alomel, calomel and jalap, compound powder of jalap, aloes, solutions of any of the neutral salts, infusions of senna, and sometimes the last two conjoined. The views which led him to the same treatment in scarlatina, he has also explained, and if the same idea is not so prevalent in the profession, it may arise from our feeling that the more simple the treatment of that disease, the more certain is the patient of recovery, and that upon the evaporation of heat from the surface of the skin the safety of the individual depends. His exposition, however, of the nature of scarlatina, and of cynanche maligna, will be read with great improvement by you, and will furnish you with some comprehensive and accurate information.

The best chapters in his volume are on the utility and administration of purgative medicines in chlorosis, in hysteria, and in chorea Sancti Viti, or St. Vitus' dance. That the first of these diseases is frequently dependent upon the state of the bowels, we are most willing to admit; but the inferences drawn by Dr. Hamilton are much too sweeping. In many cases the disease is perfectly independent of such causes; but it is our duty to discover if it be at all connected with it, and then the plan of treatment laid down by Dr. Hamilton may, of course, be most advantageously followed. Great attention is necessary to ascertain whether the exhibition of purgative medicine be required, and this is best ascertained by the inspection of the alvine egesta. Much of the same kind may be said of hysteria, and even chorea; I must, however, refer you to his work for further information. There is no doubt that the whole of the organisation materially suffers from constipation, and that a vast variety of diseases are the result of inattention, and no doubt that Dr. Hamilton's practice has been generally found to be highly serviceable.

All parts of the intestinal canal are liable to the destructive agency of retarded or suspended excretion; the stomach is overpowered with the most distressing dyspepsia; the small intestines are frequently griped, whilst the impeded ducts through which the bile ought to pass, are affected with constant spasm, and the same distressing pain which so frequently attends upon gall-stones; the large intestines have flatus pent up in them which produces a sense of constriction, and hemorrhoids are found at the verge of the anus. This last disease is a very common attendant upon constipation, and upon the efforts to free the intestines, and it reacts upon the system, for no local diseases disturb the stomach and constitution more than those of the rectum, the sympathy existing between the rectum and the bladder, and the rectum and the urethra is so great, that the same cause will produce the most distressing symptoms in these organs.

It has been stated on good authority that the putrefying mass, emitting a faint, nauseous, and pungent smell, which has been first expelled after medical assistance from constipated habits, after febrile disease, is capable of transmitting infection to a very considerable distance, and constitutes a miasm of the most fearful character, which speedily depresses the nervous energy of those who may be thrown within reach of its influences, and hence spring up the host of fevers which are familiar to some countries, spreading with the most fearful rapidity, and attacking most especially those who are, by want of care, predisposed to every exciting cause of disease. Few depressing agents are more instantaneous or more certain than the effluvia issuing from fecal matter, and sometimes in hospitals it has been found that ulcers put on their most unfavourable aspect if the suffering patient be in the neighbourhood of the Temple of Cloacina.

ON THE
CYSTICERCUS CELLULOSÆ
INHABITING
THE HUMAN MUSCLES,

By R. KNOX, F.R.S.E., Corresponding Member of the French Academy of Medicine.

[Read to the Royal Society in Edinburgh.]

ABOUT two years ago a memoir was read by me to the Royal Society in Edinburgh, respecting a peculiar microscopic entozoon infesting the human muscles, the discovery of which was due originally to Messrs Hilton and Paget. In the memoir to which I allude the attention of the physiologist was directed to the comparative rareness of that entozoon, and of the occurrence of human entozoa generally, at least in this part of the country. About the period of my original observations upon the microscopic entozoon, there were frequent notices of the worm having been found pretty often in the dissecting-rooms in London, Dublin, Bristol, and elsewhere. Without meaning in any way to doubt this, I shall only remark, that the occurrence of the peculiar microscopic vibrio described by me in the first part of the "Anatomical and Physiological Memoirs," after having read an account of it to the Royal Society, is very rare in this country. Of 130 bodies of all ages, examined publicly, and with the greatest care, in presence of numerous classes, there has occurred but a single case where muscles exhibited these microscopic vibrios, discovered by Messrs. Hilton and Paget; indeed, so far as I can learn, they have not been observed in the dissecting-rooms of Scotland by any one but myself, in the single case described to the Society. From these data it may be concluded, that instead of being of frequent occurrence, as has been stated, they are, comparatively,

