nervous and hysterical patients, without any visible source of irritation whatever, and only traceable to the intangible influences of mental emotion. Several of you may recollect the patient Emma Simkiss, who had frequent cough without any expectoration, a pulse of 120, occasional wheezings, and great dyspnoea, so that the respirations were upwards of forty in the minute, though the resonance was clear. She took antimony, digitalis, and ætherated lobelia, after which the pulse came down, and the wheezing and cough diminished, but the frequent respirations remained as before—at 40. Observing her excitability, she was put under the test of the spirometer. After trying again and again for at least ten or twelve times, she seemed able to expire no more than 32 ounces or so; yet, at length, after a deep sigh and a determined perseverance in expiration, she emitted not less than about 96 ounces of air, which of course was decisive as an evidence of the nature of the case. The same observations apply to whooping cough, under the admonitory recollection that it depends on a specific morbid poison, which is apt to induce inflammatory action in the stomach, lungs, and medulla oblongata itself, which shall run a determinate organic course, irrespective of the greater or less amount of the concurrent diaphragmatic and laryngeal convulsion.

OBSERVATIONS ON HYDATID DISEASE OF THE LIVER.

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PART II.*

At the conclusion of my last paper it was mentioned that the hydatid consisted of an external fibrous sac, which contains the true acephalocyst which is formed of numerous concentric laminæ, and of a fluid enclosed by these; the echinococci were described, and my belief that the refractile globules which, after a certain age, are apparent within their bodies, are ova, asserted. In the present communication there will be found a description of the development of the secondary acephalocysts and of the echinococci; the method of generation of the primary acephalocysts is dwelt upon, and their distribution and decadence noticed.

The primary acephalocyst, having, in a manner presently to be explained, obtained a position suited for its growth, rapidly enlarges, and develops within itself secondary cysts and echinococci. The two innermost laminæ of the acephalocyst have to do both with the generation and development of the echinococci and secondary cysts.

The innermost lamina, it is to be recollected, is washed on its inner surface by the fluid of the acephalo-

cyst; its outer surface is in apposition with the inner surface of the second lamina. The secondary cysts are developed in the following manner:—A mass of jelly-like substance is deposited from the inner surface of the second lamina; it necessarily causes a projection of the first or innermost lamina, which it separates from the second. In fact, an interlaminar space is formed, which is occupied by the new deposit. Highly refractile molecules soon appear in the deposit, which rapidly becomes opaque and granular. The first lamina is now stretched tensely over the deposit, and becomes more so as this increases in bulk. Clear spaces now form, and the indistinct outlines of microscopic cysts are seen in all parts of the deposit. By rapidly increasing in number and in size, these miniature acephalocysts rupture the first lamina, and escape into the fluid of the parent acephalocyst.

It is to be noticed that the second lamina has nothing to do in this affair, but to throw out the deposit; it undergoes no thickening. The first lamina is rendered tense, and bursts with a rent commensurate with the dimensions of the new formation. Occasionally the cysts grow to a considerable size whilst between the laminæ, and render the parent cyst very opaque in the spots occupied by them. After escaping from the interlaminar space, the newly-formed cysts sink, by their weight, to the bottom of the fluid in the parent cyst, and remain in apposition with the first lamina, whence they draw their nourishment. Growing more or less rapidly, according to circumstances, the secondary cysts become more and more laminated, and soon produce others within themselves. It appears that the secondary cysts, when just developed, consists of two laminæ only, and that the third lamina is gradually produced from the most external by a kind of fissiparous development; the fourth appears to be produced in a like manner from the third, and the fifth from the fourth, and so on. The cysts developed by the secondary cysts are evolved in the same manner.

