

produced by that dose on himself, after it had been injected into his upper arm: "Three to four hours after the injection there came on pain in the limbs, fatigue, inclination to cough, difficulty in breathing, which speedily increased. In the fifth hour an unusually violent attack of shivering followed, which lasted almost an hour. At the same time there were sickness, vomiting, and rise of body temperature up to 39.6° C. (103.3° F.). After twelve hours all these symptoms abated; the temperature fell until next day it was normal, and a feeling of fatigue and pain in the limbs continued for a few days, and for exactly the same period of time the site of injection remained slightly painful and red."

1 cc. of a 1 per cent. solution—that is to say, a dose of 0.01 cc. of the remedy—is the smallest dose which affects healthy adults, and the symptoms, more or less marked, following its administration are, in the majority of cases, slight pain in the limbs and a sense of transient fatigue. Only a few persons after this dose show a rise of temperature up to not more than about 100° F. The word "reaction" is used to indicate the symptoms, mild or severe, which follow upon the use of the remedy. In non-tuberculous adults there is no real reaction consequent upon the administration of any dose of the remedy less in amount than 0.01 cc.; therefore, the presence of reaction in the adult after a dose of less than 0.01 cc. of the remedy shows the presence of tubercle in the patient. If in the adult no reaction were obtained by any dose short of 0.01 cc., then it would be certain that the case in question was not one of tuberculosis. This is a law to which no exception has hitherto been found, and it gives the remedy great diagnostic value, which, it seems likely, will be one of its most useful clinical applications. The law applies to both man and beast, and to all tubercular conditions. Already cases have occurred in which the presence of tuberculosis was not even suspected, until the remedy was injected and reaction followed.

The dose of the remedy is regulated in tubercular cases by the age and strength of the patient, and by the conditions of his disease. In children and weak people, and in cases of very extensive disease of the lungs, the treatment should begin with the smallest effective dose, which should be very gradually increased. In fairly strong adults with lupus, joint or gland disease, and also in cases of lung tubercle, where the disease is slight in extent, or where the case is doubtful, a full dose of 0.01 cc. may be administered with safety. But in lung disease, however slight or otherwise favourable the case may be, it is well to begin with a much lower dose. The difference in the conduct of the treatment of lung tubercle and of lupus is that the former is treated with small doses daily, and the latter with large doses at intervals of one or two weeks. Tuberculosis of joints, bones, and glands is treated in the same way as lupus.

A first dose in early cases of lung tubercle in an adult should be either 0.001 cc. or 0.002 cc. If reaction follows this dose, then it should be repeated after the temperature has returned to the normal point. The same dose should be continued in this way until no reaction follows its use. The dose should then be increased by one, or at most two, milligrammes at a time; each dose being repeated until it is found that no reaction follows its administration, and so on until the dose of 0.01 cc. is reached. The dose of the remedy should never exceed 0.01 cc., except as a test to ascertain whether the utmost limit of benefit to the patient has been secured, and this test should be applied to every case. The duration of the treatment in early cases of lung tubercle Koch states to be, as I have already said, from four to six weeks. If after the administration of test doses of the remedy no evidence of the presence of disease is noticed, then the case, Koch says, may "be pronounced cured." I repeat, this statement refers to early lung tubercle only.

As regards the immunity from tuberculosis which may be enjoyed by the human patient after such a course of treatment, no evidence, so far as I know, has yet been brought forward concerning it in clinical records from hospitals, though the protective power of the remedy has been established as a fact by Koch's experiments as regards beasts. The doses of the remedy are prepared as follows: Two dilutions of the fluid are in general use, a 1 per cent. dilution and a 10 per cent. dilution. The 1 per cent. dilution is prepared by putting 0.5 cc. of the remedy into a glass vessel graduated up to 50 cc. The vessel is then filled up