very rare. Notwithstanding their alleged frequency in the London and Dublin dissecting-rooms, I cannot find that any further steps have been taken to elucidate the anatomy and natural history of the vibrio, which I showed in my first memoir to be exceedingly obscure in most points.

The peculiar worm or entozoon, the *cysticercus telæ cellulæ*, of which I am now about to speak, also infests the human muscles; although not quite so rare as the preceding one it is also seen but seldom; this instance, for example, being the only one occurring in the dissection of many hundred bodies. It is better known, however, than the *microscopic vibrio*, having been described with great care, and with the most minute attention to details, by Rudolphi, Bremser, and others. Bremser's observations, and very beautiful engravings of the *cysticercus*, were probably made from specimens preserved in spirits; he remarks, that during ten years, neither in the great hospital of Vienna, nor in the public dissecting-rooms, did there occur a single case of the human *cysticercus*; whereas, M. Rudolphi informed him by letter, that every winter session some worms of this kind were found in the public dissecting-rooms of Berlin: he further adds that M. Rudolphi kindly sent several specimens to the Museum of Vienna.

Upon one or two points I have fancied that the employment of good glasses has enabled me to observe some facts which, apparently, had escaped the notice of these distinguished anatomists, or may have been deemed by them unimportant, and this has induced me to trouble the Society with the following brief remarks:—

A. M., aged 67, was reported to have died of dropsy, and permission having been obtained to delay the interment for the usual period of six weeks, every opportunity was thus afforded of carefully examining all the textures and organs of the body. He had been a heavy, stout, muscular man, with a large powerfully-made neck, and a very small cranium; he seemed to have been a person in whom the mere animal predominated greatly over the intellectual part of human nature. The skin was covered with a papulous eruption of the class of syphilitic lichens, and a preputial, or even perhaps urethral, gonorrhoeal discharge, was evidently present at the period of his death. So soon as the muscles of voluntary motion began to be displayed by the dissectors, a cystoid entozoon showed itself amongst the muscles, sometimes superficial, at other times deep, imbedded in the interfascicular cellular tissue, and in the cellular layers between the muscles, uniformly in the axis of the muscular fibres, but without any intimate union with them. An inspection of the preparation No. 885, now submitted to the Society, and of the

accompanying drawings, as well as those by Rudolphi and Bosc, will demonstrate to those not familiar with such appearances, the true character of these singular entozoa. A single worm only was found on the inferior surface of one of the posterior lobes of the brain, and none in any other part of this organ. When first observed they resembled numerous small vesicles, semi-transparent, of an elongated ovoid or egg shape, the greater number being very uniformly of the size represented in figure 1st (and as seen in the preparation No. 885), but there were others also somewhat smaller.* It is sufficiently curious that no very small ones were found, nor any empty cysts, debris, or other remains indicating ulterior changes in respect to their reproduction or natural decay. When these cysts were very carefully examined *in situ*, they were found to adhere to the surrounding cellular substance, but very loosely throughout the greater part of their surface, and much more firmly at one of their extremities than at the other. The dissection of a great number of them gave the following results:—

1st. A semi-transparent cyst of an egg shape, whose external connections were as already described; the cyst is semi-transparent, seemingly elastic, and in texture not unlike the crystalline capsule.

2nd. On laying open the cyst the worm itself escapes, having no apparent connection with the cyst; the worm evidently belongs to the class of cystoid entozoa, and corresponds very accurately with the *cysticercus cellulosæ* of Rudolphi and Bremser; by Brera called *finæ* musculare, and by Jærdens, *tænia muscularis* and *finna humana*; an analogous species is known to be sufficiently common in the diseased and ill-fed pig; but their occurrence in other animals, and particularly in man, is assuredly rare. The accompanying drawing will explain sufficiently to those not familiar with such appearances, the character of the worm, its cyst-shaped body, its neck and head, and the parts supposed to be suckers, and the disk or ring of hooks by which it is presumed to fasten itself to the surrounding textures.

