

the temperature, is more easily effected than in adults. The general discussion of its prophylaxis may be properly omitted here, as this has lately been very minutely described in various text-books, for example, in *Griesinger's* Infecting Diseases. The treatment of cholera diarrhoea, and of cholera in children, differs but little from that practised in the adult. The attempts to check the purging in any manner, as soon as the stools have become watery, bright yellow, or, still worse, rice-water-like, prove totally fruitless. For simple diarrhoea of teething, which, during the prevalence of an epidemic of cholera, must always excite the greatest anxiety, laudanum will always prove the most reliable remedy; but, if true cholera come on, no benefit whatever, according to my experience, need be expected from it. The tincture of opium may be given in from four to five times the usual doses. Should the diarrhoea, however, continue unchanged, as it often does, or if it have existed for one or two days before the narcotic was administered, it may suddenly be arrested, and be followed by the most violent signs of narcotism. Astringents, and especially all those remedies to which any constipating effect has been ascribed, are useless.

It should be borne in mind that, in consequence of the profuse exosmotic current, which takes place toward the mucous membrane of the stomach and intestinal canal, no absorption whatever probably occurs. In the next epidemic, therefore, I intend to select some other places, which seem to be more disposed to absorption, for example, the bladder, urethra, and vagina, and try different remedies, especially of the class of narcotics. Injections into the veins are very difficult to perform, owing to the smallness of the vessels in children, and this practice will hardly ever be successful, on account of the danger of admitting air into them.

As regards the diet and regimen, it should be clearly stated that the proscribing of drinks, by which it is intended to check the profuse diarrhoea, is totally useless and cruel. Children certainly ought not to be allowed too much at one time, but they may drink as often as they feel thirsty. Large quantities of fluids, when swallowed rapidly, are liable usually to cause vomiting. Children prefer cold water to every thing else, and the nursing will draw actively at the mother's breast as long as its strength will allow; and, when it has become too feeble, will swallow the milk taken from the breast of the mother with avidity. An administration of other nutriment, except plain demulcents or lukewarm milk, is, of course, altogether out of the question; warm chamomile and peppermint teas are rejected by most.

The principal indication is, manifestly, an artificial continuous

warming of the chilled surface of the body, which is best accomplished by placing the child in a hot-water bath of 30° R. (100° F.), in which one or two ounces of ground mustard are suspended. The skin thus reddened should be dried quickly, the child then put to bed, and surrounded by bottles filled with hot water, and the diapers should not be changed oftener than once in two hours. By keeping up a high temperature, the pulse that has totally disappeared sometimes becomes again perceptible, the diarrhoea diminishes, the tip of the nose, the ears, and the breath, become warm, and a reaction sets in, which, even then, very frequently indeed, terminates in a fatal typhoid condition.

The most important indication in the typhoid condition is the frequent administration of drinks, in order to restore the occluded passages in the kidneys, and render them again permeable. The nervines, such as camphor, musk, coffee, etc., and the so-highly-lauded quinine, seem to me to have no favorable effect upon the course of this disease. During convalescence, the utmost caution will have to be exercised so long as any abnormal changes whatever can be detected in the stools. Children at the breast should retain their wet-nurses from six to eight weeks after the attack of cholera, and should be weaned very gradually; those brought up by hand should be fed upon mucilaginous soups for a long time, and slowly habituated to a milk-diet.

Consoling and important as the prompt and efficient services of the physician may be regarded, it is problematical whether all his therapeutic measures are of the slightest use to the child with cholera.

(16.) *ENTOZOÆ, ENTHELMINTHES, HELMINTHIASIS* (WORM-DISEASE).—Before we enter upon the discussion of the effect of the single helminthia, it seems proper to give the subject a simple zootomic consideration, for which purpose we take, as a part of our ground-work, *Bamberger's* excellent monograph upon entozoæ, found in his treatise on the diseases of the abdomen. In the alimentary canal of children there are found: (1.) *Tænia solium*; (2.) *Bothriocephalus latus*; (3.) *Ascaris lumbricoides*; (4.) *Oxyuris vermicularis*; and, (5.) perhaps, also *Tricocephalus dispar*. *Trichinæ*, which of late have attracted so much attention, may occur in older children as well as in adults. Small children, so far as I am aware, enjoy a total exemption from the *trichina spiralis*. This is readily accounted for by the fact that they do not eat the meat of the hog, which is known to be a fruitful source of supply of this entozoon. Since trichinosis of children differs in no respect from that of the adult, a description of it may, therefore, be omitted, as the numerous monographs upon this subject

have obtained the most extensive circulation and study, and are accessible to every reader.