The importance of the second lamina is very great; it deposits the cyloblastema whence the secondary cysts are developed, and it adds to the size of the cyst, to which it belongs, by splitting, and thus producing another lamina; the echinococci are moreover developed by it in the following manner:—At certain spots the second lamina undergoes thickening, and at corresponding situations a slight deposit occurs upon its inner surface; the first lamina is slightly stretched upon the new formation. Gradually the thickened part of the second lamina, with the deposit covering it, contracts at the base, and enlarges at the part most remote from the unaffected portion of the lamina, and in a short time quite a change takes place in the position of the tissues. The innermost or first lamina is seen to form a sac, which encloses a mass with a constricted base; this mass consists of a central stalk-like prolongation from the second lamina and of a faintly granular body placed upon this. These projections into the fluid of the acephalocyst sometimes exist in such numbers as to give quite a ragged aspect to its interior. As yet there is no sign of animal life, but after a while the stalk-like

* Continued from page 60, No. III., February 5, 1851. It is as well to have the former number at hand, as it is constantly referred to. The difficulty of obtaining specimens has caused the delay in the production of the paper.—P. M. D.

prolongation becomes covered with a deposit, identical with that it supports; it is in this new deposit that, first of all, little round bodies are seen; they are attached by their bases to the stalk-like prolongation, their free surfaces are surrounded by the granular deposit, and they are kept from the fluid of the parent acephalocyst by the interposition of the first lamina. These round bodies increase in size, their attachment becomes constricted, and in a short time the constricted part elongates into a stalk. The general appearance of the central stalk-like prolongation of the second lamina, with its little stalks, each terminating in a globular body, and the whole surrounded by the investing innermost lamina, is very peculiar.

The granular deposit gradually disappears. Very shortly after the globular bodies become stalked, a line of lighter tissue than the rest appears in each of them, near the centre, and at right angles to the long axis of the stalk; this bright line is afterwards the seat of the peculiar teeth. From a simple globule the echinococcus is thus rapidly developed, the stalk-like connexion between it and the central prolongation of the second lamina gradually attenuates, and finally separates. The sac formed by the first lamina is either ruptured before or immediately after the separation of the echinococcus from the stalk; and these creatures, still in imperfect states of development, pass into the fluid of the acephalocyst, and obtain nourishment by attaching themselves to the walls by their teeth. The fully-developed creature has no projection from its body, the immature echinococcus has the remains of its stalk. As the echinococcus advances in age the bright spots, which I believe to be ova, appear.

In those acephalocysts which have undergone a spontaneous cure, the fluid in which the echinococci float is nearly absorbed, and they will be occasionally found congregated in considerable numbers wherever there may happen to be an excess of moisture. In a case I have already mentioned numerous echinococci in the above predicament were found; they had lost their bright globular spots, and were surrounded by spherical cells with granular interiors.

Although I have been unable to make out the process of development of the echinococci in the secondary acephalocysts, I have no doubt but that it resembles that already described as occurring in the parent cyst.

A patient in the Colchester Hospital, who had had a blow on the loins, and is now suffering from a superficial hydatid cyst, has enabled me to satisfy myself as to the above particulars, and has added to our pathological collection a perfect globular secondary acephalocyst, containing others.

A weak solution of Goadby will preserve hydatids for any length of time, and a good quarter of an inch power is sufficient to distinguish the beautiful laminæ and the echinococci. It is most difficult to explain the method by which acephalocysts enter the system; most probably the ova of the echinococci produce creatures adapted for perforating tissues, and which deposit ova which develop acephalocysts within the structures of the body. We constantly find that entozoa, whilst free

and unattached to the creature they are about to inhabit as parasites, differ in external conformation from those of the same species found within the creature. In one class the organs of locomotion and of perforation are successively lost as the entozoon passes into the body of its victim. In fact, the further an entozoon penetrates the simpler does its organization become. So we have some right in asserting, as a probability, that the echinococcus, before and whilst perforating, differs from that which is developed from the tissues of the acephalocyst. Neither acephalocysts nor echinococci have ever been found on the free surface of the body or even on the mucous membranes, but they have been found in the blood vessels, but, of course, subsequent to some perforation. Andral (*Clin. Med. ii.*) p. 412, gives the following interesting case:—

A man, aged 55, with all the symptoms of organic disease of the heart, died asphyxiated. Both lungs were found to be filled with a great number of hydatids, which were first thought to be in the substance of the lung, but on careful dissection it was discovered they were all lodged in the pulmonary veins. Andral traced these veins from the heart to the lungs, and on reaching their almost capillary divisions he found that many of them presented a great number of pouches, which were formed by dilatation of a portion of the vessel, and which were filled with hydatids. Beyond each of these dilated portions the vein regained its former calibre, and a little further on became dilated again. The largest pouches were of the size of a walnut, the smallest scarcely as large as a pea. The hydatids had all the characteristics of acephalocysts.