to 50 cc. with distilled water containing $\frac{1}{2}$ per cent. of carbolic acid. One cc. of this solution contains a dose of 0.01 cc. of the remedy. Koch's syringe is graduated in milligrammes up to a capacity of 1 cc.; therefore, if 1 c.c. of this 1 per cent. dilution be placed in that syringe, each marked milligramme of it will contain a dose of the remedy equal to 0.001 cc. The 10 per cent. dilution is used exactly in the same way as the 1 per cent. dilution. Every milligramme of it contains 0.01 of the remedy, and by means of this stronger dilution, the larger doses may be given, or, by dilution, any less dose that may be needed. The subcutaneous injection of the remedy is made in the skin of the back, between the shoulder-blades and the spine, or near the lumbar part of the spine. These parts are selected for this purpose because they are less sensitive than most parts of the skin, and because absorption takes place very quickly from their neighbourhood. Before giving an injection the skin around the proposed site of puncture should be disinfected by means of a 1 in 40 dilution of carbolic acid. The needle should also previously to its being used be dipped in a 1 in 20 dilution of carbolic acid.

The reaction in tubercular cases consists in a gradual rise of temperature, beginning three to five hours after the injection. In ten to twelve hours it reaches its acme,—namely, a temperature of 102° to 104° F. It may even rise as high as nearly 106° F. Shivering often occurs as the temperature rises, but it is not a constant symptom. Pains in the joints, increase of cough and expectoration, nausea and vomiting, headache, often frontal in position, and great prostration and drowsiness, sometimes deepening into stupor, are the symptoms of the reaction. In one instance a man who was tuberculous continued in a state of stupor for forty-eight hours, after receiving a dose of 0.01 cc. Slight icterus and a general papular eruption, which has been so very well described by Dr. Radcliffe Crocker in his paper in THE LANCET of Nov. 22nd, are amongst the less frequent symptoms which follow the injection. The fever lasts, as a rule, for from fifteen to twenty-four hours, and is accompanied by an increase in the rate of the pulse and of the respiration. The fever gradually declines, and the temperature falls to subnormal, but often rises again to about 100° F., less or more, and then gradually drops to normal. The patient, as a rule, suffers but little after the fever. Cases of lupus best show the local reaction, but as Dr. Koch has perfectly described all that is meant by the local reaction, it is needless to trouble you now with a repetition of his words. I have also a case to show you which illustrates sufficiently well the early action of the remedy on lupoid tissues.

Remarks

ON

SALPINGITIS AND SOME OF ITS EFFECTS.

By J. BLAND SUTTON, F.R.C.S. ENG.,

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(Concluded from p. 1148.)