(1.) *Tæniæ solium*, and (2.) *Bothriocephalus latus*. (Cestodiæ.)

*Tænia solium* (*T. cucurbitina*, armata, chain-worm), Pl. IV., Figs. 4-7, is a yellowish white, tape-like, jointed worm, fifteen to thirty feet in length, and three to five lines in breadth. Like all *Tænia*, it has the male and female sexual organs united in each of its developed joints, and propagates itself by eggs, which, however, never attain to maturity in the alimentary canal itself. The head, to the naked eye, appears as a white point, on which, with a No. 4 magnifying glass, blackish pigmented suckers may sometimes be detected. Between these is the conical proboscis surrounded by a double circle of hooks, but the individual hooks are so small, that a magnifying power of two hundred is required to see them distinctly. The neck is several inches in length, not jointed, resembles a flattened thread, and gradually merges into the body, which, as already stated, is jointed. The first joints have a greater transverse diameter, which becomes gradually less posteriorly, till toward the end they are square or parallelogram in shape, with blunt corners. On the latter the genitals are distinctly seen, for a projection is found on their borders with the orifices for the vagina and penis, and the ovary is seen through their translucent walls. This projection is generally situated alternate on the borders of the joints.

New joints constantly form at the head, while at the tail the old joints are constantly cast off. These cast-off segments or joints appear in the stools, and are frequently compared to pumpkin-seeds in appearance, and thus the definition of *tænia cucurbitina* has originated.

(2.) *Bothriocephalus latus* (Pl. IV., Figs. 1-3, *tænia lata*, the broad tape-worm) is very similar to the preceding, but is distinguished from it by the following peculiarities: It is of a darker grayish color, the head oblong, with longitudinal depressions, without snout and without the rows of hooks. The neck is much shorter; all the joints are broader than they are long, and overlap each other in the form of slates upon a roof; and the most characteristic feature observable on every joint is, that the sexual orifices are *not on the border, but in the centre of the joints*.

The eggs are of a brownish color, and glisten through the central portion of the translucent walls of every joint like yellowish-brown rosettes. The *bothriocephalus* has, in addition, the peculiarity of not readily casting off single mature joints, but always whole rows of

joints, and this materially aids us in forming the diagnosis, since we have to rely upon the history of the patient almost entirely.

These two kinds of worms display a remarkably reciprocal exclusion. Thus the *bothriocephalus* occurs only in Russia, Poland, and Eastern Prussia, as far as the Weichsel, while *tænia solium* is seen in all the rest of the countries of Europe, except Switzerland, where, according to Mayer-Ahrens, they are both observed.

They are extremely rarely found in children under one year of age, in nurslings probably never. *Tænia solium*, according to *Küchenmeister's* investigations, originates from *cysticercus cellulosa* of the pig, and therefore occurs only in children who partake of hog's meat.

(3.) *Ascaris lumbricoides* (Class of Nematodiæ), round-worm.

The round-worm, Pl. IV., Figs. 8 and 9, is a round, yellowish, or reddish worm resembling the earth-worm, of five to ten inches in length, and one to three lines in thickness. It is very slightly flattened, has a mouth and an alimentary canal; the head is distinguished from the body by a constricted point, and is composed of three papillæ, which, during the act of sucking, are capable of dilating themselves into a broad suction-cup. The male and female can be easily distinguished; the male is smaller than the female, and has a curved tail, and occasionally a couple of very fine small white hairs are seen close to the end of the tail, indicating the position of the penis. According to *Küchenmeister*, if the body of the female be pressed, a thin bag (the ovaries) is squeezed out from the vaginal opening, which is located in the anterior half of the animal, attended by an effusion of a milk-like substance (the eggs). If the male worm be squeezed, a milky juice (semen) flows out from near the anus, without any rupture or prolapsus taking place. The skin, according to *Czermak*, consists of six layers, and is formed of tape-like transverse rings which are not endless, but sometimes split dichotomously, and usually terminates at the lateral lines of the animal.

The round-worm inhabits, by preference, the small intestines; is seldom found solitary, but in numbers of from five to ten, and sometimes as many as two or three hundred. It is much more frequently met with in the alimentary canal of children than in that of adults. It does not occur in nurslings, but may in small children who are brought up by hand on meal-jam or toast-broth. The eggs of this worm are undoubtedly introduced into the alimentary canal with the food; at least no other supposition can be assumed, since, according to *V. Siebold*, the female ascarides never bring forth any living young, nor is the spawn ever found in the human intestines. They seem to prefer

amylaceous nutriments, but it does not follow from this fact that all children who readily eat bread harbor ascarides. Were it otherwise, there would certainly be no child that did not suffer from them.

