perfect example of the beef-tapeworm measuring nine feet in length. The neck segments, up to within some three or four inches of the head, had come away separately. In this instance I did not obtain the head, but I have little doubt that the cure was complete. In the hope of dislodging the head separately, I prevailed upon this patient to take a third prescription, which, curiously enough, brought away a solitary specimen of the so-called common whipworm (*Tricocephalus dispar*).

The following is another remarkable case in which a cure was effected; the head of the worm having certainly passed during the only motion which was allowed to escape my examination and scrutiny:—

CASE XVII.—L. A. J., a married lady residing in Kent, consulted me in May, 1869. She has for nine years been troubled by a tapeworm, which has hitherto resisted the usual remedies; male-fern itself being included in the long list of drugs taken. Among the more prominent symptoms are spasmodic pains across the abdomen, nausea, sickness, and loss of appetite. Here, although the doses of male-fern given by me were unusually large, six or eight separate administrations were necessary, the parasite (*Tenia mediocanellata*) being only brought away piecemeal.

This is one of the most obstinate cases I ever

encountered, as the worm for a time successfully resisted the most vigorous treatment. However, this patient's great courage at length enabled me by perseverance to accomplish the desired end. She is now perfectly free of the parasite.

CASE XVIII.—Y. Y., a gentleman residing in Dublin, requested me to advise and prescribe for him (July, 1866), although I should have no opportunity of personally ascertaining by inspection the results of my treatment. He had suffered from tapeworm for two or more years. The male-fern preparations which he procured with my sanction in Dublin apparently produced little or no effect; but the medicines (made up from the same prescriptions) which I subsequently instructed a London druggist to send him, were most efficacious. It seems that the whole parasite came away at the first dose; at all events, there has been no return of the disease. This patient appeared considerably astonished, and was certainly gratified by the result.

CASE XIX.—B. C. C., a lady residing at the west end of London, had contracted tapeworm at Poonah, in India, and had been passing segments continually during the last six months. She consulted me in January, 1868, when I found that her general health had suffered considerably, and though of stout build, she was remarkably anæmic. The male-fern method of treatment brought away

a well developed beef tapeworm, upwards of ten feet in length. The head was not found at the time, and had probably been unintentionally removed from the stool contents with other matters. In this case also the cure was complete, for there has certainly been no return of the disease, and the patient is in the enjoyment of perfect health.

LECTURE VI.

Four Successful Cases (XX. to XXIII.) in which the Head of the Tapeworm was expelled and found—Possibility of dislodging and finding the Head when nothing else is left to operate on—The Head of a Bird's Tapeworm obtained under still greater Difficulties—Supposed Case (XXIV.) of the Broad Tapeworm or *Bothriocephalus latus*—Case XXV., illustrating the apparent Superiority of Male-fern over Areca Nut in the Treatment of Tapeworm.

GENTLEMEN,—Before concluding this section of my subject I have still a few more cases to bring under your notice, several of them being of remarkable interest.

CASE XX.—B. D., a gentleman from the neighbourhood of Manchester, consulted me in the month of December, 1865. For a period of eighteen months he had been more or less troubled with fainting fits, accompanied by much general depression. The frequent passage of "joints" occasioned him great annoyance and disgust. He has been treated for tapeworm hitherto without success. After some slight preliminary treatment, I ordered him a male-fern mixture followed by a cathartic. One dose sufficed in this case to bring away a perfect *Tænia mediocanellata* with the head and neck attached.

In reference to this case I may remark that we have here an instance where the powdered male-fern had been employed ineffectually whilst the extract succeeded. In my small treatise on "Tapeworms and Threadworms" I have figured at page 33 the head of the tapeworm removed from this patient. It not only showed the so-called fifth sucker very distinctly, but also, as you see by these more highly magnified drawings, the vessels of the water-vascular system.

CASE XXI.—C. F., a lady residing at the east end of London, consulted me respecting a tapeworm which had annoyed her for more than a twelve-month, and for which she had undergone some useless treatment. The only symptoms at the time (December, 1866) were occasional nausea, lassitude, and loss of appetite. In this case also, with some preliminary steps, I advised and prescribed the male-fern method. Here again a single exhibition of the drug brought away a very fine specimen of the *Tenia mediocanellata*, the head of the parasite being dislodged at the same time, though separately.

CASE XXII.—S. S., a married lady from Rochester, sought my advice and placed herself under my care in June, 1867. Her case was one of the severe kind, for throughout a period little short of a year she had been repeatedly subject to attacks of partial hemiplegia, accompanied by involuntary contractions of the muscles of the left cheek. She was

also subject to spectral illusions ; all the symptoms being attributed to the presence of a tapeworm. Here, again, perfect success followed the employment of the male-fern remedy, which brought away a *Tænia mediocanellata* fourteen feet in length ; the head, which was unusually well supplied with black pigment granules, being detached separately. Before this patient left London all the nervous symptoms had entirely disappeared.

CASE XXIII.—H. H. J., a gentleman residing in the neighbourhood of Newcastle, had been treated for tapeworm homœopathically, without success. The parasite had, I understood, been contracted several years previously, during which period he had simply experienced a very gradual though sensible loss of health. In the treatment of this case I had another very obstinate parasite to deal with ; repeated and powerful doses of male-fern bringing away separately, large portions of the worm, in all amounting to about twelve feet. With the fifth or final dose I succeeded not only in dislodging the isolated head, but in detecting its presence in the evacuations after a prolonged search.

In reference to this case, which I think can only be characterized as a truly remarkable success, permit me to say that no person unfamiliar with the appearances presented by the so-called heads of tænia could possibly have discovered the head. Altogether I must have spent five or six hours in conducting the

necessary examinations for the purpose, and was ultimately rewarded by securing this extremely minute body under circumstances of the utmost difficulty. To arrive at this result it was necessary to examine several quarts of fæcal matter ounce by ounce; the object sought being itself smaller than the head of a pin, and readily mistakeable for other foreign bodies liable to occur in the discoloured mucus and fæces. In this case, however, I was encouraged to persevere by the recollection of a previous experience, under even much greater difficulties. This occurred to me during my investigations of entozoa in the bodies of animals dying at the Zoological Society's Menagerie, Regent's Park. The instance is, I think, worth recording separately. On January 16, 1858, I observed some partially disintegrated proglottides in the lower part of the intestine of a horned pheasant. These were the remains of a small tapeworm, evidently a solitary specimen (*Tænia infundibuliformis*). Being anxious to secure the head, which was far too small to be rendered visible to the naked eye, I subjected the entire contents of the alimentary canal to microscopic examination, drop by drop, and at length, after a tedious investigation, discovered the isolated head, measuring considerably less than the one-hundredth of an inch in diameter. Such an unexpected success as this has naturally given me great confidence in my searches after the heads of human

tæniæ passed during the employment of remedies ; and I may even venture to affirm that if, in all the cases of the beef tapeworm coming under my care, I could have obtained the same facilities for examination that I secured in the last mentioned case of human tapeworm, I almost doubt if the " head" would in any instance have escaped my detection. As it is I have no reason to believe that any case coming fully under my care in private practice has been treated unsuccessfully. Cases indeed, not here recorded, have come before me where I have had no opportunity of giving more than a word of preliminary advice ; whilst in others, proper advice having been given, I have had no opportunity of ascertaining results. Instances of the former kind are particularly tantalizing, especially when you have reason to believe that you would have to deal with a comparatively rare form of parasite. For example :—

CASE XXIV.—P. H., a lady residing in the western suburbs of London, comes to consult me respecting a tapeworm, which she appears to have contracted some years since whilst resident in Germany. When I saw her (November, 1867) she was not passing tapeworm segments or joints of the ordinary kind ; but occasionally an entire foot or more of the body (strobile) came away with the ordinary movement of the bowels. I at once diagnosed the presence of a broad tapeworm, my suspicions being confirmed by the notions of the

patient herself, who, on being shown a figure of *Bothriocephalus latus*, at once declared that the portion referred to exactly corresponded with the drawing I exhibited. Here, as my opinion only was sought, I had no opportunity of trying the effects either of male-fern or of any other remedy.

The above happens to be the only case where this particular aberrant type of tapeworm has come before me in actual practice; nevertheless I need hardly say that I have examined and dissected many specimens of the worm procured from other sources. One of the examples thus obtained had been expelled from an Irish girl by a dose of male-fern; and I entertain very little doubt, from the observations of Leuckart, Weinland, Küchenmeister, and others, that the ordinary treatment pursued in cases of *tænia* will equally well suffice for those of *bothriocephalus*. A case recently presented itself at St. Bartholomew's Hospital, and was successfully treated, as I understood, by the male-fern method. To quote one excellent Continental authority, I may refer you to Dr. Weinland, who has remarked in his "Essay on the Tapeworms of Man" that the remedies against this worm are the same as those employed in cases of *Tænia solium*; and he might have added, as well as against all other forms of cestodes, liable to infest the human body *in their adult state*.

You will not have forgotten, perhaps, that when

in a previous discourse I was enumerating the various tapeworm remedies, I alluded to Dr. John Barclay's recorded experiences with betel-nut. Unquestionably, it is possessed of true vermifuge properties, especially if administered in the form of powder. Why it is not admitted into the British Pharmacopœia I am at a loss to understand; unless it be that its efficiency is recognised as inferior to that of the many excellent remedies already in vogue. There may be some prejudice against the employment of a drug so frequently given by veterinarians to dogs; and it is not a little remarkable that comparatively small doses suffice to expel these parasites from the canine "bearers." Here is a case in which I recently used the powdered areca or betel nut in combination with small doses of scammony. I should tell you that the male-fern extract had been unsuccessfully employed in this case previously, but not by myself.

CASE XXV.—A. H., a young lady from Buckinghamshire, aged thirteen, first sought my advice in the autumn of last year (October 21, 1869). It appears that scarcely four months had elapsed since the presence of tapeworm had been placed beyond a doubt. For the cure of the disorder she had taken three separate doses of male-fern, about a month previous to the time at which I first saw her. Unfortunately the "oil" had been administered in unusually small doses, and consequently there was

little chance of procuring an entirely satisfactory result. However, the patient's friends brought me no less than nine separate fragments of *Tænia mediocanellata*; and these collectively measured rather more than the same number of feet in length. Finding her general health to have suffered considerably, I ordered a tonic and alteratives, at the same time forbidding the re-employment of vermifuges for the present. At the expiration of three weeks there was a very decided improvement; but towards the close of the year her health began to fail again, and tapeworm segments reappeared in the stools. Coming to town to be finally placed under my care early in the present year, I found her in a weakly state, but not too low to undergo treatment. After a brief interval, I ordered three drachms of the powdered areca nut, which, though combined with a few grains of scammony, required to be followed by the exhibition of a brisk saline cathartic. These active agents eventually dislodged four feet of a remarkably broad tapeworm; but I was dissatisfied with the exceedingly tedious manner in which this still living moiety of the parasite had come away. Repeating the areca nut without further effect, I returned to my favourite remedy, and, with an efficiently prescribed dose of male-fern, followed by a powerful purgative, dislodged the remainder of the parasite quite dead. The head was found.

Here you see the superiority of a true worm-poison over a drug which is probably only obnoxious to the animal. Not only was the helminth dislodged with the head intact, but it was effectually killed, and in this instance the final moiety came away without the patient's being aware of the fact of its escape. The case is of further practical interest as showing the impropriety of timidly giving only ten minim doses, when larger quantities of the extract can be borne with impunity. It confirms the statements I have repeatedly made to you respecting the time to be allowed for the full development of the parasite; it also shows the expediency of employing the right remedy at the right time, and it demonstrates the advantage you may possess in knowing precisely the diagnostic characters of the parasite you have to deal with. A haphazard method of treatment may occasionally succeed; but the more you know of the surroundings of any form of helminthiasis, the more will you deserve the confidence reposed in you.

LECTURE VII.

Tapeworm Disorders rarely or never Incurable—Medical Skill occasionally baffled for a Time—Mistakes made from Carelessness in Diagnosis—No Excuse for such Errors—Remarkable Case (XXVI.) in which a Lady was for Six Years treated for Tapeworm when no Parasite existed—Inferences and Suggestions arising from the Consideration of the Facts of this Case—Final Reflections.

I BELIEVE the cases already brought forward fairly illustrate the amount of success which you may legitimately expect when in future you are dealing with these disorders ; but I would not conceal from you the fact that you may occasionally encounter instances where your skill may be baffled. I do not mean to say that any case of tapeworm can be called incurable ; but it sometimes happens that a patient loses the necessary courage to continue treatment after a few unsuccessful trials of the most reputed drugs. At the worst, we need only pronounce them to be obstinate, but certainly not incurable.

Easy of attainment as the necessary amount of practical knowledge on this subject at first sight appears, I can assure you that I have seen some

very unfortunate results following advice given and based upon an incorrect or hasty diagnosis. I do not now speak of those instances where one has to deal with patients who, having been properly treated for tapeworm, are still assured that they are yet playing the part of host whilst no parasite exists; but I refer to cases where the patients have been placed under treatment for tapeworm, where no such worm or any other similar parasite ever had any existence in the alimentary canal of such persons. You, with the knowledge you have already acquired in hospital and dispensary practice, may perhaps be inclined to smile at the bare possibility of such mistakes being made; nevertheless it is with stubborn facts, resting upon personal experience, that I have to deal, and it is to their teachings that I would urgently invite your attention. Perhaps the most remarkable instance which has come under my observation is the following:—

CASE XXVI.—G. A., a middle-aged lady, and the wife of an officer residing in India, sought my advice on the 9th of March, 1871. She informed me that she had been suffering from the presence of tapeworm throughout the past six years, and for this disorder she had been treated by several medical gentlemen. That their treatment had been vigorous may be gathered from the fact that she had taken kousso, male-fern, turpentine, and, I believe, other remedies. She further assured me

that she was still in the habit of passing portions of the worm to the extent of several feet in length, whilst neither herself nor her professional advisers, past and present, entertain or have ever entertained the smallest doubt as to the presence of tapeworm.

Now, gentlemen, with such evidence as that before you, would you not at once have been inclined to proceed to business, and to treat the case for tapeworm accordingly? Probably you would, especially if you were in active general practice, and had little time to deliberate. Fortunately I was in a position to give the case the fullest consideration; but from the very first indications offered I arrived at the conclusion that the notion of the presence of tapeworm was altogether a delusion. Her symptoms presented nothing remarkable. It is true, indeed, that she complained of constitutional debility, faintness, and general nervousness, with the occasional accompaniment of a peculiar choking sensation; but some of these symptoms had been observed and treated before the presumed true nature of the case was pointed out by her advisers. On account of some of these symptoms, and quite apart from the question of tapeworm, she had consulted, amongst others, Sir Thomas Watson.

If you ask the cause of my doubts as to the presence of tapeworm, I have in the first place to

remark, that very careful questionings on my part elicited the fact that no separate and isolated proglottides were actually escaping with the fæces at the time. This led me to explain to the patient that, if no joints had passed previously, the portions of the tapeworm alleged to have come away so frequently could not possibly be those of an ordinary tapeworm; but they might be referred to the common species of *Bothriocephalus* which is sometimes called the Broad Tapeworm. Not, however, believing for a moment that she was infested by any kind of cestode parasite, I was compelled to place my opinion in direct opposition to those of my professional brethren who had treated her for tapeworm.

This negative advice not appearing to give satisfaction—in point of fact, I was provisionally looked upon as an ignoramus—I consented to treat the case as if it were one of *Bothriocephalus*, as indeed it was just possible it might have been. Thus, I ordered a male-fern emulsion, followed by a brisk cathartic; and these drugs, the administration of which was several times repeated, acted very efficiently. Now, had there been any tapeworm present, we should undoubtedly have obtained the necessary evidence of its presence. But what was the immediate professional result of my treatment? Naturally enough, it excited the suspicion which apparent ill-success always begets. Whilst, on the one hand, I maintained more firmly than

ever that the statements of her previous advisers were incorrect, the patient, on the other hand, and also a friend who accompanied her, attributed the negative results to my imperfect mode of treatment!