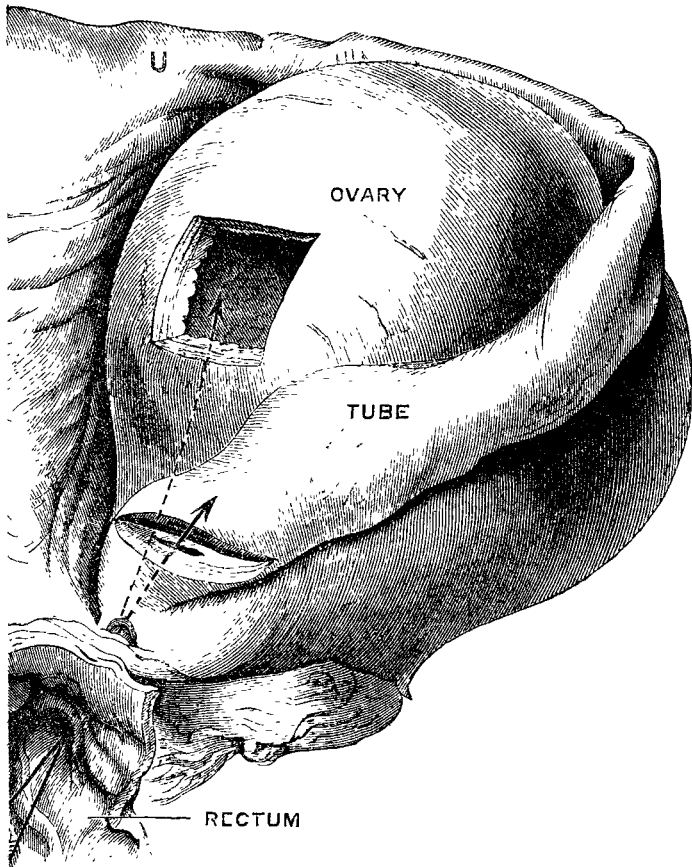
FIVE years ago I drew attention to the new and important light shed on the pathology of inflammation by the discovery of intra-cellular digestion, which tended to show that inflammation is in essence a struggle between irritant bodies of various kinds and leucocytes, a struggle which may be termed "amoebic warfare." Since Metschnikoff made us acquainted with the aggressive powers of leucocytes and the "wandering cells of the mesoderm" many have confirmed his observations, and a recent contribution to this subject by Dr. Armand Ruffer¹ on the "Phagocytes of the Alimentary Canal" is of great interest. *Phagocytes*, or "fighting cells," are of two kinds. *Microphages*, mono- or poly-nucleated cells, are as a matter of fact large leucocytes. These have long been familiar to histologists as epitheloid cells. *Macrophages* are large mono-nucleated

¹ Quarterly Journal of the Microscopical Society, vol. xxx., part 4, February, 1890.

cells, also developed from leucocytes. Microphages and macrophages are each able to engulf and rapidly digest micro-organisms. Macrophages are able to engulf microphages and destroy them. This apparently cannibalistic process seems to take place when the microphage is weakened. The cells found in the infiltrated mucous membrane of a Fallopian tube secondary to gonorrhoea belong to these two types of aggressive phagocytes.

Pyo-salpinx.—In severe cases of salpingitis after occlusion of the abdominal ostium, accompanied, as is usual, with stricture of the uterine end of the tube, the pus is as securely locked up in the tube as it would be in a deep-seated abscess, and it follows the course of an abscess. The walls of the tube, stretched by the accumulating pus, gradually thin, and the inflamed tube becomes adherent to surrounding structures—ovary, uterus, rectum, intestine, or broad ligament. The wall of the tube continues to thin until, on some slight exertion, it bursts. If the pus be discharged into the peritoneal cavity, it establishes rapidly fatal infective peritonitis. Right pyo-salpinx is very prone to open into the rectum. (Fig. 6.) When a pyo-salpinx lies in contact with bowel, the pus it contains becomes

FIG. 6.



Tubo-ovarian abscess. The tube and abscess each communicate with the rectum by a common aperture.

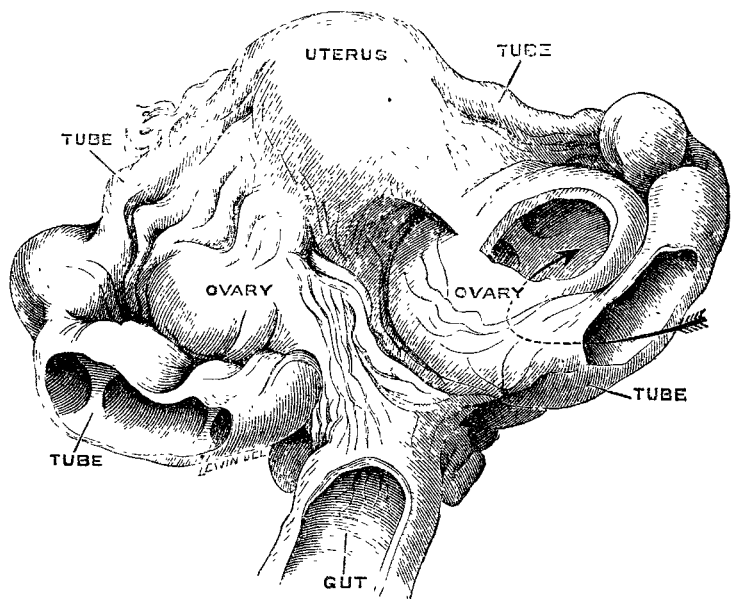
abominably fetid, due to osmosis of the intestinal gases. The relation of pyo-salpinx to the rectum must be studied in connexion with tubo-ovarian abscess. It must be borne in mind that the normal relation of the tube and ovary are somewhat different from the conventional position represented in anatomical and midwifery text-books.