This most important case gives us a clue to the means by which the acephalocysts are scattered about and located in the body; it explains how we find them in the brain, bones, liver, lung, mesentery, kidney, and in most of the tissues of the body; it gives us reason to believe that the germ, from which the acephalocyst springs, is translated from place to place with the blood until it reaches a vessel so small as to check its career. Dilatation of the walls of the vessel is then brought about by the increasing dimensions and consequent pressure of the acephalocyst, and the tissues around begin to suffer, and undergo those structural changes explained in my last communication.

The relation which the echinococcus bears to the acephalocyst, is indeed curious; the fact of a creature producing an offspring totally unlike itself strikes one as being very paradoxical, but the instances about to be given will, it is trusted, be satisfactory. In the distribution of hydatids, the enormous numbers of entozoa, and their ability to withstand external influences, must be held in mind. It is also to be noticed that very few out of the myriads of entozoa that attempt it, fulfil their destiny as parasites; and we must remember that there is a vis in the healthy body which enables the system to repel the attacks of both ento- and epizoa.

One of our greatest comparative anatomists, in noticing the immense number of ento- and epizoa, and the singular capacity they have for resisting destructive agencies, remarks, that in all probability every species

of entozoon has a different manner of entering the system of the animal of which it is to be a parasite. The more one studies the economy of entozoa, the more does the above remark strike the attention, in fact the variety of the methods by which a fragile little creature is enabled to reach a position in an animal larger than itself, where it can fulfil its destiny, is marvellous. Everybody is familiar with the fact that Nordmann*, some years ago, startled the scientific world by announcing his discovery of fifty-eight species of entozoa in the eyes of different fish. Now, Steenstrup made out their method of entrance, and distinctly proved that the chambers of the eye are the only places where these entozoa are fully developed. The life of one of these eye parasites is as follows:—Springing from an ovum a small, soft, and yet active creature, it grows rapidly, and speedily frequents the neighbourhood of the head of the fish it is destined to inhabit; it attaches itself to the cornea, and gradually insinuates itself through its layers, in a direct line, however. Arrived in the anterior chamber, it remains at rest close to the opening it has made, a film forms around it, and thus enclosed, it undergoes a metamorphosis. When this is completed, the film is ruptured, and the true eye parasite is at liberty to range about the interior of the organ. A white streak indicates, for some time after, the line of entrance through the cornea. But if the parasite happens to pierce any other part of the body of the fish, (the external tegument, for instance,) it undergoes metamorphosis all the same, but never escapes from its film; the conditions requisite for its future maintenance do not exist, that is to say, there is no expanse of fluid in which the creature, if perfect, can live after its emergence from its case. Steenstrup has, moreover, traced the path of an amphistomum through the mucous membrane of the rectum of the common frog, and has found it undergoing metamorphosis on the mesentery. He has also demonstrated the entrance of a cercaria into the skin of the common fresh-water snail. He has shown how it is modified in form to suit its new abode, how it pierces all the organs, even the heart itself, and how it lives upon the juices of the gasteropod. At this time of the year any careful observer may, by following Steenstrup's† directions, satisfy himself how thick tissues are pierced by soft entozoa.

It is evident that the structure of the acephalocyst differs from that of the cyst which encloses certain species of perforating entozoa during their metamorphosis. It is to be noticed also, that the echinococci are developed from the acephalocyst, and undergo no change. Much impressed with the value of Steenstrup's researches in the generation of the lower animals, I do not hesitate to recommend his book to all interested in natural history, especially as I believe that he gives us the strongest analogies by which we may explain the generation of acephalocysts. The medusæ or jelly fishes which frequent our shores, present in the autumn

globular ova within the ovaries; whilst in the ovaries young are developed in the ova. These oval or cylindrical-oval young quit the egg, and are collected into special receptacles formed in the tentacles of the animals, whence, after a time, they escape.