Determined not to be put down by the customary and stupid assurances that older men than myself (including one especially distinguished gentleman) had asserted that the tapeworm was certainly present, I sought, in the next place, to impart confidence to my patient by producing a variety of specimens of *Tæniæ* and *Bothriocephali*, requesting her to say which entozoon the alleged parasite most resembled. I must tell you that she was in the habit of passing portions of this wonderful worm either weekly or fortnightly, and it always came away more or less copiously after medical treatment. Well, having explained the general structure of the specimens produced, I succeeded in making a somewhat more favourable impression on her mind, and she was obliged to admit that none of the specimens exhibited precisely resembled the particular parasite from which she was suffering. Still she could not doubt that her previous advisers were correct in their opinions. "They had actually seen the creature, and must know all about it; but I had not seen it, and therefore could not know what it was." That was her mode of reasoning. What was to be done? My obstinacy appeared mere impertinence; besides, my medicines

had done no good, and they had brought nothing away. At length it was happily remarked, that as she contemplated remaining in London two or three days longer, perhaps in the interval a portion of the creature might make its appearance, and in this event an opportunity would be afforded me of pronouncing upon the true nature of the entozoon and of advising as to further treatment. Fortunately, on the morning of the sixth day succeeding that on which my opinion was first sought, fragments of the said parasite duly appeared. You may imagine that I lost no time in making the necessary stool-examination, when, sure enough, in place of any tapeworm, I found several long rolls of exudation-membrane, portions of them being considerably more than a foot in length. Thus the whole mystery was cleared up. The rolls were tolerably uniform in thickness, and sufficiently tenacious to admit of their being held up between the blades of a pair of forceps. As, however, their appearance was semi-transparent, almost gelatinous, devoid of jointing, and marked by oblique lines of twisting, it was clear that the coils in question offered no fair grounds for the persistently asserted opinion that this lady was suffering from tapeworm. Proceeding therefore to explain to my patient the pseud-helminthic character of the creature she had passed, she had the satisfaction of learning and believing that for some six years past she had been

uselessly, not to say injuriously, drugged, her medical advisers honestly believing all the while that they would thus expel a tapeworm, which, as you see, never had any existence excepting within the precincts of their own vivid imaginations.

Once more I ask you to reflect on the facts of this case. They are few and simple. Here is a lady seriously out of health. She endures various personal hardships, leaves her husband, spends her money, and takes several disagreeable medicines for no other reason than to get rid of a parasite which she certainly never possessed. Of course it is an unpleasant thing to have to give an opinion adverse to that of one's professional brethren; but this is only one instance amongst many where we are called upon to display a little moral courage in the interests of truth and of our patients' welfare. There is not a well-informed and experienced member of the profession who has not, at some time or other, been placed in a similar predicament as regards other maladies; and in respect of parasitism, all I contend is that in order to prevent the recurrence of such frightful mistakes it is desirable that you should familiarize yourselves with the appearances presented by the various kinds of human entozoa.

LECTURE VIII.

Obstinate Cases will occasionally occur in Practice—Case XXVII.
—Instances of the Value of Kousso—Cases XXVIII.
and XXIX.—Large Doses of Male-fern may give rise to
Symptoms of Jaundice—Rapidity of the Growth of Tapeworms
shown by the Fact that in the last-named Case upwards of
Sixty Feet of Tapeworm were developed from a Single Head
within Eleven Months.

GENTLEMEN,—Before completing this part of the course I shall have occasion to lay before you some other instances of supposed tapeworm where none existed ; but in the meantime let me bring before you one or two of the obstinate cases previously referred to. My object is not to pretend that no such cases could occur under the methods of treatment I employ, but rather to illustrate the certainty of their occasional occurrence.

CASE XXVII.—J. T., a resident at Battersea, about sixty years of age, first saw me on the 12th of December, 1870. He had been previously treated with partial success both as a private and hospital patient. He had a remarkably spare, not to say emaciated and gloomy look ; and this was partly due, in my judgment, to the fact of his being a

rigorous total abstainer. He complained of great languor, accompanied by pricking and other mysterious pains within the abdomen ; but beyond this, and a tone of natural despondency, there was little else worthy of notice. At first I treated him with male-fern, both in the form of powder and extract, bringing away a few feet only of the worm. At the expiration of a month I administered active doses of areca nut and scammony ; but this proved less effective than the male-fern remedies. In the next place I employed kousso, which brought away the entire body of the worm, excepting the head and neck. Lastly, at the expiration of nine weeks, as the parasite again had returned, or rather had grown to its ordinary length, I repeated the kousso. This second trial of the Abyssinian remedy proving just as effective as the first, by dislodging another ten feet of this truly obstinate beef tapeworm.

In regard to this case it was certainly not unnatural that the patient should grow despondent and think his case incurable ; yet the comparative success of the kousso, as contrasted with that of other drugs, should have induced him to give it yet a third trial. As a rule I deem kousso far less powerful than male-fern, yet in special instances one finds particular remedies asserting their apparent superiority in this marked manner. Possibly there may be physiological conditions, apart from the therapeutic action of the drug, which may account

for this exceptional activity in certain cases. Here are other instances.

CASE XXVIII.—D. W., a gentleman residing in the east of London, has suffered from tapeworm for rather more than a twelvemonth. He has taken the usual remedies without any success; and this was the more remarkable since the proglottides which I examined proved to be those of the beef tapeworm. I commenced treating the case on the 18th of August, 1870, ordering a male-fern emulsion, aperient pills, and a cathartic mixture. Almost no result following the first trial I advised a repetition of the remedies, which again proved ineffective. In the second place I resorted to the areca-nut method, followed by vigorous doses of castor-oil; nevertheless only some score of isolated proglottides came away. Guided by the above-mentioned and other experiences I was in the next instance prepared to show that kouso might again assert its apparent superiority over the other remedies; but he grew disheartened, and refused to persevere with the necessary treatment, under which it is by no means improbable the parasite would have succumbed, at least to the remarkable extent noticed in the previous case.

CASE XXIX.—G. J. M., a member of Parliament, first consulted me on the 12th of September, 1870. For some ten or eleven years he has played the unenviable part of host to a most obstinate tapeworm. He is under the impression that he contracted the

disorder in Norway; and he has been professionally treated for it at St. Petersburg without any success whatever. The remedies employed were kousso, male-fern, and turpentine. Beyond the inconvenience of carrying the creature about with him he has suffered little or nothing, though complaining occasionally of giddiness. Being a remarkably powerful man I resolved upon adopting the most active treatment, and I had the satisfaction of bringing away no less than fourteen feet of a well nourished beef tapeworm by the first administration of the male-fern extract. Ten weeks subsequently the parasite returned, when a similar course of treatment was again advised. This was in February, 1871. On this second occasion we succeeded in dislodging no less than sixteen feet of the tapeworm; nevertheless the head remained behind. At the expiration of another nine weeks the parasite returned for the third time; and on this occasion I resolved to try the areca-nut method. This drug, like the previous preparations of male-fern, acted most efficiently; and this time the parasite dislodged measured no less than seventeen feet in length. Here, however, it may be remarked that the body of the worm came away alive, whereas under the male-fern poison it was always dead at the time of expulsion. On yet another occasion this unusually fine cestode returned, when, for the fourth time, I sought to expel it. This was in

July, 1871. Naturally anxious to overcome its obstinacy I this time employed doses made up from a recently prepared extract of male-fern, knowing by previous experiences the great value of fresh drugs. This medicine, prepared by Messrs. Allen and Hanbury, acted even more rapidly and effectively than any of those I had previously administered; nevertheless we had again to content ourselves with the expelled and dead body of a tapeworm, to the extent of another seventeen feet in length, including nearly all the neck without the head.

This case is certainly instructive, and within my own experience, in some respects unique. You will please to observe that all the remedies were good and effective. In every instance the parasite was dislodged, leaving only its head and a small portion of the neck behind. Its growth was remarkably rapid, attaining its mature size in a comparatively short interval of time. There was no lack of courage on the part of the patient, whilst the previous treatment abroad had been utterly inadequate. In the probable event of its returning for a fifth time there remain, of course, other drugs to be tried. But here, again, (with much more apparent reason than the last case afforded,) the patient despaired of success, and gave me to understand that no further treatment would be submitted to. Be this as it may, I should certainly look for even-

tual success if the patient changed his mind. Whatever treatment happens to be adopted, it is impossible that the anthelmintics employed should act more vigorously than these have done. The doses were as large as could be given with safety; so strong were they, indeed, that in the case of the male-fern there was a decided action upon the liver. The flow of bile was for a short time checked, and there were decided premonitory symptoms of jaundice. These physiological indications, however, very soon passed off, leaving no prejudicial effects behind them. This is the only instance in which I have noticed any special action on the liver; and it is sufficiently accounted for by the fact that I employed unusually active treatment. I felt justified in pursuing this course on account of the utterly negative results obtained by the treatment the patient had undergone when living abroad.

In a short while I hope to be able to complete what I have further to say on this subject. We shall then pass on to the consideration of the general structure, development, and best modes of treating the threadworms and their allies.

LECTURE IX.

Comparative Rarity of Obstinate Cases—Reasons for not attempting to operate on the Head of Worm when left behind—Cases XXX. and XXXI.—The best Time to administer Remedies for Tape-worm—Why Caution in this Respect is so very necessary—Case XXXII.—Advantage of having to treat Patients who are educated—Case XXXIII.—Circumstances under which Treatment should be delayed.

GENTLEMEN,—It is not often that you will encounter such cases as the example last quoted ; yet should you do so, by all means assure your patient that his case will eventually prove amenable to treatment. Oftentimes, as I have before remarked, the head of the worm, though not expelled at the time, is discharged separately, some time, it may be, after actual treatment ; and in Case XXIII., to which I incidentally alluded, you have an instance of its expulsion therapeutically, when there was nothing else to operate upon. I would not, however, as a rule advise, as some have done, the repetition of anthelmintics immediately after you have succeeded in expelling the body of the parasite, for if your remedies have exerted a poisonous effect to the extent just mentioned, the return of the para-

site is exceptional. Here are two additional instances, the second of which may very well be relegated to the class of obstinate cases, whilst the first was probably a complete cure:—

CASE XXX.—E. C., a tall, spare, middle-aged lady, from New York, United States, consulted me on the 28th of June, 1870. In this case evidence of the existence of tapeworm had only been observed about six months previously; yet, to use her own words, within that comparatively short space of time she had “rapidly lost flesh.” Greatly disgusted at her condition as a parasite-bearer, she displayed the utmost anxiety to get rid of the animal. Accordingly, I prescribed a male-fern emulsion and an active cathartic to follow. This treatment expelled eight feet of a beef tapeworm on the 29th, whilst a repetition of the drugs secured the evacuation of no less than nine feet more of the parasite on the 30th of the same month. In addition to these two moieties of the body, properly so called, the neck of the worm was likewise separately expelled in fragments. Altogether this tapeworm measured fully nineteen feet, and considering the activity of the parasiticide, it was most unlikely that the head should have survived its poisonous action. I discouraged the notion that any further treatment was likely to be necessary, and this lady, after a short interval, left for Paris, where (not apprehending the siege) she intended to

stay for several months. I may also mention that she willingly assented to my proposal that she should again see me on her return from the Continent if the parasitic enemy reappeared.

CASE XXXI.—L. D., a lady-like young person, sought my advice in the early part of May, 1870. She came from Staffordshire, and stated that she had been the victim of a tapeworm for some three years past. In view of a cure, she had been very properly advised to try male-fern, kousso, and other parasiticides. No very marked success had attended this kind of treatment; nevertheless she admitted that she had parted with a portion of her "guest," to the extent of perhaps six feet, only three weeks previously. As she could not wait the requisite time necessary for the full re-development of the parasite, I prescribed for her at once, though somewhat unwillingly. With far more success, under these circumstances, than I anticipated, the male-fern method brought away, after the first dose, the body of the creature, whilst a second administration sufficed to dislodge all that remained of the parasite except its head. Altogether the fragments of the finely attenuated neck and the body included measured twelve feet, so that the animal—allowing some eighteen inches for the growth accomplished during the interval which had elapsed since her previous treatment—could not have been less than seventeen feet. In this case I

departed from my general rule, and advised a third dose, in the hope of dislodging the isolated head, but without avail. At the expiration of three months the proglottides reappeared, and in the following September she was again under my care. On this occasion I prescribed the areca-nut powders, followed by brisk salines, when, for the second time, almost the entire creature was effectually dislodged. In about three months more the parasite reappeared for the third time, when I advised by letter a repetition of the areca-nut method. In this instance, therefore, I had unfortunately no opportunity of ascertaining the results, as the patient was either unwilling or unable to visit the metropolis again. No doubt, as too many under like circumstances are apt to do, she began to despair of ultimate success; yet there was nothing in her case which need have led her to such a conclusion.

If you have followed me in this and certain other cases you may have noticed the reluctance with which I have, in a few instances, recommended immediate treatment. I am quite aware that in doing so I am departing from the ordinary practice pursued by others; but I have the strongest reasons for such a course. As a rule it may be said that the more you have to operate on, the more likely are you to be successful. Obviously therefore when a patient presents himself who has only shortly before got rid of a portion of the tapeworm,

it would be unwise to administer drugs which have no chance of giving thorough evidence of their efficacy. Even though you should explain the position of the case very fully, the patient, especially if he or she be deficient in education, is apt to become altogether dissatisfied. Here is an instance:—

CASE XXXII.—W. L., about nineteen years of age, the son of a butcher residing in a small town in the county of Norfolk, came with his father to consult me on the 18th of June, 1870. He had been under treatment for tapeworm less than a fortnight previously; but he was still anxious for further advice. That he had been skilfully treated by his ordinary medical adviser was evident from the alleged fact that the medicines last taken had brought away a tapeworm fully thirty feet in length. It was asserted, moreover, that the head had not been found. Making due allowance for the very probable exaggeration of the youth's statement, I was at some pains to explain the unlikelihood of there being anything left behind; but I consented (certainly unwisely) to prescribe a malefern mixture, for the chance of detaching the head and neck, in case they might, as seemed probable, have remained behind. When it was afterwards found that only a negative result followed this treatment, both parent and son appeared to be greatly annoyed, and thus, in spite of my explana-

tions, it was quite likely that they looked for the elimination of an additional thirty feet of tapeworm, including the head.

When you have to deal with persons on whose good sense you may confidently rely, experiences of this kind will not occur; but the impatience of some individuals to realize what they term "practical results" prevents their appreciation of advice and treatment which is not immediately operative. I will give one instance, amongst many, where I have advised delay with a satisfactory termination of the case.

CASE XXXIII.—C. M., an Oxford graduate, about thirty years of age, consulted me on the 3rd of April, 1869. He had recently been treated for tapeworm with a considerable amount of success, but felt quite sure that he still entertained the parasite. Not that he had any ocular evidence of the fact from the passage of proglottides; but that he still experienced persistent sleeplessness and general debility, frequently amounting to exhaustion. These symptoms he could only account for on the supposition that the tapeworm was still present. From the statements advanced respecting the amount of tapeworm dislodged by previous treatment, I conjectured that in the event of its being still attached it would require about five weeks more in order to arrive at maturity. On this account I advised delay. At the expiration of

one month he wrote to the effect that the proglottides had reappeared, and thus my suspicions proved to be correct. In the following June he returned to town, and placed himself under my immediate care, when accordingly I adopted the male-fern method of treatment. The first two administrations produced no result, but on doubling the dose of the extract and increasing its action by cathartics and plenty of coffee, the desired effect was accomplished. The parasite measured sixteen feet in length.

This case is particularly instructive, as showing the correctness of the diagnosis, the propriety of delaying to give anthelmintics, and the possibility of the parasites resisting one drachm doses of the ethereal extract of male-fern. Though the head of the entozoon was not found at the time, it probably came away with a subsequent movement of the bowels. If it had returned I should have been informed in view of a repetition of treatment. It is not often, however, that you will find patients occupying a lower sphere of life who will accept with good grace this kind of advice; but our endeavour should be to do the best we can for them, notwithstanding that they are utterly dissatisfied with our opinion. The late Professor Syme, of Edinburgh, once told me of a patient who came to him with the intention of having his leg cut off; and on being informed by that distinguished

surgeon that amputation was quite unnecessary, and that there was nothing seriously the matter with his knee-joint, he resisted the notion of paying any fee for such disappointing advice! Thus it happens sometimes that the very best advice is treated with indifference or even contempt; whereas, if incorrect advice be given, involving either loss of limb or risk of life to the patient, the adverse opinion is accepted with gratitude.

LECTURE X.

Patients are commonly only pleased with Advice which is in entire Harmony with their Preconceived Ideas—Cases XXXIV. and XXXV.—Parsimonious Reluctance of Wealthy People to obtain Medical Advice—Case XXXVI., illustrating the Importance of a Correct Opinion—Different Species of Entozoa are sometimes associated together—Case XXXVII.