I shall now take the liberty of making a few remarks successively upon the various component parts of the worm. I shall first recal to the recollection of the Society that there is a species of *cysticercus* called *visceralis*, often found in the lower animals, and especially in the pig, which *has no cyst*. I have happened to me two or three times to examine these *in situ*, adhering to the liver or even the diaphragm; they resembled in

* The immersion of all these textures in alcohol, of course alters, in a material degree, their appearance, by destroying the semi-transparency of membranes.

any respects the muscular cystoid, but they seem to have no cysts; they grow much larger, are quite isolated from the surrounding textures, excepting in so far as they adhere by their pointed extremity or head. Moreover the neck of the animal is surrounded with delicate rings or lines, and these extend over a great part of the caudal axis of the animal. Now, these rings could not be detected on the body of the human cysticercus, although the highest glasses were used. They cannot, then, I think, be of the same species as those which reside in the cysts. But to return to the cysticercus cellulosa, its cyst does not appear to me to be formed out of the surrounding cellular tissue; it seems to have a quite different texture, is apparently closed at all points, rendering it difficult to imagine how the worm can live within it, and what can be the use of the disk of hooks surrounding its head, since it does not adhere to the cyst, and cannot adhere to the animal upon which it lives, its own cyst being interposed. Whilst examining these hooks or spines under powerful glasses, I remarked that they were arranged in a double row, and that at the base of each alternate one, so far as I could observe, there was a small rounded body, resembling an ovum or egg, and their appearance has suggested to me the idea that these rounded bodies may be the young cysticerci developed at the base of each hook. Further observation has led me to think that this appearance was confined to one entire row, and they only appeared to be alternate in consequence of the arrangement of the two rows. But this opinion of the uses of these parts, I throw out merely as a conjecture.

No apology, I trust, is required for bringing these observations before the Society; the muscles of man and of most of the inferior animals, are in general so exempt as well from disease as from the presence of any worms, that their occurrence must always excite much interest. If the muscular masses had been as much infested with entozoa, as are, avowedly, the internal organs or viscera, man must, I think, have ceased employing the flesh of animals as food. Thus some species of fish are seldom used as food, in consequence simply of this circumstance, that a species of tape-worm inhabits its muscles, and if this had occurred in many animals man would most assuredly have ceased using them as food. Thus, how they originate is not a matter of idle curiosity, as some have supposed. There is another sufficiently curious circumstance in the history of the entozoa, or parasitical worms, although abounding in many parts of the digestive organs, the animal may yet be in the very best condition as an article of food to man; whereas when certain kinds of them, at least, infest the muscles it is a sure symptom of a condition so unwhole-

some that man almost universally and instinctively would decline with abhorrence their use as food.

In conclusion, I may take the liberty of remarking that the anatomy and natural history of the cystoid entozoon, properly so called, is equally obscure with that of the microscopic vibrio humana, which also inhabits a cyst, not accidentally, as some supposed, but actually connected with its mode of existence.

Fig. 1.

Fig. 2.

Fig. 4.

Fig. 6.

Fig. 3.

Fig. 5.

Fig. 7.

Explanation of the Figures.

Fig. 1. a. Square portion of the greater pectoral muscle stretched by means of pins on a perfectly flat surface.

b. b. Cysts of two entozooa, as seen when first exposed by the dissector.

Fig. 2. Square portion of the brain, with a cyst torn across, and the entozoon seen projecting as ready, on the slightest pressure, to escape.