(4.) *Oxyuris vermicularis* (*Ascaris vermicularis*, spring-worm, intestinal moth, maggot-worm). Class of Nematodæ, Pl. IV. Figs. 10-13.

The name oxyuris is only applicable to the female, not to the male worm. The female is thin, yellowish white, of from two to five lines in length, with a straight, awl-like, pointed tail. The male is barely a line in length, and has a strongly-curved tail. Both have a bulbous head, with two lateral, bladder-like membranes. The female is found in vastly greater numbers than the male, and the latter is *never found in the stools*, because it adheres very firmly to the intestinal mucous membrane, from which, according to *Zenker*, it may very readily be scraped off with the mucus after death. The male worm is still more easily collected when the alvine secretions of the large intestines have been washed away by diarrhoea. The usual abode of the oxyuris is in the rectum. In the large intestines it is found in small numbers only, and scarcely, if ever, in the small intestines. It travels from the rectum, especially when the children lie in warm beds, and wanders to the vagina in girls. *Küchenmeister* says it is a "superstition" to regard them as only or chiefly peculiar to childhood, and affirms that he has observed them twice in the adult. But every experienced physician, who practises in a region where oxyuris is at all common, will be able to offset those two adult cases by as many hundreds of cases of children, and hence I see no good reason at all for rejecting this "superstition."

(5.) *Trichocephalus dispar* (Nematodæ). Whip-worm. Pl. IV., Figs. 14 and 15.

The trichocephalus is a white, long worm, of from one to two inches in length, as thin as a hair at the head, and very gradually grows thicker posteriorly, presenting a strong resemblance to a whip-stalk. At the tip of the thin extremity an unarmed mouth is found, in which the cesophagus terminates. In the female the posterior part is straight, and exhibits a simple, straight vagina, but in the male it is spirally twisted; the end is provided with a small prepuce and a penis.

This worm is found almost exclusively in the cæcum and ascending colon, and is very seldom seen in the fæces, because, as it seems, it very unwillingly leaves the gut. Once, while making a *post-mortem* examination of the body of a girl fifteen years old, who died of cholera on the fourth day, after the most profuse diarrhoea, I found at least thirty of these animals in the cæcum, and all the physicians

present at the examination expressed their surprise at the animals having remained in the bowels for four days with such liquid and profuse evacuations. It is very rarely met with in children, and in fact has only been described for the sake of completeness.

**Symptoms.**—In regard to the symptoms which are occasioned by the entozoa, much has already been written and disputed. Our predecessors undoubtedly attributed too great an importance to intestinal worms, and believed that many serious diseases were caused by them, for no other reason than that, during such disease, these worms passed off and then restoration to health followed. The symptoms attributed to them became more and more numerous and variable, and finally so confused and improbable, that intelligent physicians began to deny the existence of worm-symptoms, as many do even at the present day, especially the Viennese physicians. Like every thing else that is new, this negation found many adherents, and for some time it was very fashionable for one not to know any thing about the anthelminthia. Some symptoms, however, cannot be ignored, and, in order to proceed safely, I will only mention those which I myself have observed many times. They may be divided into local, general, and reflex symptoms; the imaginary symptoms which in adult tape-worm patients occur so frequently, we may in the Pædiatria, fortunately, ignore altogether.

**A. Local Symptoms.**—Of the local symptoms, those which arise from the direct irritation of the entozoa are first of all to be mentioned. Pain is a very frequent symptom; sometimes it is pinching, gnawing, boring, etc., and is uniformly intermittent. Various articles of food, especially those which are very salty, or aromatic, or sour, increase it, and consequently all kinds of fruit aggravate it, while milk, oleaginous and fatty nutriments, generally mitigate it. The appetite in worm-patients is usually normal, sometimes, however, diminished; it is not easy to decide in children whether it is increased by worms, because it is well known that at different times an abnormal augmentation of the appetite occurs in every child. Generally the cause of an augmentation of the appetite is to be sought in a more rapid development or more active exercise, and bodily exertion, and not in the existence of worms. Vomiting may become superadded, either as the effect of the entrance of a worm into the stomach, or as a reflex phenomenon, having its source in the irritated mucous membrane. *Ascaris lumbricoides* frequently find their way into the stomach, where by their movements they seem to induce retching and vomiting, by which, to the great horror of the parents, they are sometimes thrown up. The youngest child that I saw throw up a round-worm was nine months old, and had merely partaken of a little

meal-broth, along with the milk of the mother, for only three months. The stools are generally irregular; sometimes there is constipation, and sometimes diarrhoea is present; with the latter, as a rule, a great number of the entozoa are expelled. The large masses of mucus (so-called worm-nests), which occasionally pass off from tape-worm patients, are seldom observed in children, because tape-worm is rare in children.