This conventional relation of the tube and ovary is, as is now well known, purely diagrammatic, and is adopted merely to display the structures in the broad ligament. The ovary is suspended between the folds of the broad ligament, but invested only by the posterior layer, hence it projects from the back of this structure, and has its major axis nearly vertical, the obliquity varying with the position of the uterus. The isthmus of the tube is directed outwards and slightly upwards; but the ampulla descends, passes behind and external to the ovary, and then turns its ostium, surrounded with the fringes, upwards and inwards towards the ovary. Hence the ova, on escaping from the ovary, fall among the fringes of the tube, and the grasping of the ovary by the fringed end of the tube, as related by conventional retailers of traditional physiology, is, as a matter of fact, a fable. This dependent position is not without its influence, for in every case of pyo-salpinx I have examined after closure of the

ostium this part of the tube has been dilated with pus, and the walls were thinner than elsewhere. This has an important relation to the changes which arise in the ovary secondary to, and set up by, direct extension of inflammation of the tube. These we may now proceed to consider.

The first effect of salpingitis upon the ovary is to cause thickening of its capsule, and if lymph is effused upon its surface this may organise and extensive perimetritic adhesions result. The effects of this thickening of the capsule are twofold. At first it prevents the rupture of ripe ovarian follicles, and the tension gives rise to considerable disturbance and causes pain; and as the enlarged follicles cannot discharge their contents, it naturally follows that on section an ovary which has long been the seat of peri-oöphoritis will be found largely converted into cystic spaces, and two or more may become confluent and form a cyst the size of a walnut. As such a cyst enlarges and makes its way by absorption to the surface, it not unfrequently comes into relation with and adheres to the dilated pus-containing ampulla of the corresponding tube, which has been brought in contact with it through the restraining influence of the tubo-ovarian ligament. Except that the tube and ovary are in contact, no further change ensues in the majority of cases, but not infrequently absorption takes place, and the dilated ampulla of the tube will communicate with an enlarged follicle or cyst in the ovary and thus give rise to a tubo-ovarian abscess. The communication in such cases is usually small, and barely admits a probe. I have had many opportunities of dissecting such specimens, and find that when a tubo-ovarian abscess communicates with the rectum it is the portion of the abscess lodged in the ovary that invariably becomes the seat of fistula. (Fig. 7.) When a pyo-salpinx or a tubo-ovarian

FIG. 7.



A tubo-ovarian abscess.

