American specimens of *C. virginiacus* are somewhat larger than the Indian and Maltese ones. Both varieties however have been recently found by Capt. Drummond in Bermuda. In a list of the Birds of Bermuda by Mr. H. B. Tristram, which is on the point of being published by Sir W. Jardine in his 'Contributions to Ornithology,' these two varieties are regarded as distinct species, as appears from the following passage: "No. 46, Charadrius marmoratus [i. e. *virginiacus*], American golden plover. No. 47, Charadrius . . . . . ?, an unnamed species smaller than the American and perfectly distinct. Not unfrequent here. It has been also found in Malta by Capt. Drummond, 42nd R.H."

VII.—*Notice of a new Genus of Cestoid Worm.* By M. P. J. Van Beneden*. Communicated by J. T. Arlidge, A.B., M.B., (Lond.).

The researches of M. Beneden in the lower forms of animal existence have rightly secured him the reputation of an original, diligent, and careful observer; and every communication therefore from him deserves the attention of the naturalist. This leads us to give an abstract of his notice of a new genus of Cestoid Worms, and of a proposed amended arrangement of them.

M. Beneden discovered the new entozoon at the commencement of the spiral intestinal lamina of the skate, in company with other worms of the genus *Bothriocephalus*. Before entering on its description, he would premise that, as the *Cestoideæ* go through several phases of existence, a species is not represented by the adult state only, but by its several successive generations by gemmation, and of which the last only is furnished with sexual organs; and that it is consequently necessary to describe separately those various phases and to give them special names.

Thus the first stage of existence may be called the *scolexoid*, being that of the *scolex* or young worm on its escape from the ovum; the second, the *strobiloid*, from the word *strobilus* of M. Sars, designating the analogous stage of the *Medusæ*; the third and last, the *proglottoid*, from the term *proglottis*, applied by M. Dujardin to the separated joints of the *Cestoideæ*.

Owing to the striking peculiarities of the newly-discovered worm, M. Beneden has felt it necessary to constitute a new genus, of which it is at present the only example. This new genus is designated *Echinobothrium*, and presents the following characters:—

First, or *Scolexoid* generation, unknown.

* Extracted from vol. xvi. of the 'Bulletin de l'Académie Royale de Belgique.'

Second, or *Strobiloid.* The body elongated, flattened, terminated by a distinct head, assuming the form of a hammer, and having two rows of hooks; neck supporting three rows of spines on each side. The lemniscus protrudes in the median line. Length of worm 5 to 6 millimetres.

Third, or *Proglottoid.* Body elongated, rounded, no external opening except that for the lemniscus to escape; lemniscus rugose at the base, and when unrolled nearly as long as the body. Length of body 1 millimetre. Ova very minute, $\frac{1}{100}$th of a millimetre in diameter.

Echinobothrium typus. Scolexoid stage unknown. In the *Strobiloid,* a distinct head, neck and trunk exist. The general form is that of Helminthoid worms,—that one mostly assumed by naturalists to be the perfect condition of such beings.

The head resembles in its great mobility that of *Scolex,* or of *Tetrarhynchus.* It may elongate itself into the figure of an arrow-head, or become contracted into a rounded form; and such changes take place with astonishing rapidity. The head is flattened like the rest of the body, and has two overlying very contractile fleshy lobes applied to one another. Within the head and towards its fore-part lies a bulb, rather more transparent than the surrounding tissues, and supporting two rows of hooks, one beneath the other, as seen on viewing the flat surface of the head. This bulb expands itself abruptly, giving off a process on each side the head, which then resembles in figure that of the hammer-headed shark. The hooks previously seen within the head now fringe the extremities of these processes, and in situation resemble that of the eyes of the fish just named. This appearance is to be seen only in certain positions of the head.

Nine of these hooks have been counted disposed in one row; they are all of about the same length and shape, tapering to a point which is curved inwards, and exhibit near their middle a slight enlargement. They are very readily detached.

In the interior of the head, posterior to, and nearer the surface than the bulb, are four flexuose cords, extending thence to the last joint of the animal. These cords resemble those met with in most Tenioid worms, and which M. E. Blanchard has, in some examples, succeeded in injecting.

The neck is clearly defined by constrictions, from the head in front and the trunk behind. It is nearly as long as the head, flattened like it, but narrower; and on each side is armed with three rows of spines, in which circumstance this worm differs from all other Helminths. The spines are nearly of the same length, straight, tapering, with a trifid base imbedded in the soft substance of the animal. Each row has twelve to thirteen closely

implanted but distinct spines, directed backwards, and like those of the head easily separable.

The trunk forms the remainder of the body, made up of numerous segments, first indicated by delicate lines, and towards the posterior extremity by deep constrictions, which ultimately end in transverse fission.

The individual joints constitute the last or adult phase of the worm on the completion of their development, which may occur before their separation from the strobiloid animal. The four cords seen in the latter belong also to this third generation, which however alone possesses a sexual system.

The development of these segments is by gemmation, differing it will be found in no essential points from that in Polypes, if an extended view of the process be taken.

Third or *Proglottoid* generation. Along with yet entire articulated worms, joints are met with living independently as Trematodes, but are the analogues of complete or adult *Medusæ* derived from the fission of the Strobila. After their separation from the strobiloid parent, these joints increase in size so considerably as to equal that of two or three yet attached segments.