GENTLEMEN,—The following is a characteristic instance in which I thought it my duty to resist the wishes of a parent that active treatment should be pursued:—

CASE XXXIV.—H. C., a lad thirteen years of age, called with his father to see me on the 7th of May, 1870. For fully three years he has been troubled with tapeworm. As he was fond of underdone beef, and only rarely partook of pork, it was easy to conjecture the true character of the parasite. He had taken kousso very frequently; its action usually causing the expulsion of short fragments only. However, some three weeks back, he passed as much as twelve feet of the worm at a single sitting; yet he was desirous of being treated afresh. Of course I resisted the pressure in this instance; and

the more so as he was suffering from an attack of chorea, which first appeared during the previous summer. Advising the parent to dismiss from his mind the notion of tapeworm, I strongly insisted that, for the present at least, the administration of vermifuges was entirely contra-indicated. I prescribed tonics, and an immediate change of scene, with temporary cessation from school or other work; but, from what I have already advanced, it will scarcely surprise you to learn that my advice was received with marked tokens of dissatisfaction. To have given powerful anthelmintics would, in my judgment, have been cruel and useless: yet such advice, if tendered, would not only have harmonized with the preconceived opinions of the parent, but would also have secured his entire confidence accordingly.

CASE XXXV.—S. L. J., a captain in her Majesty's Indian army, called upon me in the spring of 1870. He was under the impression that he was still infested by a tapeworm, for which disorder he had been treated some three years previously, whilst he was under the depressing effects of an attack of jungle fever. On questioning him as to the passage of proglottides I arrived at the conclusion that he had already been effectually cured; so far, at least, as the mere expulsion of the parasite was concerned. This view of his case, however, was received by himself with considerable reluctance; and therefore,

in accordance with his wishes, I prescribed an anthelmintic in the form of powders, containing areca-nut and scammony. As I had fully anticipated, and explained as probable, the results were entirely negative; the patient in this particular instance having the good sense to rest satisfied with the evidence thus afforded of his complete freedom from tapeworm.

As I have elsewhere remarked, these suspected instances of tapeworm are by no means uncommon, and it is in this sort of cases that so much mischief accrues from the parsimonious reluctance of even comparatively wealthy persons to obtain a definite opinion. On the other hand, many persons go about with parasites in their interior, gradually losing health without a suspicion as to the real cause of their ailments. Here is another case of supposed tapeworm where a final opinion proved of the utmost service:—

CASE XXXVI.—R. M., a middle-aged gentleman, residing in the northern suburbs of London, sought my advice on the 1st of May, 1871. He had been infested by tapeworm for about a twelvemonth, during which he had been extremely nervous and depressed; whilst from his very agitated manner it was very easy to perceive that the evil effects of the parasitism had not yet disappeared. On closely questioning him, I found that nearly eleven weeks had elapsed since he was last treated for the

malady ; and he admitted that the male-fern treatment then employed was successful to the extent of bringing away from ten to fifteen feet of the worm. However, he quite believed that the animal had grown afresh, and was prepared to take any vermifuge I might order. This kind of treatment I decidedly refused to adopt, exhorting him meanwhile to dismiss from his mind the notion of his still being a parasite bearer. I gave advice as to diet, and ordered a powerful neurotonic. At the expiration of twenty-four days he returned much improved in his general health, and he appeared much gratified when I now tendered him the most positive assurances as to his entire immunity from tapeworm or any other evil being of a similar description.

Of course it is not always safe to say that a patient is free from parasites when the particular entozoon for which he has been treated happens to be absent ; but with very careful questioning you may generally form a correct diagnosis on this point. Occasionally in treating for one kind of worm you encounter another of a totally different description. Thus in Case XVI. I expelled a *Trichocephalus* ; and the whipworm, you know, is comparatively rare in this country. It is so at least in the human subject, but not in our food-producing animals. As regards other parasites liable to occur in association with tape-

worms, it is always worth while ascertaining the presence or absence of threadworm in any case that may present itself for treatment. Here is an instance in which I prescribed for the two kinds of entozoa :—

CASE XXXVII.—B. V. H., about thirty-five years of age, an officer in her Majesty's Indian army, sought my advice on the 13th of May, 1871. He has been infested by tapeworm for a period of ten months. He is quite sure that he contracted the disorder in the Punjaub, where measly beef is unusually prevalent. He has been treated with kousso and male-fern; but with such feeble results that hitherto only a few inches of the worm have come away. Proglottides, nevertheless, are passed daily. His general health is good; but he is sometimes troubled with slight hemicrania, vertigo, and singing noises in the head. At once adopting the male-fern method I expelled a very fine specimen of the beef-tapeworm, measuring fifteen feet in length, including the finest neck-segments close up to the head. Observing a solitary threadworm in the fæces I advised some further treatment in view of ascertaining whether any more were left behind. I administered areca-nut powder and santonin, followed by a brisk saline purgative; but this combination was adopted not alone for the purpose of testing for oxyurides, seeing that the head of the tapeworm might still

have remained attached. Two or three more threadworms having thus been expelled, I further recommended the employment of sulphur and saline mineral waters, the efficiency of which I have found so marked in more serious cases of this description. There, however, appeared to be no more oxyurides.

LECTURE XI.

The Age at which Tapeworm most commonly Occurs—Case XXXVIII.—Tapeworm may Attack very Young Persons—Case XXXIX.—Parasitism may be masked by, or complicated with, various other Diseases—Cases XL. and XLI.—The Cucumerine Tapeworm of the Dog has been found in Man—Necessity for Caution in identifying the Species—Opposed Genital Pores in the Proglottides not Conclusive—Case XLII.—Remarkable Cestode Abnormality.

GENTLEMEN,—In regard to the age at which tapeworm most frequently occurs in the human bearer, my experience has been decidedly in favour, so to speak, of middle-aged persons; or say, rather, between twenty and forty years. This is sufficiently accounted for by the more strongly pronounced meat-eating habits of persons at this period of life, in association with their frequent penchant for underdone flesh. As people get into years, soups, fish, and made up dishes, which are tender and readily masticated, become more and more appreciated; whilst as regards the Indian peninsula, so productive of tapeworm, the older men will have returned home to enjoy the flesh of our native beeves, which at present remain tolerably free from

cestode parasites. How long they may remain so is quite another question. Young children, when they become infested, do not suffer so much from tapeworm as from either oxyurides or lumbrici; but they ought not, on that account, to be allowed to go about year by year as tapeworm bearers. I mention this for reasons quite apart from the possibly injurious effects ultimately accruing to themselves. The following case is one of the kind alluded to:—

CASE XXXVIII.—C. B., from Brighton, is a young gentleman only six years of age; nevertheless, during fully one-half of this short period of his life, reckoning up to the 24th of April 1871, he has enjoyed the unenviable privilege of playing the part of host to a tapeworm. At least, I was so informed by the lady who brought him to receive my opinion. It is true, there were no particular symptoms likely to produce alarm on his behalf; yet there was the customary loss of tone, excessive pallor, feeble pulse, and indifferent appetite. Although there was no chance of my watching the results of any treatment I might propose, I considered it my duty to prescribe an anthelmintic. I ordered areca-nut powders in two drachm doses, to be repeated, with an aperient, every two hours until its action had proved effective. These produced no immediate result, but towards the end of the following month he passed the tapeworm, which I was

told measured four yards in length. He has since had no return of the disorder.

In cases of threadworm and roundworm it is not uncommon to meet with instances of infection in children much younger than C. B., speaking from the time when he was first attacked; and here I may mention that the case in which I originally determined the certainty of the occurrence of *Ascaris mystax* in the human body was that of an infant only thirteen months of age, as you will find recorded in the pages of the *Lancet* for January 10th, 1863. The youngest age at which I have known tapeworm to occur is given in the following instance:—

CASE XXXIX.—M. D., a member of the profession, called on me in the spring of 1871, requesting a second opinion as to the course to be pursued in the case of a female child only eighteen months of age. Afflicted with tapeworm, she had, under his able treatment, passed no less than four yards of the parasite; but as the head was not detected at the time, he had some hesitation as to further prescribing. Guided by previous experiences, I naturally counselled delay; suggesting the employment of areca-nut powders in the event of any return. What happened I do not know; but the interesting point of the case lies in the circumstance that it was known to the parents that the child had first partaken of underdone meat just four months previously; so that it was quite clear

that its earliest efforts as a flesh-feeder, at the age of fourteen months, had unluckily secured for it the privilege of becoming a parasite-bearer. In this respect, therefore, the case is singularly instructive, if not altogether unique.

Once more permit me to insist upon the desirability of exercising great caution, not only in accepting the statements of others concerning the presence of tapeworm, but also in respect of the propriety of at once adopting active measures of treatment. Apart from the actual demonstration of the existence of any parasite, the mere symptoms themselves are very likely to deceive. We should be prepared to encounter all sorts of complications; sometimes looking for indications of previous disorders, parasitic or otherwise, as the case may be, when the patients themselves are all the while attributing their ailments to an ever-present or persistent entozoon. Some of the cases previously advanced will have afforded a sufficient illustration of my meaning, but in this particular relation I will select two others, each of them presenting features more or less worthy of attention:—

CASE XL.—H. M., a young lady, twenty-three years of age, visited me on the 1st of October, 1869, and desired that I would treat her for tapeworm, from the presence of which she believed herself to be suffering. Fortunately, a friend who accompanied her had brought portions of the alleged parasite in

a bottle for my inspection and determination. Therefore, on questioning the patient and on examining the supposed parasitic *débris*, I had no difficulty in at once deciding that this patient was not infested by any tapeworm. However, she succeeded in satisfying me that she had really suffered from oxyurides a few years previously ; and I was inclined to look upon some of her present symptoms as a permanent result of the attack by her former enemies. At all events, she was now suffering from acute hysteria, coupled with delusions. There were distinct indications of "globus," combined with voracity, and a tendency to bolt her food. To add to these vexatious symptoms, it was rendered quite manifest that she had been very much neglected ; and it was therefore not surprising that I also found evidence of serious constitutional disturbance, in association with distressing anæmia, leucorrhœa, occasional diarrhœa, abdominal distention, a feeling of soreness over the region of the stomach, and other painful complications. I prescribed a mixture containing assafœtida and carbonate of ammonia ; at the same time suggesting certain rules as to diet and occupation. Obviously, however, it was a case where treatment could be of little avail in the absence of personal kindness and consideration on the part of those upon whom such duties naturally devolved.

CASE XLI.—A. A., a gentleman residing in Liver-

pool, requested advice on the 19th of October 1870. He had been the victim of tapeworm for the last four years. His nervous system had been much injured, rendering the movements of his limbs irregular and uncertain. He was still subject to twitchings, accompanied with tingling sensations at the tips of the fingers; and he not unfrequently cut himself whilst in the act of shaving. Under the care of several medical advisers he had, at different times, taken male-fern, kousso, turpentine, pumpkin-seeds, and other remedies; and only some three weeks previous to the date of his present visit he had passed a tapeworm, estimated to have been five yards in length. Under these circumstances I prescribed a tonic, but counselled caution and delay as to the employment of any more vermifuges, deeming it highly probable that there would be no return of the parasite.

I have an especial pleasure in recording this case because (apart from any actual examination of the entozoon) the facts that were at the time brought under my notice afforded evidence of the clearest possible description that this patient had, during the invasion of an ordinary species of tapeworm, been infested by the so-called cucumerine tapeworm. The explicit statements of one of this gentleman's professional attendants as to the characters presented by certain small tapeworms which after treatment were passed, along with portions of

the ordinary species, seemed quite conclusive. The alleged extremely delicate character of the proglottides, ascertained to have been furnished with bilaterally disposed sexual orifices, two to each segment, could only have referred to this species of cestode, and in this case therefore I thought I saw a fresh confirmation of the statements originally and independently advanced by Leuckart and Eschricht, that the cucumerine tapeworm (whether you call it *Tænia canina*, *T. elliptica*, or *T. cucumerina*, it perhaps matters little) is occasionally liable to infest the human body.

That the statements of others in respect of the specific characters presented by particular forms of human *Tænia* cannot always be relied on I have already shown, and in this connexion few seem to bear in mind the very remarkable malformations which occur amongst the tapeworms. In this purely professional course I cannot go fully into the matter, but I may mention that only very recently I had a case of *Tænia solium* where several of the proglottides had two sexual papillæ arranged precisely as in the cucumerine tapeworm. The odd thing is, moreover, that this patient also came from Liverpool, a circumstance which naturally seems to weaken the verbal evidence produced in the previous instance as to the occurrence of *Tænia elliptica* in the human subject. The facts are as follow :—

CASE XLII.—A. H., a respectable married person,

under middle age, has had tapeworm for fully two years. She admits that she at one time had a sort of mania for underdone meat, especially pork, which she frequently ate in the perfectly raw state. She experiences obscure pains about the abdomen, has irritation at the nasal passages, and elsewhere, and is frequently disturbed at night. Her ordinary medical attendant appears to have treated her most judiciously, and his success has been so marked that on one occasion it was estimated that the remedies brought away no less than seventy feet of tapeworm in fragments. These portions were referred to two or more individuals. She was last treated about two months since, on which occasion twenty-four more feet of tapeworm came away, all being referred to a single worm, as it included the finest neck segments close up to the head. The drugs employed were kamala and male-fern. When she brought me six loose proglottides in a phial I observed that two of the segments presented the abnormal characters above mentioned, but in other respects the joints corresponded with those of the pork-tapeworm. Under my advice she first took a drachm and a half of male-fern extract in two successive doses without effect. She then took powders containing half-an-ounce of areca-nut with a drachm of the fern-root, which dislodged more than eighteen feet of tapeworm, and this was followed up by a combination of these two drugs

with two drachms of kamala, which she stated had expelled the rest of the worm. Unfortunately, I was deprived of the opportunity of searching for the head, but the final portion removed and retained for my examination measured upwards of five feet. This specimen of *Tænia solium* therefore measured fully twenty-four feet in length, and it displayed a great number of malformed joints, not only of the kind already described, but also of the type more commonly seen in specimens of the beef-tapeworm.

These cestode abnormalities exhibit every conceivable variation of character, but as I said before, I have no time to dwell upon them. I will only, therefore, further mention that by far the most remarkable form of tapeworm proglottid which I have ever seen is one preserved in the Royal College of Surgeons' Museum. It is a Hunterian specimen, marked No. 120 in the revised Catalogue of the Entozoological Series. This strange segment displays no less than twenty-two separate sexual orifices; or, in other words, we have, as it were, twenty-two segments rolled into one.

LECTURE XII.

Prevalence of the Seatworm Disease—The Children's Pest—Wide distribution of *Oxyuris vermicularis*—The Eggs and their contained Embryos—Development of the Larvæ—Opinions of Vix, Leuckart, Zenker, and Heller—Head-quarters of the Adult Worm—Symptoms produced in the Human Bearer.

GENTLEMEN,—The particular parasitic disorder, or helminthiasis, to which I now propose to call your attention, constitutes one of the most prevalent and obnoxious maladies with which we have to deal. Five out of every six persons who come to you stating that they are troubled with worms, wish you to understand that they are infested with *Ascarides* or, more properly, *Oxyurides*. Some persons innocently suppose that there are but two kinds of human entozoa, namely, threadworms and tapeworms; and they are not a little surprised when you inform them that all mankind are liable to be invaded by one or other of at least a score of distinct specific forms of helminth. As a rule, however, it is better to withhold this sort of information, for in the case of nervous and apprehensive persons your communicativeness might induce serious mischief.

The human threadworms, properly so called, refer exclusively to the species termed *Oxyuris vermicularis*, which may emphatically be called the children's pest. Although its presence within the human body is seldom attended with fatal results, there is no entozoon more universally distributed amongst the younger members of our race. At the same time it is an entire mistake to suppose that it confines its attacks to young persons, since we are liable to play the part of host at any age. Some persons, indeed, are all their lifetime subject to this disagreeable form of helminthiasis.

As I have stated in the second edition of my smaller treatise (now out of print), the existence of oxyuris, as happens also with some other entozoa, is not limited to either hemisphere, though it appears to be rather more abundant in warm than in cold climates. In this country it is not so frequent as on the Continent; nevertheless, with such data as have been placed before you thus far, I have been led to hazard the statement, that probably about one-tenth of our island population are actually infested by this minute worm. Be the truth of that conjecture proven or disproven, as the case may be, by subsequent investigations, it is more consolatory to be able to affirm that of those who are thus called upon to play the part of host only a very small proportion really suffer serious inconvenience.