In girls, oxyuris sometimes travel from the rectum, where they occasion incessant itching, into the vagina, redden its mucous membrane, and give rise to leucorrhoea. The incessant tickling sensation they produce is often the stepping-stone to onanism, of which practice it is seldom possible to break them, even though the oxyuris have long been expelled. In boys they sometimes crawl up under the prepuce, from which balanitis, erections, and similar inclinations to onanism, may likewise be developed.

The round-worms extend their wanderings even farther than the oxyuris. They sometimes get into the oesophagus, causing vomiting, thence into the mouth and nose, and are even said to have passed into the larynx and produced suffocative attacks. In some *post-mortem* examinations, abscesses of the liver have also been found, in which one or two round-worms were hidden. These have doubtless found their way into the gall-ducts through the ductus choledochus, and then caused inflammation, hepatic abscesses, and death; they have been also found in the ductus pancreaticus and appendix vermiformis, where they produced irritation and suppuration. The extremely rare instances in which encysted ascarides were found in the peritoneal sac have lately been doubted altogether, because no organ can be detected on any part of the body of the worm by which it would be able to perforate the intestines. I have not seen such a case, and am therefore unable to decide; but *V. Siebold*, one of the most eminent helminthologists, and known for his conscientious observations, maintains that the ascarides are able to insinuate themselves, with their firmer cephalic extremity, through the coats of the intestines, and penetrate into the abdominal cavity, without it subsequently being possible to detect any trace of the perforation of the bowel. The penetration of the muscular coat is indeed possible, but how the compact mucous membrane and the dense serous coats are made to give way before so mild a pressure as the round-worm is capable of exercising, is really difficult to imagine.

*B. General and Reflex Phenomena.*—Itching of the nose is a very common symptom of the presence of worms; still, it should not

be forgotten that almost all children bore and rub their nostrils and nose, whether they have worms or not, so that this symptom has no great value. I have often seen dilatation of the pupils disappear with the expulsion of ascarides, and I consider it, though not a very constant symptom, one sufficient to merit regard. Convulsions of various kinds, especially epilepsy and chorea, have been looked upon as being connected with entozoa. As these views are also entertained by the laity, I have in many instances been requested to treat such children for worms, but have been unable to detect any entozoa, or any change in the convulsions, notwithstanding the employment of the most energetic remedies. The occurrence of worms in choreic and epileptic patients seems, therefore, to be a mere coincidence.

I doubted, until I finally convinced myself of it, whether worms can produce severe hydrocephalic symptoms. Some years ago a child was brought to our children's hospital in a dying condition, having been first attacked by convulsion a few days before. It presented all the signs of a child dying from acute hydrocephalus, and died in a few hours.

To our great surprise, at the autopsy we found the brain and its meninges, the heart and lungs, the liver, spleen, and kidneys, in a perfectly normal state, but in the intestinal canal there were more than a hundred round-worms, rolled up in small and large balls, at some points completely choking up the calibre of the canal; the mucous membrane itself in the same regions had become reddened.\*

*Diagnosis.*—By these local and general symptoms a probable diagnosis may, it is true, be arrived at; a certain one, however, is only derived from the appearance of helminthiæ in the evacuations, or, in the case of tape-worm, the appearance of single pieces. Since the ordinary vermifuge remedies are harmless when given to children free from intestinal catarrh or other disease, we are justified in administering them to children presenting the symptoms just described, in the hope that the expulsion of worms may confirm the diagnosis.

*Treatment.*—(1.) The expulsion of *tape-worm* may be undertaken in children of one year and over, providing they are free from diar-

\* That the reflex symptoms are sometimes of the most peculiar and variable kind is seen from the two following singular cases, which lately occurred to me. In the first, a girl three and a half years old, they manifested themselves by a croupous cough, differing in no respect from that occurring in genuine croup; in the second, a boy five years old, by severe and protracted toothache of almost all the teeth of the upper jaw, though, on examination, they were all found to be perfectly sound. In the former, the cough had a periodic character, i. e., it would come on whenever the oxyuris accumulated in any considerable numbers in the rectum, and would disappear as soon as these were expelled; in the latter, the toothache persisted until a long round-worm was expelled, since which the boy has been free from it.—Tr.