They also undergo a change of form;—losing their flat ribbon-like form, they become rounded or purse-shaped. In general characters and in their movements they resemble *Planariæ*, but have been yet more frequently confounded with *Trematoda*.

Their investing integument offers nothing peculiar. Its surface presents neither cilia nor folds, but is occasionally furrowed. Its continuity is uninterrupted, except at the opening by which the lemniscus escapes; no mouth or respiratory organ being apparent. The internal organs maintain an adhesion with the external wall.

No evidence supports the notion that the organ variously called the lemniscus, cirrhus, cirrhule, and penis, belongs to the reproductive apparatus; and the observation of the passage of spermatozoa by it is illusory, for we have examined this organ in every stage of development, and at the period of its greatest vigour, without perceiving the least indication of such a passage. The anatomical character of the lemniscus is also opposed to such a phænomenon.

In our opinion this appendicular organ performs the same office as the tubes of the *Tetrarhynchus*, viz. that of affixing the animals to the tissues, or of infolding them more completely in the mucus in which they live.

Its position varies in different genera: in the Helminth in question it occupies the median line about the posterior third of the body. It is distinguishable when inclosed in its sheath; is

larger at the base, where it is covered with asperities, and when unrolled nearly equals the body in length.

The lemniscus is also lodged in a sac resembling the sheath of the tube of *Tetrarhynchus*, and unrolls itself like that tube. A very perceptible retractor muscle arises from the bottom of the sheath, and thence extends to the extremity of the lemniscus.

We agree with Siebold, that, like as in the *Trematoda*, the *Nematoidea* and other worms, there exists one organ for the formation of the germ, and another for that of the vitellus. The germigenitor (*germigène*) occupies almost the whole length of one side of the body, having a coiled form, and is easily detected when containing germs.

The vitellogenitor (*vitellogène*) is made up of cells more or less round, often very clear, and which are distributed throughout the parenchyma in large number. Ova in their interior are often to be seen in course of development. We believe that the cells rupture, scattering the vitelline globules in the cavity of the body, which then envelope the germinal vesicles after they have undergone contact with the spermatozoa.

A dull white organ is also seen in the centre of the body, which, when the animal is compressed, appears a tortuous cord, like the testes of insects. It has distinct walls, and may be completely uncoiled. We have supposed this tube might terminate at the base of the lemniscus, but have been unable to determine this opinion by observation. We regard this organ as the testes, but do not think it discharges its product externally.

In the interior of the body we have observed ova in course of development, having experienced the action of the spermatozoa; but as there is no perceptible opening externally, we are compelled to admit fecundation to result from the spermatozoa of the same animal, which implies complete hermaphrodism.

Helminthologists generally admit the existence of natural vents for the escape of the reproductive products, but, in the worm described, nothing of the sort is seen. When the skin of an animal, on the object-glass of the microscope, ruptures, the ova escape through the rent.

The ova are very small, measuring but $\frac{1}{100}$th of a millimetre, but are not otherwise remarkable. It is worth while to observe, however, the great difference in size the ova present in animals closely allied. Thus in *Bothriocephalus flos* the ova at the time of their discharge have eight or nine times the volume, and admit of the ready observation of their cells in process of organization.

Affinities.—The *Echinobothrium* is allied to the *Bothriocephalæ*, but cannot be included in that or any established genus. In seeking to classify this worm we have been struck with the sin-

gular confusion presented by the genus *Bothriocephalus*, and with the necessity of another arrangement of Cestoid worms.

The primary character to be adopted is taken from the presence or absence of hooks on the head, according to which we divide the *Cestoideæ* into *Acanthocephalæ* and *Anacanthocephalæ*. The first, the more numerous, forms two very natural families, one of which has a circle of hooks with four surrounding sucking-discs, whilst the second possesses from two to four extremely contractile lobes. The former family is that of the *Tenioideæ*, the latter that of the *Bothrioideæ*, which includes a portion of the *Bothriocephalæ*.

The *Anacanthocephalæ* are at present constituted of a single family, embracing all the unarmed *Bothriocephalæ*.

We present the following as the first sketch of an arrangement of the *Cestoideæ*, for numerous investigations are still needed to acquaint us with all the genera at each epoch of their development.

CESTOIDEÆ.

Section I. Acanthocephalæ.

Family I. *Tenioideæ*.

Genera.	Tenia	Tenia Solium.
	Halysis	H. genettæ (*Gerv.*).
	Trienophora	T. nodosus.

Family II. *Bothrioideæ*.

Genera.	Acanthobothrium, n. g.	Bothriocephalus bifurcatus.
	Echinobothrium, n. g. .	E. typus.
	Dibothryorhynchus .	D. lepidopii.
	Tetrarhynchus . . .	Rhync. corollatus.

Section II. Anacanthocephalæ.

Family I. *Bothriocephalidæ*.

Genera.	Phyllobothrium, n. g. .	Bothriocephalus tumidulus.
		B. flos.
	Fimbriaria?	Tenia malleus.
	Bothridium	B. megalocephalum.
	Bothriocephalus . .	B. latus.
		B. punctatus.
	Schistocephalus . .	B. solidus.
	Cryptocephalus, n. g.	