The general appearance of the *Oxyuris vermi-*

cularis is so well known to most of you that I need not minutely describe it; moreover a detailed account of the anatomical peculiarities of this parasite will be found in my larger work on Entozoa, with explanatory figures. If an ordinary full-grown female worm be submitted to microscopic examination, even the employment of the one-inch achromatic objective glass will reveal the presence of a multitude of eggs internally. Under higher powers, say the quarter inch, the contents of the eggs will be found to display every variety of character, according to the positions which they severally occupy within the uterine tubes of the maternal body. As Claperède and myself long ago pointed out, and quite independently, the most advanced eggs do not exhibit vermiform or filiform embryos in their interior (as Kuchenmeister erroneously figured and described them), but thick bodied, tadpole-shaped larvæ. After extrusion from the body of the parent, however, they soon assume the vermiform character, that is, when they are placed under conditions suitable to their further development.

The researches of Vix and Leuckart have shown that "one needs only to expose the eggs to the action of the sun's rays in a moistened paper envelope, when at the expiration of some five or six hours the tadpole-shaped embryos will have already become slender elongated worms. At this stage they are not altogether unlike the sexually mature oxyurides in

shape, exhibiting rather lively movements under the application of warmth." The best way to rear the vermiform stage of oxyuris is to put a number of the eggs in a glass tube filled up with saliva. The tube should then be placed in the arm-pit, in which situation it can be carried about with little inconvenience. In a very short space of time the transformations will commence, and go on continuously until the vermiform condition is attained.

If it be asked whether the embryos, whilst still within escaped eggs which have found their way into the human bowel, are capable of arriving at this vermiform stage of maturity, the answer is decidedly in the affirmative; for, as Leuckart has also remarked, "the elongated embryos are to be found not only in the fæces, but also in the mucus of the rectum above and around the anus." I believe it was further stated by Vix that the mature or vermiform embryos were occasionally to be detected in the intestine of the human bearer along with the eggs; but if he meant that they were thus hatched in the cæcum, colon, or rectum, all the evidence obtained by later investigations goes to disprove his interpretation of known and recognised facts. According to Leuckart the escape of the embryos from the eggs "ordinarily takes place under the action of the gastric juice, also primarily in that condition when they have by some means or other gained access to a new bearer."

If this view does not convey the whole truth, it is at all events correct as far as it goes, and constitutes an important advance in our knowledge of the development of this worm. Moreover it has received in the main substantial confirmation from the still more recent and elaborate researches of Professors Zenker and Heller. To the last named observer, whose acquaintance some of you made when he was over in this country last summer, I am indebted for the hint already named, as to the best modes of artificially rearing oxyurides, and I have also to acknowledge other useful contributions at his hands. From the united labours of these two *savans* it is now quite certain that the entire developmental phases of oxyuris are accomplished within the intestinal canal of the human bearer; and for this end it is not necessary that the eggs should find a new, or rather a second human bearer. In other words, the person already suffering from *Oxyurides* may increase the numbers of his enemies to any extent by accidentally conveying the eggs or worms lodged in the region of his anus into his mouth. This he may do during sleep quite unconsciously; so that it is not fair to charge persons who are the victims of this disorder with uncleanness. On the other hand, it occasionally happens that due care in this respect has not been exercised, and from such persons you may remove the eggs of oxyurides from the margins of the finger nails.

Whenever, or by whatever mode the eggs are conveyed to the mouth, their subsequent passage to the stomach insures their being hatched, and the little vermiform embryos are soon transferred to the duodenum and other divisions of the small intestine. In this situation the embryos undergo still more remarkable transformations, casting their skins, and growing with great rapidity; being at length conveyed to the cæcum, which constitutes, so to speak, their head-quarters. It is quite an error to suppose the lower bowel or rectum forms their especial habitat; nevertheless you will find statements of this kind in the most approved manuals, vade-mecums, general treatises, and specially contributed articles.

As regards the organization of the adult worm, I must refer you again to my larger treatise, and more especially also to the admirable monographs by Professor Bastian, and to a paper by my colleague Mr. Lowne.

The symptoms produced by the presence of *Oxyurides* in the cæcum and large intestine, though seldom or never fatal to the bearer, are occasionally very serious; whilst in the mildest cases they have a tendency to undermine the general health. As I have observed elsewhere, the unpleasant sensations chiefly develop themselves in the evening and at night, consisting for the most part of sensations of heat and irritation within and around

the margin of the anus. These symptoms in bad cases become distressing and almost intolerable, especially when the itching extends to the genito-urinary passages, in consequence of the escape and migration of the parasites about these parts. By-and-by the local inflammatory action thus superinduced sets up various sympathetic phenomena, such as restlessness, general nervousness, itchings at the nose, involuntary twitchings, grinding of the teeth during sleep, chorea, convulsions, and epileptiform seizures. At the age of puberty special local disorders arise, the nature of which will be readily understood when merely spoken of as the morbid phenomena of sexual irritation. In the female the occurrence of pruritus and leucorrhœa is not uncommon, accompanied or not, as the case may be, with hysteria in various forms. In the ordinary run of cases you merely encounter general asthenia, with more or less emaciation. The anæmia is sometimes remarkable; but in place of anorexia, which is however an occasional concomitant, you frequently find a most voracious appetite, especially in the younger patients. Sometimes one meets with all sorts of obscure symptoms simulating those of local organic disease.

LECTURE XIII.

Cases XLIII. to LII., illustrating the more ordinary Methods of Treatment—Employment of Santonin, Podophyllin, Areca-Nut, Chenopodium, Buckthorn, Salines, Jalapin, Scammony, and other Cathartics—Simple and Medicated Enemata, with Lime-water, Steel, Sulphuric Ether, Quassia, and Tansy.

GENTLEMEN,—Without further discussing, in general terms, the more prevalent symptoms noticeable in the seat-worm disorder, I proceed to offer a few illustrative cases. These examples will suffice to show the sort of treatment I have hitherto usually recommended under ordinary circumstances. In reference, however, to the question as to the possibility of permanently curing the disease I shall address you at greater length presently.

CASE XLIII.—C. W. W., a gentleman residing at Scarborough, consulted me in June, 1869, and again in July, 1870. For some years past he had been “annoyed by ascarides,” though he could not be said to have suffered from them. As there were no marked symptoms I prescribed santonin in combination with podophyllin and jalapin in small, perhaps in unnecessarily small, doses. These powders, in association with the employment of cold water

enemata, had the effect of affording temporary relief; but they were afterwards abandoned in favour of compound scammony powders, followed by active saline draughts and the administration of medicated injections.

CASE XLIV.—S. G. J., a gentleman past the middle age, living in Gloucestershire, has been infested by threadworms for a period of sixteen years, their presence rendering him irritable and nervous. He first consulted me in the autumn of 1866; and when I saw him again in the following December, he admitted that he had derived relief from the treatment recommended. In the first instance, I had here also employed santonin in combination with senna, and the use of copious enemata. This treatment was subsequently modified, with decidedly better effect, by ordering santonin and podophyllin supplemented by injections containing sulphuric ether. In the following spring, when I saw him for the last time, the improvement observed was such that I merely advised a renewal of the enemata whenever occasion required.

CASE XLV.—G. R., a gentleman about sixty years of age, also from Gloucestershire, first saw me in April, 1866. He has been troubled with these obnoxious parasites all his lifetime hitherto. Their presence had not only rendered him highly nervous, but he suffered from depression of spirits, accompanied with great debility and considerable

emaciation. In accordance with my advice, he persevered in the employment of copious enemata, preceded by the use of powders containing santonin. Unfortunately, active purgatives could not be borne, although when I last saw him in December, 1870, I so far prevailed upon him as to induce him to take powders containing a few grains of scammony. Simple cold water enemata, however, became the most acceptable mode of treatment, affording only a very temporary and partial relief.

CASE XLVI.—S. A. W., a magistrate from Sussex, about fifty-five years of age, has also been annoyed all his lifetime by ascarides. He suffers chiefly from depression of spirits, being at times almost hypochondriacal. He has tried various remedies without success. When I first saw him, which was in April, 1866, I recommended electuaries of santonin and cold water enemata. With some slight changes, this simple method of treatment was continued for a month. Large numbers of parasites were brought away, and on the 16th of the following May I received a note stating that up to that time there had been "no return of the inconvenience." The good effects, indeed, lasted until the middle of June, during which month there was a recurrence of the irritation, "though to no great extent." The temporary relief thus afforded appeared to give satisfaction, the patient being contented to renew the remedies whenever they might become necessary.

CASE XLVII.—C. F., a gentleman from Gloucestershire, placed himself under my advice on the 19th May, 1866. Though scarcely thirty years of age, he had become extremely weak, and he was subject to severe fainting fits, sufficient to produce serious alarm. These symptoms were attributed to ascarides. Here, again, I was induced to employ santonin; relying, however, chiefly upon lime-water enemata, which also contained steel. On the 4th of the following June I learnt by letter that the treatment had caused a diminution in the amount of irritation; nevertheless, some ten days subsequently I was likewise informed that there had been a recurrence of one of the severe fainting fits. Acting, very properly, under the advice of his usual medical attendant, the santonin powders were discontinued; and in this instance it was believed that the drug had acted prejudicially. Occasionally, though very rarely, I have seen untoward symptoms arise in other patients from its use.

CASE XLVIII.—F. F., a gentleman from Stratford-on-Avon, about seventy years of age, has been a great sufferer from threadworms for many years past. He has been treated by various physicians with more or less success, and has found more good from taking copious draughts of salt and water than from anything else. I first saw him in November, 1866, and have had opportunities of watching the case from time to time ever since. At first I recommended

santonin powders and cold water enemata ; but the inefficiency of these remedies soon caused me to substitute powders of areca nut and chenopodium, followed by active saline mixtures. So far as the parasites were concerned this treatment seemed to promise more success ; but the necessity of discontinuing all vigorous treatment of this sort was afterwards rendered imperative by the setting in of serious paralytic symptoms, attended with aphasia and extreme depression. Under additional professional advice, he resorted to the south of France. This was in the month of January, 1870. Whilst there, for a period of three months or so, he experienced a decided improvement in health, but it could scarcely be said that this was due to the change of residence, since the climate proved too relaxing. Under my advice he had continued the areca-nut and chenopodium powders, gaining further aid from the use of simple enemata, and more particularly also from a strict adherence to rules as to wine and diet. The saline draughts could not be borne at any time ; and the employment of all other active purgatives was equally contra-indicated.

CASE XLIX.—M. G., a gentleman of middle age, residing in the suburbs of London, consulted me in May, 1867. The symptoms in this case were less marked than usual. The employment of santonin and podophyllin electuaries, with other injections, had but little effect ; but the subsequent ad-

ministration of santonin in combination with a saline purgative brought away considerable numbers of oxyurides. At a later period I prescribed aloes, followed by quassia enemata, further advising only a continuance of these remedies as occasion might seem to require. It was not a case requiring very active treatment.

CASE L.—C. W. A., about thirty years of age, a gentleman of independent means, has for years past been a perfect martyr to threadworm. His appearance indicated suffering of no ordinary kind, for he was reduced to a mere skeleton. Every kind of treatment has been recommended by his medical advisers, and hitherto with only a very partial relief. At first I employed santonin and podophyllin, with lime-water enemata containing steel; but as this form of injection could not be retained sufficiently long to be of service, I afterwards recommended a twelve-ounce enema containing three drachms of sulphuric ether and a few drops of the oil of rue. This treatment commenced in January, 1867, and it had the effect of driving out a large number of parasites, which were mostly dead. At the expiration of two months the threadworms ceased to appear, and the relief was, of course, well marked. The cure, however, was only very temporary; for in the course of another month or six weeks the attacks recommenced. I then recommended the frequent use of injections con-

sisting of equal parts of the infusions of tansy and quassia, some sulphuric ether being still added. Excellent temporary results once more followed, to be again and again experienced on subsequent renewals of this treatment, which, as the patient himself admitted, had done him more good than any of the other measures he had been previously advised to adopt.

CASE LI.—M. R., a married middle-aged lady, consulted me for threadworms on the 20th March, 1868. Her symptoms presented nothing remarkable; but the inconvenience thus occasioned almost amounted to distress. I prescribed rhubarb, jalap, and santonin, with the exhibition of enemata containing steel. I also recommended the local use of mercurial ointment, to prevent the nocturnal migration of the parasites in the neighbourhood of the fundament. At the expiration of a week I discontinued the powders, substituting electuaries of jalap and podophyllin, followed by a cathartic mixture. Considerable advantage following this mode of treatment, I finally advised its repetition as often as occasion might require. The patient being rather strengthless and anæmic, I likewise prescribed a tonic containing the ammonio-citrate of iron.

CASE LII.—R. T., a middle-aged clergyman, consulted me in September, 1869. He has had tapeworm, and was successfully treated by the malefern method, after the previous frequent and inef-

fectual employment of koussou and turpentine. He is now suffering from oxyurides exclusively; the excessive local irritation being productive of irritability, depression of spirits, vertigo, and occasional pains in the region of the pylorus. In the first instance I prescribed santonin and oil of chenopodium, along with the syrup of buckthorn. This medicine operated vigorously, but only afforded trifling relief. This feeble result was scarcely to be wondered at, seeing that under other medical advice he had previously tried all sorts of powerful drugs, such as scammony and jalap, along with enemata of lime water containing steel. I also subsequently prescribed powders containing santonin and scammony, supplemented by saline draughts. This mode of treatment proved somewhat more efficient.

LECTURE XIV.

The Parasitism of Threadworms is occasionally complicated by other Diseases—Cases LIII. and LIV.—Oxyurides in Children are frequently overlooked—Cases LV. to LIX.—Insufficiency of the Ordinary Remedies—Liability of the Disorder to Return after apparently effective Treatment.

GENTLEMEN,—The foregoing instances very fairly illustrate the ordinary run of cases which come under my care ; but ever and anon I meet with patients whose sufferings are far greater, and whose helminthiasis, so to say, is complicated by other disorders. In such instances it is rather puzzling to know what course to adopt, because the remedies which are suitable for the worms may aggravate the disorder of which the parasites were not the primary cause. Or again, the symptoms of irritation from the worms alone may be so serious that all active remedies are resisted by the sufferer. The next two cases will perhaps sufficiently illustrate these points.

CASE LIII.—W. L. B., a young lady residing at the West-end of the metropolis, solicited my opinion in the spring of 1867. She had been

troubled with threadworms from childhood, and had undergone all sorts of treatment without any manifest advantage. She appeared to be as it were "eaten up with worms," and in addition to the ordinary symptoms superinduced by these creatures they had brought on severe chlorotic symptoms, anæmia, asthenia, and utter prostration, accompanied with complete deafness. In fact, I found her in an apparently moribund condition. Naturally it was difficult to say what was the best treatment to advise, as the system required every kind of support, while at the same time the parasites were the true cause of her ruined health. At some risk I ordered a brisk purgative containing spigelia, but the action was too powerful to allow of her taking a second dose. I subsequently encouraged the use of enemata; but the patient's previous experiences seemed only to induce despair as to any good results being obtainable from this source. The case is instructive, as showing the necessity of treatment before the time arrives when active anthelmintics can no longer be borne.

CASE LIV.—H. H. T., a surveyor, of middle age, requested advice on the 12th July, 1869. With a foul tongue, depressed look, and remarkable dullness about the eye, there was continual trembling of the upper limbs, especially of the right limb, attended with general restlessness, hemicrania, and anxiety. He could not even hold a pen to write.

These symptoms had existed for five years, but they were not in the first instance attributed to the presence of oxyurides. The parasites, indeed, were not observed until a year later, and when first seen were only noticed in very small numbers. Some of his symptoms led me to suspect the existence of Bright's disease; but on submitting the urine to the ordinary tests I could discover no trace of albumen. Anxious therefore to ascertain the extent of the parasitism, I prescribed santonin in combination with an active saline purgative. This medicine operated very efficiently, but only expelled two examples of the threadworm. Having satisfied both the patient's mind and my own that no serious mischief was arising from this source, I prescribed a vegetable tonic, and countenanced a proposal that he should quit business for a time and repair to the sea-side. This step proved of the utmost benefit, and when I saw him again in the following September he had a good appetite, a clean tongue, a bright look, a soft and regular pulse, with an almost total disappearance of the trembling of the upper right limb. Such good results thus far encouraged me to recommend a trial of the bromide of potassium; yet I am free to state that its employment did more harm than good. At all events, the asthenic and dyspeptic symptoms returned, with some other features of the old disorder. Of course I counselled a repetition of the previous treatment,

which had proved so successful ; but I have not since learned what results followed. I think it quite possible that if in place of the bromide I had prescribed the ferro-cyanide of potassium a further improvement in the nervous system would have continued to show itself.