rhoea, and otherwise healthy. Very young or teething children tolerate badly even the mildest tape-worm remedies. The simplest and surest remedy is *cortex radic. punice granati*. The precaution, however, should be taken to have it fresh and sufficiently macerated. For children of from two to five years, the following formula will be found useful:  $\mathcal{R}$ . *cort. rad. punic. granat. rec.*  $\mathfrak{z}$  j, macera c. aqua fontan. libr. j, per horas 24 dein coq. per hor. 12 ad remanent.  $\mathfrak{z}$  vj. Two ounces to be given at half-hour intervals in the morning, fasting, the bowels having been gently moved the preceding day by the use of boiled dry prunes. It is advisable to have a double quantity of the granat-bark decoction prepared, because occasionally one or the other portion is thrown up, and in that case should be repeated in half an hour. After one or two hours, the whole worm is usually expelled. If this do not take place, or if the head of the tape-worm cannot be found in the stools, the same procedure may be repeated after a few days, without any detriment to the health. Generally no persistent diarrhoea nor colics are produced by this remedy, but, when they do occur, they may soon be relieved by emulsions.

Where the fresh bark of granat-root is not obtainable, or if the child cannot be induced to take it, other remedies may be resorted to. Among these we may mention: *Ext. felic. mar. aether*  $\mathfrak{D}$ ss, the blossoms of *Brayera anthelminthica*, of which an ounce may be given, mixed with honey into a confection. Drastic purgatives, such as *gummi gutti*, *colocynth*, and *croton-oil*, should under no circumstances be given. In sickly children this treatment for tape-worm should never be practised. I am conversant with cases in which, notwithstanding the presence of the tape-worm, children have gradually recovered their health, the worm not seriously influencing development.

(2.) *Ascaris lumbricoides* seldom produce any serious disturbance or characteristic symptoms, and often pass off in large quantities from perfectly healthy children, in which neither any subjective nor objective symptoms preceded. The usual method of expelling them consists in active purgation with the following substances, viz.: *pulv. semin. cinæ*  $\mathfrak{z}$  j, and *pulv. rad. jalap.*  $\mathfrak{z}$  ss, divided into four or five powders, which are to be taken at intervals of two hours. It is easier, as a rule, to administer these powders mixed with a little water, than when made into a confection with honey. Owing to the alkaloids having come into such general use of late, it is customary to employ the essential principles of remedies instead of the gross substance, as they possess all the virtues in much smaller bulk. Hence a few grains of santonine are now given in place of a drachm of cinæ-seed. But the effect of santonine is by no means as brilliant as has been claimed by

some; on the contrary, it is very problematical and much inferior to the ordinary cinæ-powder. Although the fear of calomel, with which some individual therapeutists are affected, is by no means well grounded, its employment as an anthelmintic has no defence. Children are liable to crush the wafer in which the powder is enveloped, in the mouth, and then generally get stomachace from it. In all the text-books on the diseases of children, *ol. ricini* plays a manifold part, and some physicians omit no opportunity to make the children happy by prescribing a few teaspoonfuls of castor-oil. I have frequently tried to administer it, but have succeeded in but few cases, as most children refuse to swallow it and spit it out. I have therefore discarded it altogether.

(3.) Against *oxyuris vermicularis* internal remedies are of but little use; on the other hand, it is very easy to remove them by clysters, since they are almost wholly located in the rectum. Various vermifuge remedies, such as decoctions of *garlic*, *onions*, *asafetida*, *valeriana*, *tanacetum*, or a few drops of *turpentine*, *camphor*, salt water, and even a weak solution of corrosive sublimate, may be added to the clysters. The principal object, however, is always to soften the contents of the rectum, and to cause their expulsion once a day. This is easily accomplished with simple cold-water. Two cold-water clysters daily, continued for four weeks, will invariably expel all oxyures. If leucorrhoea at the same time be present, cold-water injections will be found equally efficacious for that. In the large liquid evacuations which follow the first cold-water clysters, such a countless number of oxyures is sometimes found, that the liquid fæces are kept in a constant state of agitation by the swarm of animals.

(4.) *Trichocephalus dispar* never produce any symptoms, and are scarcely ever seen in the evacuations, but always observed accidentally at the autopsy; a description of the method of expelling them is therefore impossible and unnecessary.

#### E.—LIVER.

The liver is comparatively much larger in the new-born child than the yearling. *Frerichs*, however, is unable to confirm the assertions of *Portal* and *Meckel*, according to whom the liver should be one-fourth heavier in the new-born child than at eight to ten months. That author found that the weight of the liver in comparison to the whole body is

As	1:	17	in a seven months' fetus,
"	1:	28	in a new-born child,
"	1:	24	" " " "
"	1:	20	" " " "
"	1:	33	in a child sixteen months old.