Now, this progeny does not resemble the parent in any one particular; each newly-born creature swims about with the assistance of its ciliary covering, until it reaches a fit place for its future career. A depression now appears at one end of its sac-like body, and this depression soon turns out to be an apparatus by which the body is to be firmly fixed and located. Soon four, then six, then twelve, then thirty and more tentacles are developed from the free extremity of the animal, which then presents every aspect of a polype. Now, this polypiform descendant of a free swimming medusa does not produce ova, but develops creatures from its own body, both by fissiparous and gemmiparous generation, like unto its parent. In other words, a medusa lays eggs, which, when hatched, produce creatures unlike the progenitor, but which, by-and-by, without the interference of an opposite sex, develop into medusæ. The cercaria I have already mentioned as attacking the fresh water snail, possesses the following peculiarity of generation:—After the cercaria has lived for many months, in the water surrounding the snail, it will be noticed that its visits to the creature it is soon destined to inhabit as a parasite, become more frequent. Swimming about for a short time, these cercariæ attach themselves by their suckorial cavities to the snail's integument, so that their anterior extremities and their tails are free. After a while they endeavour to insert their head, and as much of the body as is possible into the mucous integument; they then lash out the tail forcibly from side to side, and at last wriggle it off, and their first phase of existence is ended. The creature now resembles a fluke or distoma, and it could not fail to be recognized as such, in case it were met with in the viscera of other animals. As soon as the tail has been got rid of, the cercariæ, which, during their late violent exertions, have been covered by a thick mucus, begin to turn round and round in a serew like motion, and endeavour to pass through the integument in which they are embedded, and to reach the adjacent organs. It is worthy of notice, that the deeper they penetrate the simpler in organization do they become, that is to say, they gradually lose the suckorial cavity and their skins become thinner, and their spines less distinct. Whether the cercariæ pass through the integument, or remain embedded in it, or simply remain attached by their spines to the outside, in a short time the mucus around them hardens, they become quiescent, cast off a thin skin, and surrounded by these as by a cyst, undergo a metamorphosis. Emerging, they after awhile produce ova. The ova produce creatures which bear no resemblance to their parent—creatures which grow rapidly, take on a yellow colour, and which do not produce ova. These yellow beings are to be seen at this time of year in all the organs of the fresh water

* Nordmann, *Mikrographische Beiträge Zur Naturgeschichte der Wirbellosen Thiere*. Berlin. 1832.

† Steenstrup's *Alternation of Generations*—Ray Society.

* See Busk's Translation.

snail; they soon begin to develop little circular cells within their integument. Now, these cells are not ova, but become gradually developed into cercariæ, which at last burst the integument and escape. So that the cercaria produces an ovum, out of which comes a creature, the yellow worm, which produces in itself creatures like its parent cercaria, before it had entered the body of the snail.

It is found also, that some of these yellow worms do not produce cercariæ inside them, but creatures like themselves, which in their turn develop cercariæ. This wonderful series of structural changes singularly adapts the cercaria for its abode; and Nature, knowing how few of these entozoa fulfil their destiny, and how many die before they are capable of reproducing others, evidently formed the yellow worm to prevent their extinction. This yellow worm has the same destiny as the fixed offspring of the medusa, they both produce creatures from their own bodies, unlike themselves, but resembling their parents. Steenstrup calls them "Ammen," wet nurses. This remarkable natural phenomenon of an animal producing an offspring which at no time resembles its parents, but which, on the other hand, itself brings forth a progeny, which returns in its form and nature to the parent animal, is seen in many of the lower classes of animals, and has been studied in the medusæ, claviform polypes, salpæ, trematoda, and cestodea. It is also to be noticed, that in higher animals a peculiarity exists—in aphides for instance. In the spring, male and female aphides are hatched, and the female is impregnated and brings forth eggs; these produce aphides, which, even to the twenty-fourth descent, produce eggs and progeny unlike the parent, without further impregnation. The last eggs of the season produce male and female insects, which in the usual manner contribute to the existence of the next year's numbers. The fact I have wished to establish, is, that it is frequent for certain lowly-organized animals occasionally to produce creatures unlike themselves, which develop others resembling the parent. To suggest that the acephalocyst is an "amme," which develops creatures like those by which it was generated, viz., echinococci, and which, like as the "ammen" of the cercariæ is capable of developing others like itself, or in other words, of producing secondary acephalocysts.