In regard to the prevalence of ascarides amongst children, it is well known that they are extremely common, and that their presence is frequently overlooked ; but there is this to be said also, that when detected they are as a rule less difficult to get rid of than obtains in the case of adults. The reason of this is no doubt partly owing to the circumstance that the bowels are much more readily cleared by simple purgatives. The folds of the intestines are less numerous, and present fewer opportunities for the parasites to avoid the action of the remedies. In very bad cases, however, the most active purgation is of little avail, save as affording temporary relief. Undoubtedly saline draughts and copious enemata frequently constitute the most simple and effective treatment. I have tried various other remedies with more or less success. Here are a few cases selected more on account of the symptoms and other peculiarities than as illustrating the comparative merits of particular remedies.

CASE LV.—P. B., a respectable lad, ten years of age, sought my advice in the spring of 1870.

From his mother's account the boy's sufferings were extreme, the irritation causing irritability and distress during the day and convulsive twitchings at night. He was pale and emaciated. Anxious to try a remedy much extolled in India, I at first gave small doses of the powdered seeds of *Butea frondosa*, with scammony and ginger. Though the medicine operated efficiently no parasites came away until the employment of the third dose, the action of which had been increased by a spoonful of Epsom salts. Only a score or so of the oxyurides having been thus dislodged, I subsequently advised the employment of calomel and compound scammony powder; but I had no opportunity of further watching the case.

CASES LVI. AND LVII.—H. A. W. and P. W., young gentlemen of seven and ten years of age respectively, and brothers, visited me on the 25th October, 1870. In each case there was anæmia, loss of flesh and tone, with nasal and anal irritation. The younger boy had a remarkably weak pulse, with a constant watery suffusion of the eyes. They had been treated with turpentine, which produced violent dysuria and other unpleasant symptoms. For the one I prescribed scammony and salt, and for the other scammony, calomel, and santonin. These remedies were followed by the employment of cold water enemata

and tonics. In both cases the treatment proved decidedly beneficial.

CASE LVIII.—C. M., a young gentleman nine years of age, residing in the suburbs of London, was brought to me on the 24th April, 1868. Here also, in addition to the extreme pallor and some emaciation, there was the usual restlessness, with disturbed sleep and convulsive startings at night. He had been treated with ordinary purgatives and saline injections. These remedies had evidently done good service; nevertheless the attacks recurred from time to time, and he continued to pass threadworms “by hundreds and thousands.” Under my instructions the administration of jalap and santolin powders, followed by a senna mixture, and the use of ether enemata, had the effect of once more restoring him to a state of comparative comfort—at least such was the case when I last saw him, at the expiration of a month only after his first visit.

CASE LIX.—R. T., a young gentleman, fifteen years of age, consulted me on the 8th April, 1868. The irritation arising from the presence of worms was excessive, producing nervousness, headache, gnawing pains across the abdomen, and a continual craving for food. In this instance I prescribed an active powder, containing jalap, santolin, and rhubarb, followed by an aperient of senna, and

the employment of an injection containing ether and quassia. The effect was described as magical, the medicines causing the evacuation of "enormous quantities" of parasites. Subsequent doses (with some slight alteration of the prescriptions) only brought away a very few more worms, for the simple reason that only a very small number had been left behind to operate on. The temporary cure in this instance left little more to be desired in the way of treatment, and at the expiration of a month, when I last saw him, the good results were fully maintained.

Without needlessly multiplying cases like the foregoing, I may observe that their record suffices to illustrate the usual measure of success which attends the more ordinary methods of treating them. As you may have noticed, the results are not entirely satisfactory, for the disorder is capricious, and constantly liable to return, even after your success appears to be complete. Now and then, however, one meets with a case where the cure remains permanent, and I can remember one patient, a nonconformist minister, who obtained this result simply by the use of aperients and enemata containing two or three drachms of sulphuric ether. Though, in deference to the statements of practitioners abroad, I have often employed santonin, podophyllin, and chenopodium, the latter both in oil and powder, I am bound to say that any good

results following their use generally appeared to me to be principally attributable to the aperients employed to increase their action. The seeds of *Butea frondosa*, and several other drugs rarely prescribed in this country, have also disappointed my expectations.

Those who desire to try any more new drugs, with the view of introducing them into British practice, should previously consult Dr. E. J. Waring's *brochure*, entitled "Notes on some of the principal Indigenous Anthelmintics of India."

LECTURE XV.

Salines with Enemata constitute the most effective Treatment—
Saline Mineral Waters especially recommended—Some Patients
cannot bear vigorous Treatment of any kind—Cases LX. to
LXV.—Personal Cleanliness is the best Preventive against
Infection.

GENTLEMEN,—If it be asked what remedies I have found most beneficial I do not hesitate to say that the exhibition of salines generally, and especially of natural mineral waters, aided by the use of injection, has afforded me the most satisfactory results. Of course a judicious choice of these waters is necessary; but those which contain the largest proportions of chloride of sodium and sulphate of magnesia, in combination with iodides and bromides, are most worthy of trial. In this view I am in the habit of recommending, more particularly, the waters of Friedrichshall and Pullna; but the Carlsbad, Homburg, and Kissingen waters are perhaps nearly as efficient. Upon further trial it would not surprise me if the Woodhall Spa of Lincolnshire should prove itself superior to any of the foreign waters; but as this water requires to be aided by purgative drugs, I have chiefly relied upon the

sufficiently saline water of Friedrichshall, which perhaps has an advantage over the Pullna in its strong degree of bitterness. Of course there are cases in which the use of these waters is contra-indicated; as, for example, in patients who object to large potations of any kind. In such cases the prepared salts may be prescribed with advantage; this being a method of treatment frequently adopted on the Continent. In the few following cases, as in all the foregoing, I have alike recorded perfectly and imperfectly successful cases; for I have little sympathy with those who think that medical science is advanced only by recording remarkable or wonderful cures.

CASE LX.—D. A., a member of the profession, under middle age, visited me in December, 1868. He informed me that the active duties of a large practice were rendered doubly arduous by the irritation arising from the presence of large numbers of threadworms; and he has been afflicted in this way, more or less, from boyhood. At first I suggested the employment of jalapin, podophyllin, and santonin, leaving the question of the frequent use of enemata to his own experienced judgment. However, little or no good following this and other comparatively lenient modes of treatment, I lately urged the employment of sulphur and charcoal powders, followed by draughts of the bitter and saline Friedrichshall waters. Unfortunately neither

the one nor the other of these remedies could be borne, the water being described "as so bitter and salt that the stomach would not retain it." Discarding therefore these active remedies, he has been obliged to content himself with a milder form of treatment, and has since found considerable benefit by taking "every morning, early, a tumblerful of strong infusion of gentian on an empty stomach." Should this measure of good not be maintained, it is proposed to return to the mineral water treatment in a modified form.

CASE LXI.—B. R., a retired lieutenant-colonel, sought my advice on the 13th January, 1871. His age is about seventy, and he has suffered from these threadworm pests ever since he attained his majority. He has been treated with aloes, sulphur, and other drugs, aided by quassia and saline injections. He had likewise been induced to try the homœopathic method; the results being, as you would naturally suppose, eminently unsatisfactory. In this case I advised a continuance of the enemata, substituting steel instead of salt; but I relied more especially upon the use of powders of scammony, santonin, and sulphur, washed down by copious draughts of Friedrichshall water. Unfortunately this patient could only bear a trifling amount of purgation; nevertheless, the treatment proved decidedly beneficial.

CASE LXII.—N. H. J., a clergyman, from

Norfolk, about fifty years of age, has been a great sufferer from oxyurides. The irritation thus occasioned has sometimes been so extreme that his public duties have been carried on with great difficulty. He had been recommended to take steel, but found its employment detrimental to his general health; on the other hand, he has derived great advantage from the use of the natural waters of Homburg, and during his occasional visits at the spa he appears to have been perfectly free from any parasitic annoyances. The entozoa have, however, invariably reappeared shortly after his return to England. Partly in imitation of the mineral water treatment I advised the taking of saline aperients, followed by the frequent employment of enemata of strong infusions of quassia and tansy. This treatment had the effect of bringing away great numbers of parasites; but he never feels himself to be entirely free of his enemies except when actually residing at Homburg.

CASE LXIII.—M. H., a young lady twenty years of age, residing in the northern suburbs of London, is subject to repeated attacks of threadworm. They have tormented her for some six years past, during which time she has been constantly dyspeptic; being also subject to frequent bleedings at the mouth in the early morning. Most of her symptoms, however, were those of chlorosis. The marked anæmia and puffy state of the skin, together with

significant indications of impairment of the circulation and uterine organs, seemed to me to be fully accounted for on this assumption; and the more so since I did not learn that the oxyurides were at any time particularly numerous. In the first instance I ordered sulphur and charcoal powders, along with moderate draughts of the Friedrichshall mineral waters. The results being negative as regards the parasites, I next advised a temporary discontinuance of the anthelmintic remedies, substituting a powerful tonic containing steel, quinine, and strychnia. This treatment, materially strengthened by a prolonged stay in the south-west of England, produced excellent results; but as the threadworms returned I was again consulted. Finally I recommended the Pullna waters, as being more powerful than those she had previously taken, but even this treatment failed to dislodge any considerable number of worms. In point of fact, the degree of parasitism in this case was comparatively trifling; but amply sufficient, nevertheless, to aggravate the uterine symptoms, nine-tenths of which were due to one of the commonest of female disorders.

CASE LXIV.—H. S., a young lady, resident in Germany, sought my advice through her parent in the spring of 1871. The symptoms were of the ordinary type, but decidedly severe. I commenced treatment by employing steel injections, with san-

tonin and scammony, in the form of electuary, further accelerated in its action by one-ounce doses of castor-oil. These remedies, employed for three successive days, produced excellent effects; lasting for a fortnight, at the expiration of which period it was found necessary to repeat them. More or less perfect relief again followed, the good effects extending over a period of at least six weeks. At the next return of the parasitic symptoms, which was in the month of July, I prescribed sulphur and charcoal powders, followed by copious draughts of the Saxe-Meiningen mineral waters; this mode of treatment proved most successful. When I last heard from her the freedom "from any annoyance" had become complete; the Friedrichshall waters and other drugs having been found both "agreeable and effective."

CASE LXV.—H. J., a distinguished man of science and letters, of middle age, is subject to occasional attacks of ascarides, which of late years have become more frequent and severe. I first prescribed for this gentleman in the month of December, 1868; recommending podophyllin and santonin powders with cold-water injections. This treatment proving altogether unsatisfactory, I lost sight of the case for a considerable period, but in the following year I had an opportunity of recommending a modification of this treatment. Fresh attacks, however, continuing to recur at intervals, I

tried (in January, 1871) my sulphur and charcoal method, aided by the waters of Friedrichshall. At the expiration of a month this patient called to say that he had already derived much benefit from this mode of treatment; and subsequently, at the expiration of another month, he wrote to tell me that the treatment had been "perfectly successful." I also ascertained at a much later period that these good effects continued, and I believe that they do so to this present hour.

Such are some of my experiences with this troublesome disorder, and I think you will admit that guided by a correct knowledge of the more recent contributions to the natural history of this parasite, we have at length arrived at a better system of counteracting and checking, if not of absolutely curing the disease which it occasions. Personal cleanliness is certainly essential. A recent writer, who is at the same time a very accurate observer in other departments of biology, has ventured to hazard a statement to the effect that "probably any infected person who adopted the requisite precautions against reinfection from himself or others would get well in a few weeks without treatment by drugs." Dr. Ransom bases his belief on the known facts of the life-history of this entozoon, as recorded in his article, which gives a *résumé* of the views of Leuckart. I regret that I cannot fully share Dr. Ransom's

notions on this point; and still less should I think it fair by my silence to appear to endorse his rather nauseating statement to the effect, "that every person who is shown to be infested with those very common entozoa, *Oxyuris vermicularis* and *Trichocephalus dispar*, is thereby demonstrated to have swallowed minute portions of his own or another person's fæces." I respectfully submit that this is putting the case too strongly. No doubt the eggs of oxyurides swallowed by ourselves must have previously passed through some person's rectum; as such, either separately or mayhap collectively, in the body of the maternal parasite. That does not, however, justify Dr. Ransom's unpleasant statement, to the effect that we must "have swallowed" particles of our own or of some other person's excrement. The eggs are not to be regarded as constituent portions of the fæcal matter, but rather as the products of the legitimate inhabitants of the human intestinal territory. Even should you still maintain the old notion, that they are "foreign bodies," that would not entitle them to be called "minute portions" of the fæces. Perhaps Dr. Ransom will say that the surfaces of these eggs, being in contact with fæcal matter, must carry infinitesimal portions of the fæcal matter on their surfaces, and it is to such invisible particles that he refers. As however a large proportion of the ova escape with their parents, whilst they are still

lodged in the maternal body, it would, I hold, require a great stretch of the imagination to believe that these intra-uterine ova also support fæcal matter on the exterior of their shells. I repeat my conviction therefore, that it is not fair to state, without reservation, that every sufferer from this parasite must have "swallowed minute portions of his own or another person's fæces." Eggs are not fæces, neither when swallowed are they necessarily covered or contaminated with fæcal matter.

LECTURE XVI.

The Ascarides properly so-called—Lumbrici not common in England—*Ascaris mystax* still rarer in Man—Eggs of the Roundworm ejected from the Stomach—Ascarides common Abroad—Symptoms similar to those produced by Oxyurides—Singular Habits of *Ascaris lumbricoides*—Often solitary in this Country—Cases LXVI. to LXX.

GENTLEMEN,—I have purposely dwelt thus long on the tapeworms and threadworms because these parasites give rise to diseases respecting which you are sure, sooner or later, to be consulted. If, by way of illustration, I have adduced more cases from my experiences with the tapeworm than with the threadworm class of disorders, it is not because the latter have less frequently come before me in practice, but because the former are more varied in character, and therefore more worthy of study. Some of the rarer kinds of parasitism, indeed, are even more instructive than any of those I have thus far described, but I fear the limits of my available time will not allow me to give to their consideration all the attention they deserve.

In regard to the ascarides, properly so called, I cannot now enter at any length into the question

of their mode of development ; although, had I sufficient time and opportunity at my command, a discussion of this kind might be offered with very great advantage. In my large illustrated work I have devoted some six or more pages to purely practical matters connected with the presence of *Ascaris lumbricoides* in the human subject, but the comparative infrequency of the occurrence of this entozoon in England renders it less incumbent upon me to add to the details I have there given. Then again as regards the *Ascaris mystax*, which I had the good fortune first to recognise as a possible member of the human parasitic fauna, so to speak, only some half dozen cases have been observed and placed on record. In British practice, I repeat, you will rarely meet with cases of *Ascaris lumbricoides*—i.e. of Lumbrici, or Roundworms, as they are more frequently called. When you do meet with them they are not difficult to manage, and it is only very rarely that more than one worm is present. Occasionally, especially in hospital and dispensary practice, you will find several of these parasites occupying the same bearer, and only last year Mr. De Morgan had a patient at the Middlesex Hospital from whom as many as thirty-seven were expelled. As a rule the presence of ascaris in the human subject is not detected before the patient has passed a worm either by the mouth or anus ; but I have known of one or more instances of successful diagnosis

having been made in the absence of the above-mentioned evidence, and I have myself discovered the eggs of *Ascaris lumbricoides* in vomited matters where no suspicion of the presence of lumbrici appears to have been entertained.

Should circumstances carry you abroad you may happen to take up your residence in localities where the lumbricus occurs endemically, and in such situations the presence of a single worm only in the bearer is probably the exception rather than the rule. The Mauritius is such a locality; and in the pages of the *Medical Gazette* for 1834 you will find an able paper by Professor Robert Dyce, of Aberdeen, "on the causes of their prevalence in that island." Without particularizing the various instances on record, I will only add that in extreme cases from one to five hundred and upwards of these large round worms, each from six to twelve inches in length, have been found to infest a single human bearer.