- a. Cerebral surface covered with the arachnoid and pia mater, and vessels seen coursing along the depression.
 - b. Substance of the brain cut vertically.
 - c. Cyst, below but very intimately connected with the arachnoid membrane in such a way as not to admit readily of separation.
 - d. Entozoon projecting from the cyst.
- Fig. 3. Appearance of the entozoon when removed from the cyst; copied from Bremser.
- Fig. 4. Appearance of the head and neck greatly magnified; copied from Bremser.
- Fig. 5. Appearance of the head and central disk, viewed from above and greatly magnified.
- Fig. 6. A detached spine or hook proportionally magnified.
- a marks what we suppose to be the ovum of the entozoon, it was attached to all the spines seen surrounding the mouth.
- Fig. 7. Cyst removed from among the muscles, in which the head and neck (b) of the entozoon is seen to project at one side through a natural, well defined, circular opening.

This observation rests on the authority of my brother; he had an opportunity of seeing this appearance only once, and as it has never, so far as I know, been noticed heretofore, it would require to be repeated several times before so important a fact could be fully admitted as constant and certain.

NOTE RESPECTING THE OCCURRENCE OF A PECULIAR MICROSCOPIC ENTOZOOON IN THE TEXTURES OF THE HERRING.

By MR. F. J. KNOX.

My brother within these few days has called my attention to the existence of a minute *entozoon* in fishes, which he thus describes:—

Dec. 2, 1837. Whilst engaged in anatomising and examining a large collection of fishes exposed in the Edinburgh market at this time, and taken in the Firth of Forth, by means of highly illegal nets, I observed a purely microscopic entozoon, which, so far as I have been able to ascertain, has not hitherto been described. The fishes forming the subject of my investigation belong to the family Clupeadæ, and it will be sufficient for our present purpose to state that they seem principally composed of two species, viz., the clupea herringus, or herring, and the clupea sprattus, or sprat, or Garvic herring. The proportion of the clupea herringus to the clupea sprattus, may be about one to ten, or were greater, but

during the present season, so far as I have observed, no herring-fry, properly so called, has been captured. The smallest herring, out of many large collections I have now examined being $8\frac{1}{4}$ inches, whilst the size of the largest sprat I have as yet found is $5\frac{1}{2}$ inches.

The herrings vary in size from $8\frac{1}{4}$ inches to $5\frac{1}{2}$ inches, the most common length being $6\frac{1}{2}$ inches, but are all proved by *anatomical investigation* to be, without exception, young, and evidently fishes which have never spawned. I have examined the adult and spawning herring with the same care, i. e. with the microscope, in search of the proper food of the herring, but never observed the singular worm I now propose to bring under the notice of the Society.

I have, as yet, remarked it only in the young herring. The microscope used in these investigations is a two-inch focus magnifying the object about ten times. Twenty dozen and upwards having been examined to ascertain the presence and kind of food on which these herrings were living and not having been able to ascertain this my observations became general and more minute, and I was thus led to notice the microscopic entozoon. The parasite was by no means present in all the specimens examined, although in many collections I have now dissected, some were always found in which they were present. On carefully opening up the abdomen with a pair of probe-pointed seissars, so as to avoid injuring the contents, the liver and pancreas surrounding what we must consider the duodenal portion of the intestinal tube, first presents itself. The pancreas in most fishes is composed of a great many short cæca, each opening into the interior of the gut; these cæca, or cul de sacs, are connected together by vessels and a very fine cellular tissue the whole being covered; though at the same time outside the peritoneal sac, which in the fish is extremely delicate, and presents rather a curious modification, according to its position, inasmuch as where lines the abdominal parietes it is of a more or less black colour, whilst, where covering the visceral organs, it is transparent and colourless. Along what may be called the free margin of the pancreatic cæca, and also passing up between many of the cæca, observed, with the aid of the microscope numerous opaque minute egg-shaped bodies when situated on the free extremities of the pancreatic cæca, these bodies float into the abdominal cavity like clusters of grapes but a careful examination satisfied me that they were situated in the cellular tissue outside the peritoneum. I now observe that a few were sprinkled over the liver; they were imbedded in the texture of the organ, and thus seemed as if their presence had led to the absorption of an equal portion of that viscus. The season of the year