I think that we may reasonably believe that the ovum whence the acephalocyst springs, is the product of an echinococcus, that this ovum is introduced from without into the system, that when it obtains a nidus, it after a while produces a globular albuminoid cyst, which, if it can overcome the resistance of the surrounding parts, and that natural resistance of the healthy body against all parasites, gradually enlarges, and, when it becomes visible to the naked eye, is called a simple acephalocyst hydatid. During the course of its growth, by its pressure, it produces alteration in the contiguous parts, bones, blood-vessels, nerves, and whatever may be in the way, become absorbed or degenerate into tough fibrous tissue, which forms the protective wall of the hydatid. After a while echinococci are developed in the lamina of which the acephalocyst is formed, they

soon pass into the limpid fluid, which gives it form and tenseness, and either float about or attach themselves by their circlet of hooks. The echinococci, when first developed, are elongated shut sacs, of a brownish colour, and possessing the rudiments of the circlet of teeth; they have no markings on their surface. Dr. Budd, in his correct description of the mature echinococci, writes as follows:—"Studded with globular bodies, which, from their refracting light strongly, have, under the microscope, a strong dark outline and a bright centre." I have noticed in my last communication, that these bright globules are ova.

These ova, I believe, produce echinococci modified in external form for the purpose of being able to perforate tissues, and these echinococci deposit in the blood vessels ova, which are the germs of acephalocysts, producing, by gemmiparous development, ova, bearing echinococci. The acephalocyst, once deposited in one of the blood vessels, passes onwards with the current until it is stopped in some capillary, the smallness of whose calibre could not allow it to pass; it becomes stationary, the liquor sanguinis nourishes it, and produces, according to the resistance of surrounding tissues, a more or less rapid growth. In bone, and in the denser tissues, the acephalocyst grows slowly, but in the folds of the mesentery its growth is exceedingly rapid. The walls of the capillary first suffer; becoming distended, (the apertures being soon closed,) they, in all probability, form the innermost layer of the fibrous sac. Subsequently the progressive growth causes absorption of all the soft parts. Influenced by its pressure, the blood vessels and masses of white fibrous tissue by which these are pervaded, remain in a degenerate state, as part of the sac; and in the liver, bile-ducts of no small size, with their cavities obliterated, undergo the same fate. There appears to be no limit to the growth of well-nourished acephalocysts; they attain to their greatest size in the mesentery. Killing by their pressure or exhausting effects, they occasionally undergo an intrinsic degeneration. It is worthy of notice that occasionally acephalocysts are solitary, that is to say, they may attain a considerable size without generating within themselves secondary cysts. There appears to be no limit to the numbers in which acephalocysts may exist in the system, the presence of one alone is indicative of a loss of that power of resisting the entry of parasites which is peculiar to a healthy being; it is therefore not to be wondered at that many are gradually introduced. I totally disbelieve that whilst in the body one acephalocyst can generate others externally to itself; but there is no reason why, if a large acephalocyst bursts into a cavity, the secondary cysts, providing they can be nourished, should not progress and live.

Hydatids very frequently are destroyed by suppuration of the inner layers of their fibrous sac; this may be caused by violence, or by perforation with knife, cautery, or trocar. And it does not follow that the acephalocysts are materially injured; they are to be found entire, floating about in creamy pus and their peculiar fluid, but as a rule the echinococci perish. I have