Under ordinary circumstances the symptoms to which lumbrici give rise resemble very closely those produced by oxyurides. As I have elsewhere stated: "In the stomach and intestines they give rise to colic and shooting pains about the abdomen, followed generally by dyspepsia, nasal itching, nausea, vomiting, and even diarrhœa. Sometimes also there is a considerable degree of cerebral disturbance, attended with general restlessness and convulsive

twitchings during sleep." In very severe cases amaurosis, catalepsy, convulsions, erotomania, and death by enteritis, or by perforation of the intestine, have been known to occur. These parasites have a remarkable tendency to grope about the intestinal canal as if seeking a new habitat, and thus they not unfrequently make their way into the various parts of the body, having been found in the gall duct, the cavity of the chest, the parietes of the abdomen, and in various other strange situations. Many instances are on record of their having been in this way caught in a trap, since any foreign solid body, with a suitable hole in it, and lodged in the intestine, is sure to attract their attention. Thus they have been strangled by metallic buttons, by hooks and eyes, by an open topped thimble, and by other foreign bodies accidentally, or even purposely, swallowed by their human bearers.

Though I cannot dwell at greater length upon the symptoms and pathological effects produced by the common ascaris, it is as well that the above facts should be borne in mind. In various obscure cases, where parasites are never dreamt of, you may sometimes by this means discover the true cause of what hitherto appeared to be an altogether mysterious complaint. In cases of bleeding from the lower bowel, or in hæmatemesis and hæmaturia, always be on the look out for the eggs of parasites. On the other hand, be cautious how you accept the notion of

parasitism, for without fully going into the particulars of any given case, you might be led to encourage an erroneous view strenuously urged by the deluded patient. An estimable and amiable member of the profession once consulted me in reference to the presence of peculiar worms of this sort, which he believed to be groping about beneath his skin in every direction, and I have encountered other equally curious experiences, some of which will be brought forward presently. Probably the so-called lumbricus is more frequently suspected to be present when actually absent than any other kind of human parasite, because when once a single worm has come away, the patient or "bearer" is alarmed by its formidable proportions, and is therefore constantly on the look out for more to follow. I have frequently been called upon to advise in such cases, but the favourable prognostications which I have generally held out to the persons concerned have not in all instances given satisfaction. A few examples may be quoted in illustration.

CASE LXVI.—M. S. G., a gentleman under middle age, one of H. B. M.'s Consuls from the East, consulted me in the spring of 1866. About two months previously he had passed a small *Ascaris lumbricoides*, and he attributed the anomalous nervous symptoms from which he was still suffering to the presence of other lumbrici left behind. He assured me that he was free from *Oxyurides*, and, so far as

he knew, he had never been attacked by any other species of helminth. Without really sharing his suspicions as to the presence of more ascarides, I prescribed three successive four-grain doses of santonin, each dissolved in half an ounce of castor oil. In this way I hoped, of course, not only to test for lumbricus, but also in the event of a negative result to satisfy the patient's mind. In this latter respect I believe my anticipations were fully realized.

CASE LXVII.—B. A., a gentleman residing in London, requested my opinion on the 23rd March, 1871. He had nothing particular to complain of beyond slight indigestion; and he had hitherto never entertained any suspicion respecting the presence of lumbrici. However, on the previous day he had passed an *Ascaris lumbricoides* about ten inches in length. Having explained to him the unlikelihood of there being any more entozoa to come away, I ordered a few compound scammony powders combined with santonin, their action being increased by a saline aperient. The result was not communicated.

CASE LXVIII.—C. B., an infant only seven months old, was brought to me by its parents, who could only attribute the child's refusal of food and sickness to the presence of parasites; of the existence of which, however, they admitted they had never had ocular evidence. The father, a medical man, practising in the suburbs of the metropolis,

suspected lumbrici, but I saw no satisfactory grounds for that assumption. To test his views I prescribed single-grain doses of santonin, and a simple tonic containing steel. What further treatment was adopted I do not know; but had the result been otherwise than negative as regards the parasites, I should certainly have been informed.

CASE LXIX.—M. B., a lady residing in London and rather advanced in years, believes herself to be the victim of lumbrici. Six months back she passed a large specimen of this kind of worm; and as she is still subject to painful sensations in the region of the stomach and liver, these symptoms, in her own judgment, can only be attributable to other parasites left behind. At the present time the pain in her right side is more or less persistent, but before the solitary *Ascaris* came away she suffered much more considerably from nervous twitchings, colicky pains, accompanied with occasional attacks of hæmatemesis. Here again, considering the fact of the cessation of all the more marked and characteristic symptoms, I doubted the presence of lumbrici, attributing the alleged symptoms partly to nervousness, and partly to a rather free use of stimulants. Nevertheless, as is my wont in such cases, I tested for lumbrici by the administration of santonin and scammony powders, followed by a saline cathartic. No worms of any kind coming away, I looked more closely into the

possibilities of the case, and found she was really suffering from vesical irritation. On this account I prescribed a buchu mixture, containing bicarbonate of potash. This treatment having been continued with good results for about a month, I finally advised a mineral tonic; insisting however, more particularly, on the better observance of certain common-sense rules as to diet and drink.

The record of these negative cases, if I may so term them, is not without instruction; for apart from the suggestions conveyed as to treatment they set forth the value of a correct diagnosis and prognosis alike. In one or two instances I have certainly been deceived, but not in cases of the above description. Only very recently I treated a case of supposed threadworm disease with the fullest expectation of bringing away several or even many parasites, yet in this instance the nervous and other symptoms must have been due to another cause. Though a little out of place, I think the case ought to be recorded; and you will at once see whether or not I was justified in the course I pursued.

CASE LXX.—T. W. A., a gentleman in business and residing at the East-end of London, visited me on the 18th September, 1871. He has been under the care of a medical gentleman who attributed his symptoms to "worms," and who, in this view, had prescribed male-fern, but without any satisfactory result. Moreover, to suppress any

doubts I might entertain on the subject, the patient brought me a parasite which he had just passed, and this I readily determined to be a characteristic female example of *Oxyuris vermicularis*. This was a sort of evidence scarcely to be resisted; but it was rather weakened by the fact that he had observed no other specimens in the fæces. When, however, I questioned him as to his symptoms, the correctness of the surmise of his usual medical adviser that he had worms seemed to gain strength. For years past he has been getting thinner and thinner, being now anæmic and emaciated. His appetite has been at all times indifferent; he is likewise extremely nervous, and occasionally disturbed at night by unpleasant dreams. His general appearance was that of a man gradually reduced by some persistent cause of internal irritation; and there was nothing else, apparently, to account for the ill health apart from parasitism. Accordingly, I thought it right to put him to a thorough test, and prescribed charcoal and sulphur powders, followed by ℥viij doses of the Friedrichshall mineral waters. In a few days he called to tell me that the aperient action of the water was at first excessive, but it soon gradually decreased in power. It appeared nevertheless to have had a sufficiently fair trial for the particular purpose held in view; yet no more *Oxyurides* were observed. Therefore, discountenancing, provisionally at least, the further use of

anthelmintics, I prescribed a tonic (consisting of perchloride of iron with infusion of calumba), fully expecting that this simple treatment, combined with regulations as to wine, food, and exercise, would eventually prove successful, and that there would be no occasion to repeat the apparently useless vermifuges.

LECTURE XVII.

Value of Santonin in *Ascarides* or *Lumbrici*—Trichiniasis first discovered in the Living Subject by Zenker — Symptoms of the Trichinous Disease—Recent Outbreak in England—Home-fed Swine generally free from this Parasite—Dr. Dickinson's published Cases—His Claims as being the First Person to recognise and treat the Disease in England are said to have been disputed—Further Explanation required.

GENTLEMEN,—Here I must draw to a close what I have to say respecting the commoner forms of nematode entozoa, only adding my assurances as to the value of santonin in the treatment of lumbrici; though, as I have repeatedly stated before, its inefficacy in oxyurides is pretty well proven. As an instance of the almost specific action of santonin in *Ascaris lumbricoides*, I may mention the interesting circumstance that on one occasion a man passing through the laboratory of a pharmaceutical firm in the City picked up a santonin lozenge and swallowed it. During the following night or morning, to the astonishment of his wife, he passed a huge lumbricus, which had thus evidently been expelled by

the action of a single grain of this valuable drug. The medical value of the anecdote is further increased by the fact that the man had never complained of parasitism of any kind, nor was he aware of the medicinal character of the sweetmeat. No doubt the lumbricus might sooner or later have proved itself to be a troublesome guest, so that on the whole the "host" must be congratulated on this apparently providential interference in his favour.

As regards the rarer forms of human nematode parasites, the only other species respecting which it is necessary that I should say a few words is the little *Trichina spiralis*. I have so fully enlarged upon the history, structure, and development of this entozoon elsewhere that I need only add a few particulars. The disease produced by it was first discovered, or rather diagnosed, by Professor Zenker, of Erlangen; but, for the antecedent discoveries recorded in this connexion, and also for a correct knowledge of our later experimental researches, I must refer you to the supplement of my larger treatise on Entozoa. In my smaller book on "Tapeworms and Threadworms" I have given a concise statement of the practical bearings of the subject; but as this volume is now out of print, and as cases have recently occurred in the North of England, I cannot be satisfied with merely referring you to what I have there said. The trichina,

as I have stated, is introduced into the human body by the ingestion of verminiferous meat. "When the parasites are taken in sufficient numbers many unpleasant symptoms show themselves in the infested person. There is, first of all, restlessness, loss of appetite, and more or less prostration. This is succeeded by rheumatoid pains in the limbs, with the frequent accompaniment of considerable swelling. The pain is not situated in the joints, but in the intermediate soft parts. In severe cases the limbs are drawn up and half bent, as in instances of severe and continued cramp. Sometimes the suffering is excruciating, and even unbearable; patients having been known to request the surgeon to put an end to their lives. In the worst forms of the malady death rapidly ensues from diarrhœa and exhaustion.

"When once the parasite has gained admission to our muscles, all hopes of destroying it are at an end; but if a person suspects himself to have eaten diseased or trichinized meat he should lose no time in seeking assistance. Immediate advice, followed by a suitable anthelmintic, might be the means of saving his life, whereas a few days' delay would perhaps prove fatal. Whilst the worms are in the intestinal canal we can get rid of them; but when once the trichinal brood have migrated into the flesh we have no means of expelling

them. In bad cases of capsuled trichina, if the system is properly supported, patients will recover who otherwise would undoubtedly have perished. Various drugs have been administered, but at this stage they have failed to effect any good. I have no faith in the micro-nitrate of potash or other vaunted remedies. They have probably done more harm than good; for it should be borne in mind that any drug sufficiently powerful to poison this entozoon could scarcely fail, when introduced into the human body, to act injuriously upon the bearer. The great point is, in bad cases, to support the system at all hazards. In the early stage of the malady, before the embryos have commenced migrating, all the parasites may be dislodged and serious consequences be prevented. It should be borne in mind, moreover, that the unpleasant symptoms do not show themselves until at least a week has elapsed since the ingestion of the diseased meat; that is to say, at a period corresponding to the birth and development of the migrating progeny."

In England, until very lately, no case of trichiniasis had been recognised in the living human subject. It is true that trichinæ have been observed, after death, in at least thirty separate instances; several of these trichinized subjects having been examined by myself. Into our experimental inquiries on this head I do not propose to enter;

but I may observe that they have led myself and others to the practical conclusion that whereas, on the one hand, persons should avoid eating the imperfectly cooked flesh of mammals of all kinds, they need not, on the other hand, abstain from swallowing the flesh of birds and fish, since the latter may be eaten raw with perfect impunity—at least, in so far as these entozoa are concerned. The introduction of prepared meats from the Continent is a constant source of danger, especially if precautions as to cooking are not taken. At home, our swine are singularly free from this parasite, and the same may be said of the flesh of our other domesticated mammalia. There is thus little likelihood of the disease becoming prevalent amongst us; nevertheless the recent outbreak of trichiniasis in Cumberland should suggest caution.

The circumstances connected with this outbreak I have already made known in the pages of the *British Medical Journal*, and also subsequently in my Cantor Lectures delivered before the Society of Arts, and published in their admirably conducted journal. I do not propose to recapitulate the facts, but I may observe that the three persons attacked had been feeding on the flesh of a sow of their own rearing. The man-servant, who naturally ate most heartily, suffered most, and I made a calculation that he must have played the part of

“host” to some forty millions of these minute parasites. Dr. William Lindow Dickinson, of Workington, who first sent me some of the flesh for determination, has himself published a brief account of the cases in the columns of the *British Medical Journal*. I wish therefore to state, emphatically, my belief that Dr. Dickinson was the first person to observe, recognise, and treat the disorder in the United Kingdom, and that up to the present date (November, 1871) I am not aware that any other English, Scotch, or Irish physician or surgeon has ever encountered any case. If I lay stress upon this statement it is because I have learned from Dr. Dickinson himself that at least one other person has asserted his priority in this relation, and I should like to see the matter cleared up by a reference to any published record proving their prior experiences in the matter. Sir Dominic Corrigan is stated to have told a gentleman in the House of Commons “that he had often met with trichiniasis in his practice in Dublin,” further averring, moreover, that the disease “was quite common in many parts of Ireland.” If Sir D. Corrigan merely wished his friend and others to understand that he has repeatedly encountered the trichina at post-mortem examinations, then there is nothing surprising in his statements; but if, on the other hand, the disease itself has been frequently recognised in the living Irish subject, I can only

express my astonishment that hitherto we have heard little or nothing about it. It may be that our Irish brethren have been too modest to place such valuable experiences on record ; and if that be the case they must not blame us for deliberately refusing, in the present state of our knowledge—or, mayhap, of our ignorance—to accord to them their otherwise legitimate credit of priority.

LECTURE XVIII.

Imaginary or Spurious Instances of Parasitism—Pseudhelminths
sometimes Real—Bots, Maggots, and other Larvæ of Insects—
These Cases often connected with Hysteria—Cases LXXI. to
LXXV.

GENTLEMEN,—Tempting as this subject of trichina is, I cannot longer dwell upon it, nor upon the other forms of nematode parasites which are only rarely encountered in actual practice. In truth, it is, after all, a thorough knowledge of the commoner forms of parasitism which you most require, and it is on that account that I purposely dwell only very briefly on the obscurer forms of helminthiasis. Whilst recording the previous cases I dare say you will have remarked that a large proportion of these alleged sufferers from tapeworm, threadworm, and roundworm were altogether under a delusion. Of these, several had at some time or other been plagued with parasites, and had got rid of their enemies without being aware of it, whilst others were deluded from the beginning. On the other hand, my experiences have shown or confirmed what many of you probably knew well enough before, that not a few people go about with en-

tozoa in their interior without ever so much as dreaming of their presence. Again, as regards a whole group of other creatures, which I have elsewhere called pseudhelminths, you must be prepared for all sorts of odd statements and persistent assurances. In some cases the pseudhelminths are veritable creatures, such as bots, maggots, and all sorts of insect larvæ; whilst in others the morbid imagination alone has had to do with the patient's distress. Some of these forms of affliction are amongst the most troublesome and vexatious maladies with which any physician can have to deal; nevertheless, in one or two instances the happiest results have attended the mere delivery of an honest opinion. The record of one or two of these unrealities will probably excite your astonishment—at least, they are likely to appear strange to those of you who have not already paid attention to the phenomena of hysteria and other allied nervous affections. If the following cases cannot be said to be entirely unique, they are not on that account the less devoid of instruction:—

CASE LXXI.—R. E., an elderly lady, resident in London, sought my advice in November, 1866. Mentally troubled by some misfortune, she had taken up the notion that she was harbouring a truly formidable parasite, the creature in question giving rise to all sorts of strange feelings, especially

in the region of the throat. At times she was even tempted to think that this mysterious entozoon might turn out to be that undesirable helminth called in biblical phraseology "the worm that dieth not." Having assured her that the awful parasite to which she referred was quite unknown to helminthologists, I nevertheless encouraged her to think that we should dislodge any other species of worm which might happen to be present. Accordingly, I prescribed an aperient, containing at the same time three grains of santonin to each dose. As luck would have it, the medicine produced considerable nausea and sickness, resulting in the passage by the mouth of a number of fine filaments more or less resembling minute worms. These threads were carefully collected and brought to me in an envelope, and on my submitting them to microscopic examination they turned out to be portions of variously coloured wool. Having explained to my patient that the presence of these foreign substances, when lodged in the neighbourhood of the fauces would sufficiently account for the tickling and other disagreeable sensations she complained of; and having also further assured her that there were no other parasites capable of producing her particular symptoms, she expressed herself as being entirely satisfied, her manner at the same time showing that the mind was greatly relieved. The further

recommendation of a suitable tonic, with advice as to diet, completed the case, which was certainly that of a perfect cure under very peculiar circumstances.

CASE LXXII.—H. M., a middle-aged unmarried lady, from Oxfordshire, consulted me in the spring of 1867. She believed herself to be the victim of worms, and was quite sure that she passed great numbers of them continually. None of the forms she described appeared to me to answer to any genuine species of entozoon; but it will surprise no one to learn that my repeated assurances to that effect only excited astonishment, not so say contempt. Here, again, to satisfy a deluded patient, I prescribed santonin in combination with podophyllin, each powder being followed by two-drachm doses of the liquid extract of senna, and of course I naturally insisted upon having an opportunity afforded me of examining any entozoa which might come away. Surely enough, at a subsequent visit, the patient produced abundant examples of the so-called parasites, and I was enabled to explain to her that the worms in question were characteristic specimens of strawberry seeds. In this case, however, no symptoms of gratitude or pleasure on the sufferer's part followed my announcement, the parasitic delusion immediately assuming another shape.

CASE LXXIII.—C. D., an elderly unmarried lady,

from Pembrokehire, is certain that she is a martyr to worms, from which she has suffered for years, as her medical advisers, if I asked them, would be ready to testify. That she had been well physicked there could not be the slightest doubt, for she seemed to have tasted almost every drug in the Pharmacopœia. Amongst the various medicines she had swallowed—to say nothing of the turpentine and other remedies introduced as enemata—she certainly named ammonia, aloes, assafœtida, gentian, quassia, sulphur, potash, taraxacum, valerian, hyoscyamus, senna, santonin, male-fern, and quantities of mercury. That, under these circumstances, she should be so well as she now appeared was in itself, I thought, noteworthy. On closely questioning her, I felt bound to admit that at one time or other she must have had lumbrici; but when I saw her, which was in November, 1867, the pains she complained of were clearly referable to rheumatism and gout, and there was no evidence that she was suffering from parasites of any kind. In accordance with her wishes, I prescribed an anthelmintic (containing santonin), but the result, as I anticipated, was equally negative and unsatisfactory.

CASE LXXIV.—J. M., a titled lady, residing in Belgravia, was seen by me in consultation with her usual medical attendant. Suffering from hysteria and *ennui*, she attributed her obscure pains to

the presence of minute living parasites, which she alleged to be constantly passing. Undoubtedly there was vesical irritation, with uterine disturbance. Several of these so-called worms having been placed in a bottle of water and submitted to my scrutiny, I at once referred them to certain well-known forms of Infusoria; the more conspicuous species being *Cypris tristriata* and *Bursaria vulgaris*. It was evident to my mind that these pseudhelminths had neither passed from the bowel nor from the urethra, and that the case was therefore either one of intentional deception, or, more probably, of unintentional self-deception. On the latter supposition I sought to explain the accidental introduction of water containing these creatures into the night-stool, but suggestions of this kind led to no satisfactory explanation. To allay the vesical irritation and evident nervous irritability I prescribed buchu, hyoscyamus, and small doses of steel. I also advised a change of scene; likewise the avoidance of late hours and excessive visiting. This advice gave disappointment; the one thing needful, in the patient's mind, at least, being the administration of a good vermifuge. From what I subsequently heard I have little doubt that the case was one of unintentional self-deception. It is unpleasant, of course, to demand that patients should be watched in order to find out how entomostracous crustaceans, water-fleas, and other ani-

malcules, are thus introduced into their night-stools; but a professional friend to whom I have since mentioned this case has advised such a step.

CASE LXXV.—A. F. D., a gentleman from Worksop, called in November, 1870, stating that he was suffering from bots. He did not look like a person in ill health; neither did the case offer any symptoms worth noting. He could only be said to be labouring under a slight attack of dyspepsia. As, however, he insisted, pertinaciously enough, upon the existence of bots in his interior—and he had been professionally informed that he had undoubtedly passed bots—I prescribed powders containing santonin, calomel, and scammony. I particularly requested that any specimens which passed should be sent to me; and on the 2nd of the following January I received a phial containing eleven of these alleged parasites. To the naked eye, it must be admitted that these foreign bodies did more or less resemble the larvæ of *œstrus*. They varied in size up to seven-tenths of an inch, and, with one exception, were of a yellow colour. Further examination showed that the exceptional specimen was only an undigested and entire raisin, retaining its pulp cells and numerous crystals; whilst all the other bot-like bodies were only undigested masses of imperfectly cooked, waxy potatoes. The cells, varying from 1-140th to 1-80th of an inch in length, gave the usual purple

reaction on the addition of iodine. In accordance with this evidence I finally advised as to food, habits, and drink—especially insisting upon the avoidance of strong spirits—which I suspected were almost the only cause of the impaired digestive functions.

LECTURE XIX.

Bots from the Human Intestinal Canal—Difficulties may arise as to the means of distinguishing Genuine from Spurious Cases—Maggots may lodge beneath the Skin—Cases LXXVI. to LXXVIII.—The Larvæ of Flies may give rise to disagreeable Symptoms—Cases LXXIX. to LXXX.—The Harvest Bug and the Gigger.

GENTLEMEN,—At this point I may mention that numerous instances of insect larvæ occurring in the human intestines have from time to time been brought under my notice ; and I have also to record the fact that such creatures occasionally take up their abode beneath the skin. I now show you a specimen of human bot which I received from Mr. Alfred Higginson, of Liverpool ; and in the College of Surgeons you will see a small insect larva which was presented to me by Dr. Kirk, who had removed it from Dr. Livingstone's leg whilst they were travelling together in Africa. Through the kindness of friends I have obtained a great variety of spurious worms of this sort, and of other pseudhelminths, some of which undoubtedly were parasitic, whilst others were erroneously interpreted to be such. In truth, it is not always easy to decide ; at least a correct diagnosis is difficult when you can

only get at a garbled or imperfect statement of the facts. Here are three more maggot cases, all of which are probably genuine :—

CASE LXXVI.—C. D. P., a physician residing at the West End of London, called upon me on the 18th of January, 1868, bringing for my inspection and determination a parasite which he assured me had been removed from the arm of a lady of rank. To be more precise, I understood him to say that it had been expelled from a boil situated in the immediate neighbourhood of the wrist-joint. On examining this pseudhelminth, I perceived that it was only an ordinary caterpillar, referable to one or other of the numerous species of *Noctuidæ*. It was not unlike that of the common gooseberry moth. However, my opinion having been requested (in a thoroughly professional and proper way) in reference to the possible mode of introduction of this parasite, I at first felt obliged to assert my doubts as to the accuracy of his statements. Afterwards, however, my opinion was somewhat shaken when he positively assured me that he had himself pressed one of the specimens from the interior of the boil. Provisionally accepting this view as a possible explanation, I suggested the employment of a camphor liniment, in view of preventing any recurrence of the maternal insects' attacks, or rather of any species of insect resembling the supposed original offender ; and it is so far satisfactory

to know that nothing of the kind recurred. We must, of course, be always on our guard lest we infer that the maggots occasionally found on removing bandages have necessarily proceeded from the diseased or injured parts.

CASE LXXVII.—H. H. G., a spare and highly nervous young man from the East End of London, called on me on the 11th of September, 1869. He brought with him a very peculiar looking insect larva, specimens of which he alleged were constantly passing from him by the lower bowel. He believed, I fear correctly enough, that the severe symptoms from which he was suffering were entirely due to the presence of these parasites; but he declined to let me prescribe for him. His manner, appearance, and style of address betokened extreme irritability and sensitiveness, and he told me that he was subject to epileptiform seizures. His excessively agitated, hurried, and anxious manner, prevented my gathering any other particulars, but the impression I received was to the effect that these pseudhelminths were the sole cause of his sufferings. I have mislaid the parasite, which I believe to have been the larva of an *Anthomyia*.

CASE LXXVIII.—E. D. W., aged sixty, residing in Newport, Monmouthshire, informed me by letter that he had passed several worms, the nature of which, his medical friends tell him, "is unknown." He is very much out of health, but is in doubt as

to the real cause of his sufferings. His illness commenced, he says, with pain over the epigastric region, followed by diarrhœa. When he visited me, on the 28th of September, 1871, I perceived that there was a strong pulsation (as if from an aneurismal tumour) over the epigastrium; and on this account he afterwards consulted Dr. Murchison. To what extent, however, the parasites contributed to his symptoms it was impossible to say. My impression is that the diarrhœa was in part due to them, and that the prostration of which he complained was not solely attributable to the heart affection from which he was at the same time suffering. As many of the disagreeable symptoms had disappeared since the passage of the worms, I forbade the employment of any active anthelmintics, except in the event of their return, or of a suspicion that there were any more parasites. Five or six were passed in all; and those which I received were characteristic examples of the larvæ of *Anthomyia canalicularis*.

The presence of these insect larvæ is by no means harmless, and I believe that, in proportion to their number and size, they give rise to more irritation than the ordinary forms of intestinal worms, properly so called. Numerous instances of the occurrence of the larvæ of flies in the human intestines have come before me; but, fortunately for the bearers, they rarely existed in any considerable

numbers. Armed, as most of them are, with sharp bristles, or stiff hairs, their active movements in the intestinal canal could hardly fail to be productive of serious mischief. Occasionally, one meets with the dead eggs of the common flesh-fly in the fæces, these having been swallowed accidentally at table after they had been thoroughly cooked along with the joint on which the parent insect had deposited them. The larvæ of Diptera are usually passed alive; and three particular examples, which Dr. Wilson Fox kindly sent me in a pill-box, assumed their imago condition some time after they had been placed in my cabinet. I hope at no distant day to unravel some more of the mysteries connected with the occurrence of these spurious parasites in the human body, but I can assure you that the subject is surrounded by many difficulties. In this connexion I will only record two other allied cases, as I must, for the present at least, bring my remarks to a close.

CASE LXXIX.—J. H. W., a distinguished clergyman, rather beyond middle age, requested my advice respecting certain injuries received from the bite of the common harvest-bug (*Leptus autumnalis*). That these bites were not trifling may be gathered from the fact, that their poisonous effects had resulted in the formation of three large boils on the surface of the abdomen. Their inflamed look bespoke severe irritation at the surface, whilst as a

consequence other symptoms had set in, such as anorexia, with disturbed sleep, producing a general loss of health. For internal administration I ordered a vegetable tonic and mild aloetic pill; the inflamed bites being ordered to be kept constantly moist with Goulard's lotion. Lint thus soaked, and covered with oil-silk, was applied over the entire abdominal surface. Under this simple but effective treatment the boils rapidly disappeared, and after a while the general health itself was thoroughly re-established; partly I believe in consequence of the subsequent changes and additions in the tonic treatment which I had found necessary. I bring forward this case as being the only instance in which I have myself witnessed any marked constitutional disturbance following the bite of the harvest-bug. Personally, I can testify to the excessive irritation caused by the bites of this insect.

CASE LXXX.—H. S. J., a married person, about fifty years of age, consulted me in the autumn of 1869. When living in the West Indies she had suffered severely from the bites and lodgment of the gigger or chigoe in her feet; unfortunately, also, she still retains the belief that either the original insects or their progeny are still lodged beneath the skin. On examining her feet I found them scarred all over with minute incisions. These it seems she had recently inflicted upon herself,

and certainly without any sufficient reason, for beyond the evidence of slight impetiginous ulcerations there were no indications of disease, much less of parasitism. I prescribed a carbolic acid and glycerine wash, which I directed to be applied every morning and evening, after the feet had been well bathed with warm water. I also, of course, endeavoured to put a stop to the practice of harpooning. At the expiration of a week I had the satisfaction of observing that the scars and old impetiginous sores had nearly disappeared; nevertheless she could not be persuaded to abandon the notion that the giggers were still occupying their old abode.

LECTURE XX.

Flukes or Trematode Parasites are comparatively rare in Man—
The *Bilharzia hæmatobia* forms a Notable Exception—Formidable nature of the Disease thus Produced—The Ciliated Larvæ of this Entozoon display a Complicated System of Aquiferous Vessels—Case LXXXI.—Comments on the Peculiarities of the Disease, with an Exposition of the Principles which should guide us in the Treatment of Cases.

GENTLEMEN,—The last form of helminthiasis which I propose to bring under your notice, is that arising from the presence of flukes in the human body. It is a fortunate circumstance that the disorders caused by trematode parasites are comparatively rare; at least they are so in European countries, and especially in our own islands. In Africa, however, the case is far otherwise, as I shall immediately show you. Of the nine so-called species of fluke recognised as human entozoa, four have only been once observed; another has been twice or thrice noticed; yet another three times, and one other on four occasions; whilst the so-called sheep-fluke (*Fasciola hepatica*) has occurred about twenty times in all. There is one fluke worm, indeed, of terrible importance, inasmuch as its entrance into

the human body not unfrequently produces a severe and even fatal hæmaturia. I allude to the *Bilharzia hæmatobia*, generically thus named by me in honour of its original discoverer. This parasite is so prevalent in Egypt that Dr. Bilharz of Cairo has expressed his belief that nearly half the adult inhabitants of that country are infested by it; and we now know from subsequent investigations that this parasite is only rather less abundant in Natal, cases having also occurred at the Cape, and in the Mauritius. My acquaintance with this remarkable entozoon dates as far back as the 4th of December, 1857, when I discovered a solitary specimen in blood that had escaped from the portal vein of an African monkey which had died at the Zoological Society's Menagerie, Regent's Park.

Since the original discoveries and researches made by Bilharz and Griesinger, several cases of this formidable helminthiasis have been brought to the notice of physicians in this country. Dr. John Harley recorded the first case recognised in this country in January, 1864; and altogether I have heard of certainly not less than six separate instances where colonists (or other persons who have previously visited the infected districts) have come to England with the disease upon them more or less strongly pronounced. For a general description of the worm, together with a condensed account of the symptoms and diseased appearances

this parasite produces, I must refer you to my larger Treatise, and also, more particularly, to the standard works of Leuckart and Kuchenmeister. You will also gain some interesting information from Dr. Harley's contributions to the Medico-Chirurgical Society. The complete developmental history of this entozoon remains to be cleared up; but I take this opportunity of mentioning that I have already observed the development of the larvæ of *Bilharzia* up to the stage at which they display a remarkable subcutaneous water-vascular system. The results of my investigations I hope shortly to publish at greater length; but I may add that a brief notice of the principal points observed has already been recorded in the Report of the Proceedings of the Meeting of the British Association held at Liverpool in 1870. As it is not improbable that many more cases are likely to come to the notice of the profession in this country, I am glad to be able to bring before you the facts of one very interesting, and in some respects unique, case, which has occurred in my own practice. This example will serve to illustrate certain points in the early history of the disease, and it will also, I hope, be instructive in reference to the questions of diagnosis, prognosis, and the most correct methods of treatment.

CASE LXXXI.—G. I. G., a little girl, seven years of age, came to England from Natal, with her parents,

in the month of May, 1870; and I first saw her on the 22nd of July of that year. She was suffering from hæmaturia, the first indications of the disease having been noticed about a twelvemonth previously. Though by nature a remarkably strong and healthy child her strength had gradually declined; the prostration, however, being more marked during the warmer months. She complained but little; yet her parents and nurse observed that she frequently showed that she suffered pain during or at the close of the act of micturition. She had been treated for urinary parasites by the family physician; and the true nature of the helminthiasis appears to have been fully determined by Dr. J. Vacy Lyle. In a letter to Dr. Harley, recently published, Dr. Lyle refers to this case. According to the statements of her parents, the child had passed three vermiform entozoa from the bladder; moreover, she also suffered from the common roundworm, the exhibition of santonin powders under Dr. Lyle's advice bringing away altogether about one dozen lumbrici. The powders were supplemented by enemata and cold bathing; tonics and diuretics being likewise ordered from time to time. In addition to the symptoms above mentioned I have to notice that she was pale and anæmic, the skin and muscles were lax and flabby, the sclerotics and conjunctivæ almost bloodless, the tongue white but clean, the skin moist, the pulse irregular, very feeble, and varying from

100 to 112. It should also be added, however, that the appetite has always remained good, the bowels being also regular, and her sleep undisturbed. To the naked eye the urine was extremely turbid and very high coloured; and after standing for a few hours formed a thick gelatinous deposit at the lower part of the vessel. On submitting a little of the sediment to microscopic investigation I at once discovered enormous numbers of the eggs of *Bilharzia hæmatobia* in association with a great quantity and variety of débris. There were myriads of blood corpuscles, with a large quantity of pus corpuscles; also numerous scales of vesical epithelium, a few fat globules, irregular shreds of mucus, mixed up with an abundance of fine granules and molecules. In addition to these elements there were some peculiar cellules, refracting light very strongly; and, still more strange to say, there were also detected at this first examination six oval eggs of some nematode parasite, each of which contained in its interior a living and actively moving embryo. After the urine had stood for about twenty hours numerous uric acid crystals were found associated with large prismatic forms of the ammonio-phosphate of magnesia.