mentioned that decadence which invariably occurs after a while of the tissues of the fibrous sac in my last communication, and lately whilst satisfying myself on the correctness of some of the above remarks, I had several beautiful specimens of degenerating acephalocysts. The acephalocyst does not appear to suffer any structural change until long after the deposition of that exudation matter within the vessels and tissues of the external fibrous sac, which has been accounted for in the last paper. It is necessary to recollect that the acephalocyst consists of numerous concentric layers, each of which is in close apposition with a layer on either side. In the healthy acephalocyst the layers are in most perfect contact, no fluid even exists between them, but as the supply of nutrient fluids is cut off by the structural changes in the external fibrous sac, so do we notice in many places slight granular deposits between the laminæ. Now these deposits have, as a rule, this peculiarity: they occur between successive laminæ, and each is in the line of a radius, or of an imaginary line, drawn from the most external laminæ to the centre of the acephalocyst, consequently the line of deposit is at right angles to the direction of the laminæ. Generally speaking not more than twenty interlaminar spaces become affected in one of these lines; the deposit is small in the most external interlaminar space, larger in the next, and increases in successive spaces till the tenth or twelfth, when it decreases gradually to the twentieth. These deposits soon undergo a change highly refractile, globules become evident, and after a while the whole mass becomes hard, occasionally crystalline, and destroys, by pressure, the portion of lamina in its immediate neighbourhood. After a while the linear series of deposits is no longer broken by intervening portions of laminæ, but is in perfect continuity, the integrity of the acephalocyst is suffering, and ere long perforation ensues, the fluid escapes, and comes in contact with the fibrous sac, and suppurative inflammation is a natural result. Occasionally the interlaminar deposit is confined to one interlaminar space, and when such is the case it frequently crosses the track of one of the before-mentioned linear series, a crucial mass results. Having thus noticed the generation, development, and decadence of hydatids, the next paper will include the symptoms, diagnosis, prognosis, and treatment of the disease in the various organs usually affected.

October, 1851.

WHAT OUR ASSOCIATION MIGHT DO.

By C. RADCLYFFE HALL, M.D.,
TORQUAY.

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No. II.

AN abuse to which people choose to submit cannot be put down. It will die only from inanition, when its

supporters one by one have dropped off. It is, therefore, quite out of our power to put down any form of quackery; but it is quite in our power to draw the line of demarcation between it and medicine so plainly as to deprive it of all countenance from established truth. Let it stand alone. At our last annual meeting, the Association spoke out strongly and well against the prevalent quackery of the day; but through its individual members it might do much more than this. Observe the anxiety of all quacks to be considered as part of the medical profession. The lower grades—for there are gradations in this—filch the names of our men of eminence; the less vulgar seek our titles; would fain be on terms of professional intimacy; are delighted when an established practitioner will meet them in consultation; send their patients to authorities on a given speciality "for a diagnosis," as one might send an unmanageable horse to be broken in for his own bestriding; in short, they seek to obtain both the profit of the charlatan and the position of the honourable professional man. Let them seek to combine these incompatibles; but let not us assist them in the search. The public are taught to speak of the New System of medicine. They are not aware, as we are, that homœopathy is no *system* of anything, nor that it has no connexion with medicine at all. How should they, so long as we speak of allopathy on the one hand, and of homœopathy on the other?—so long as our eminent men, both Physicians and Surgeons, coquet with homœopaths in high places, speak mincingly of homœopathy in society, and in no respect discountenance it?

There are two reasons why certain amongst us have done this injustice to themselves and to medicine. The first is the "*auri sacra fames*;" and that we may leave undiscussed. The second is, the assumed impolicy towards legitimate medicine of fanning homœopathy into greater notice by illtimed opposition. And this reason deserves consideration.

It is neither judicious nor dignified for a medical man to obtrude the subject of homœopathy upon his patients or in society, any more than the subject of pathology. Neither is it generally useful or becoming to make the public our court of appeal in any form. To decide a question of law, the public must apply to honest lawyers. If they act otherwise, they suffer. To decide a question of medicine, the public must apply to honest men who have made medical truths their special study. Law requires the diligent study of numerous and various facts, and the exercise of sound reason upon them. Medicine requires precisely the same. When a non-professional person has gone through the work, study, and reflection of the lawyer, he is a competent judge of law, not before. When a non-professional person has gone through the work, study, and reflection of a medical man, then, and not until then, is he a competent judge of medicine. We forget all this practically, when we appeal to the mind of the public by discussing medical theories with or before them. It is for the public to inquire from us what in our profession is true and trustworthy. They will respect our opinion so