My treatment at the outset consisted of tonics, the cold bathing being continued as Dr. Lyle had previously advised. Violent exercise of all kinds was to be avoided, but she was to be constantly out of doors. At the expiration of a few days this

simple *régime* began to be useful, for the pulse became fuller and stronger. On the 3rd of the following August, the hæmaturia becoming more marked, I ordered small doses of the bicarbonate of potash in combination with the infusion of buchu. On the 7th I found the pulse quite steady and regular, varying from 100 to 104; her tongue showing more colour, and her general tone improving. At this time the urine was strongly albuminous (from hæmorrhage), and after standing for forty hours gave a specific gravity of 1030°. On the 10th August she was placed with my family (in the suburbs of the metropolis), in order that her case might be more closely watched. I was thus enabled not only to judge of the effects of treatment from day to day, but also placed, by thorough and repeated examinations of the excretions, in a position to ascertain the negative and positive facts of the parasitism. On the evening of the 11th the pulse had risen to 118, the very highly-coloured urine giving a specific gravity of 1017°. For several days the pulse continued to vary exceedingly, ranging from 104 to 126; but the temperature of the body was remarkably uniform, the palm of the hand generally giving 94°, the arm-pit 95° to 96°, and the mouth 98½° and 99° Fahrenheit. I had some difficulty in ascertaining the average of water passed daily, but on the 13th I found the quantity to amount to forty-two ounces, and this, on standing in a tall

glass vessel, settled into three well-marked layers. The lowest stratum comprised about four ounces of brownish deposit, crowded with eggs and blood corpuscles; the central layer consisted of twenty-four ounces of thick fluid heavily charged with albumen; the uppermost layer consisting of about fourteen ounces of clear and healthy-looking urine. The specific gravity of these strata, however, varied only to the extent of one degree—namely, from 1011 to 1012. On the 14th the pulse was quiet and regular, varying from 100 to 108, the urine registering 1017. After a few days the irregularities of the pulse again became more marked, ranging from 118 to 120 on the 21st, but falling to 114 on the 26th. In like manner corresponding fluctuations occurred in respect of the specific gravity of the urine; and it was at all times noticeable that an increase of hæmorrhage always followed unusual exertion or excitement of any kind. Notwithstanding these variations the general health steadily improved, so that by the 1st of September the muscles had regained their firmness, the complexion was bright and natural, and the entire system had acquired a better tone. But for the astonishing amount of natural vigour she never could have borne the persistent hæmaturia, which was at all times considerable. This, aided by a never-failing appetite, enabled her to consume an unusual amount of

milk, butter, eggs, and especially cream, with meat and fish, and also plenty of fruit, the latter being sometimes fresh and sometimes stewed. The whole time, or one month, during which she remained with my family she continued to take the buchu infusion with the most marked advantage; and at the expiration of that period she was, with my approval, removed to the west coast of England, where, under the excellent personal superintendence of a relative, she has continued to retain her healthy condition. Nevertheless the hæmaturia, though lessened at times, has never disappeared. When I again saw her on the 22nd March, 1871, her general health was satisfactory. She slept well; the tongue was clean and of good colour; the bowels and pulse were both regular—the latter numbering 104—and the appetite hearty as usual. In the small quantity of urine brought for my examination I could find no eggs of *Bilharzia*; but I soon afterwards ascertained that this afforded me no true criterion of the state of the parasitism. A subsequent examination proved them to exist in the urine in great numbers. Satisfied, however, with the marked palliative effects of buchu as affecting the vesical mucous membrane, I still recommended a continuance of this drug; but I deprecated the employment of injections of any kind into the bladder. In my last prescriptions I combined the tincture of buchu with the syrup of bearberry (*arctostaphylos*),

a change of medicine which appeared to suit the little patient admirably. It may be said, indeed, that but for the fact of the hæmaturia no ordinary observer would suppose that at the time I last saw her the child was otherwise than in a perfect state of health.

This case, gentlemen, is a most remarkable one ; for, apart from the special interest attaching to the so-called "endemic hæmaturia" from Bilharzia, you will have noticed that the child was invaded, certainly by two, if not by three, other forms of parasite. She had been efficiently treated for lumbrici by Dr. Lyle ; and it was alleged that she had passed three small worms by the urethra. The truth of this latter statement appears to have been borne out by the fact that I discovered numerous eggs of a species of nematode in the urine. On one occasion I found six ova, and on another about fifty. Had only one of the three adult nematodes from the urine been preserved for examination, it would have enabled me to have solved an important point connected with the history of vesical entozoa. As it is, I have no hesitation in expressing my belief that the nematode ova are of the same kind as those found by Dr. Salisbury in a patient in America, and which he was unfortunately led to regard as a new form of *Trichina* (*T. cystica*). In respect of the best modes of treating this peculiar form of hæmaturia, I believe that the essential

thing is to support the system. The amount of parasitism and consequent bleeding in this case was, and probably still is, extraordinary. But for her change of residence and vigorous tonic treatment away from the infectious locality, this child must, in my view, have sooner or later succumbed to the disease. At the very lowest estimate she cannot have expelled less than 10,000 eggs of *Bilharzia* daily; and on some occasions I believe the number discharged in twenty-four hours was fully ten times that amount. The santonin remedies, though of great service in securing the expulsion of the round-worms, appear to have aggravated the hæmaturia. The parents, at all events, were of that opinion. For my own part, I should only foresee great danger to the patient in the attempt at administering what are termed true parasiticides. Be pleased to bear in mind that these blood-flukes are actually lodged within the blood-vessels; and you cannot operate upon them without conveying the poisonous remedy into the circulating system. Moreover, if you weaken your patient in any way, and especially by mere drugging, you prevent Nature from slowly working a natural cure. Even the employment of diuretics should be adopted with caution. The only service they can render is mechanical, facilitating the expulsion of the parasitic ova by increasing the flow of the urine. The administration of injections by the urethra is, in my

judgment, altogether contra-indicated in the case of young persons; but in adults, if the disease be far advanced, there are considerations which might induce me to give them a trial. I am strongly of opinion that the efforts voluntarily set up by Nature in view of moderating the hæmaturia—by the formation of plugs at the ulcerated points of the mucous surface where the bleeding occurs—are likely to be frustrated by the use of medicated injections; and I further doubt the policy, on general grounds, of catheterizing the urethra of young persons unless there be the most cogent reasons for taking such a step. Dr. John Harley thinks that “a persevering use of belladonna and henbane would retard the development of the parasite, even if it did not result in its destruction.” I do not at all share in that opinion; but I am free to allow that either of these drugs may be employed with advantage in advanced stages of the hæmaturia where a strong sedative or calmative action might be required. On the whole, I think there are good and cogent reasons for recommending less poisonous agents, and I therefore particularly advise the employment of such drugs as are known to exert a special soothing action on the mucous membranes. Not only is buchu a medicine which has a remarkable power in allaying vesical irritation and of restraining excessive mucous discharges, but, so far as my experience

goes, no harm ever results from its long-continued employment. In like manner, I think well of the arctostaphylos uva ursi, believing that its astringent properties materially assist Nature in her endeavours to check the excessive bleeding. A small quantity of hyoscyamus may be advantageously combined with it. Our object should be, I repeat, not to interfere with, but to promote Nature's curative efforts. If I read the pathological facts correctly, it seems that the *vis medicatrix natureæ* seeks to bring about this result by erecting artificial barriers which serve to moderate the bleeding. In this way, under ordinary circumstances, the life of the bearer is sustained or held in the balance until the parasites either perish or cease to be capable of causing active disease. Depend upon it, this is the principle which should guide us in our treatment of the Bilharzia disorder. If the adult parasites were merely attached to the lining membrane of the bladder, then, powerful diuretics and medicated injections would probably prove serviceable; but since the entozoa reside in the blood we must be careful not to increase our patients' troubles. In the case of intestinal worms, properly so called, you have seen that the most powerful parasitocides may be prescribed without let or hindrance; but that drug must be a truly subtle worm-poison which, when taken into the system, shall effectually kill these blood-flukes

without exerting any injurious effects upon the parasite-bearer. Without any sympathy for the system of infinitesimal doses, I have an equal dislike to over-drugging. Patients no doubt are sometimes unwise enough to look for a display of what they are pleased to call an active, vigorous, and masterly mode of treatment; but the careful physician, who by a prolonged study of any one particular class of disorders has familiarized himself with all the possible bearings of the case, must be guided by sounder indications than those which commend themselves to uninstructed persons. Whenever we allow ourselves to be taught and led by natural laws we are sure to effect some good, for in this way we place ourselves and our method in harmony with a teaching which is essentially Divine.

The first part of the paper is devoted to a general
 introduction of the subject. It is shown that the
 theory of the present paper is a special case of
 a more general theory which has been developed
 in the preceding papers. The theory is then
 applied to the case of a particular system of
 particles. It is shown that the theory is in
 agreement with the experimental results. The
 theory is then applied to the case of a
 particular system of particles. It is shown
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 of particles. It is shown that the theory
 is in agreement with the experimental
 results. The theory is then applied to the
 case of a particular system of particles.

The second part of the paper is devoted to a
 detailed discussion of the theory. It is shown
 that the theory is in agreement with the
 experimental results. The theory is then
 applied to the case of a particular system
 of particles. It is shown that the theory
 is in agreement with the experimental
 results. The theory is then applied to the
 case of a particular system of particles.

APPENDIX.

THE following list—exclusive of Reviews, Leaders, and other anonymous Articles—comprises a record of the Author's Contributions to the science of Helminthology.

SEPARATE PUBLICATIONS :—

Entozoa; an Introduction, &c. (pp. 480), London, 1864.

Supplement; with Index, &c. (pp. 124), London, 1869.

Tapeworms; their Sources, &c. (pp. 83), London, 1866.

Tapeworms and Threadworms; 2nd edit. (pp. 101), London, 1867.

New Entozootic Malady; Observations, &c. (pp. 15), London, 1865.

Catalogue of Entozoa contained in the Museum of the Royal College of Surgeons (pp. 24), London, 1866.

LANCET :—

On the Occurrence of *Ascaris mystax* in the Human Body; Jan. 1863.

On Spurious Entozoa in Diseased and Healthy Cattle; Jan. 1866.

On the Discovery of *Trichina*, in relation to the Question of Priority; March, 1866.

On Entozoa in Veal and Beef (in Letters to the Ed.); Feb. and Aug. 1865.

On the Curative Treatment of Intestinal Entozoa ;
April, 1866.

On Entozoa contained in various Metropolitan Mu-
seums ; May, 1865.

On the Entozoa of Abyssinia (Lecture) ; Dec. 1867.

MEDICAL TIMES AND GAZETTE :—

Lectures on Practical Helminthology (being the first
six of this Series) ; 1870.

Entozoa in relation to Public Health and the Sewage
Question ; Jan. 1871.

On Sewage, in relation to the Dispersion and Vitality
of the Germs of Entozoa ; Feb. 1871.

BRITISH MEDICAL JOURNAL :—

Rare Entozoon in the Hog (in a letter to the Ed.) ;
Jan. 1871.

The New Hog Parasite (second Communication) ;
Sept. 1871.

Outbreak of Trichiniasis in Cumberland (Announce-
ment) ; April, 1871.

DUBLIN MEDICAL PRESS :—

Note on Parasites in the Lower Animals ; Feb. 1863.

ROYAL SOCIETY'S PROCEEDINGS :—

On the Production of " Acute Cestode Tuberculosis "
by the Proglottides of *Tenia mediocanellata* ; May,
1865.

LINNEAN SOCIETY'S TRANSACTIONS :—

Observations on Entozoa, with Notices of New Species,
&c. ; 1858.

On some New Forms of Entozoa ; 1859.

Further Observations, with Experiments ; 1861.

LINNEAN SOCIETY'S PROCEEDINGS:—

Synopsis of the *Distomidæ*, with Description of New Genera and Species; 1859.

Experimental Investigations with Cestoid Entozoa; 1865.

On *Sclerostoma syngamus* and the Disease it occasions in Birds; 1861.

On the Best Methods of Displaying Entozoa in Museums; 1864.

Remarks on *Cœnurus* from an American Squirrel; 1864.

On Entozoological Individuality; 1864.

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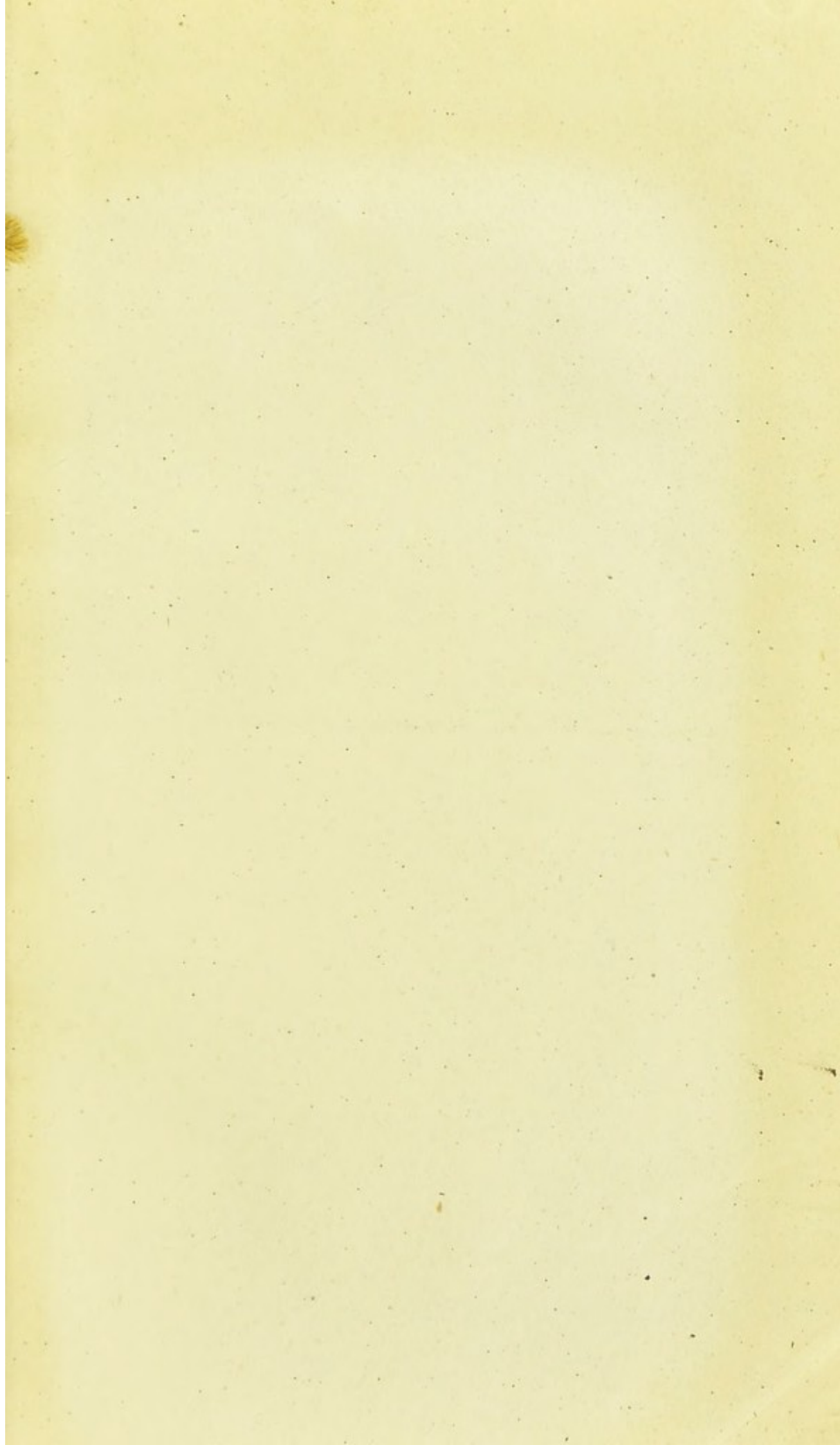
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