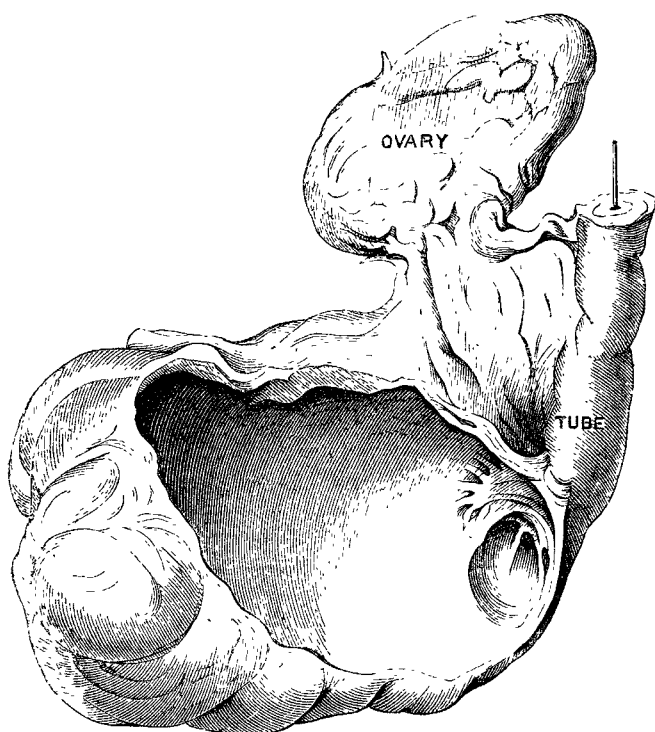
abscess communicates with the rectum, the pus is discharged by way of the rectum at irregular intervals, and is accompanied by great improvement in the patient's symptoms.

Anatomical evidence indicates that when the infective qualities of pus are not very great, a pyo-salpinx may resemble a chronic abscess, and give rise to few symptoms. It is this form of pyo-salpinx which I believe becomes slowly and passively dilated with fluid, and is transformed into a hydro-salpinx. My reasons for believing that as a rule a hydro-salpinx is a late stage of pyo-salpinx may be summarised thus:—1. Hydro-salpinx is not found in acute cases. 2. In many chronic cases hydro-salpinx is found on one side of the uterus, and a progressive pyo-salpinx on the other. 3. The ampulla of a tube will sometimes be dilated into a hydro-salpinx, and the isthmus contain pus. 4. The fluid contained in a hydro-salpinx will sometimes be colourless, but the recesses of the tube contain caseous material and cholesterine. 5. The dilated tube in hydro-salpinx may, as in pyo-salpinx, communicate with an ovarian follicle to form a tubo-ovarian cyst. Tubo-ovarian abscesses and tubo-ovarian cysts must not be confounded with ovarian hydroceles.

Hydro-salpinx.—The persistent course of salpingitis leading to occlusion of the ostium, though very frequent, does

not occur in all cases. Many mild attacks may be conveniently described as "catarrh of the tube," and like a nasal or gastric catarrh subside and leave no trace. If the inflammation is sufficiently intense to seal the ostium permanent damage results, and if, as is so commonly the case, both tubes are affected, they remain throughout life functionless, and often a source of grave danger. In cases of salpingitis sufficiently severe to occlude the ostium the tube is, after the subsidence of the inflammation, in the condition of a blocked ureter; there is no escape for the fluid which is excreted by the glands in its walls, or for the fluid which passively exudes into its cavity. It consequently forms a cyst by retention. The contained fluid is more or less colourless; sometimes it has a greenish tinge, due to the presence of cholesterine. Frequently it is the colour of chocolate. This condition is termed "hydro-salpinx," and may be defined as a Fallopian tube, distended with fluid in consequence of inflammatory occlusion of its abdominal ostium. The changes which arise in the occluded and distended tubes are such as we are familiar with in the case of the gall-bladder, vermiform appendix, or pelvis of the kidney, when they become cysts by retention. The first effect of the accumulating fluid upon the walls of the tube is to stretch them; this continual pressure induces atrophy, the pathological sequence. The epithelium and mucous membrane become thin, lose their character, until nothing but a thin-walled transparent cyst remains, with delicate ridges, representing all that is left of the longitudinal plicæ of the tubal mucous membrane. The shape of a typical hydro-salpinx is very characteristic, and though not invariable, is fairly constant, like that of a legume with somewhat blunt ends; the ovary always occupies the concave border of the legume, and the bent shape of the cyst is doubtless due to the traction exercised by the tubo-ovarian fimbria or ligament. In some specimens the situation of the ostium is indicated by a depression, from which a series of folds radiate, as in Fig. 8,

FIG. 8.

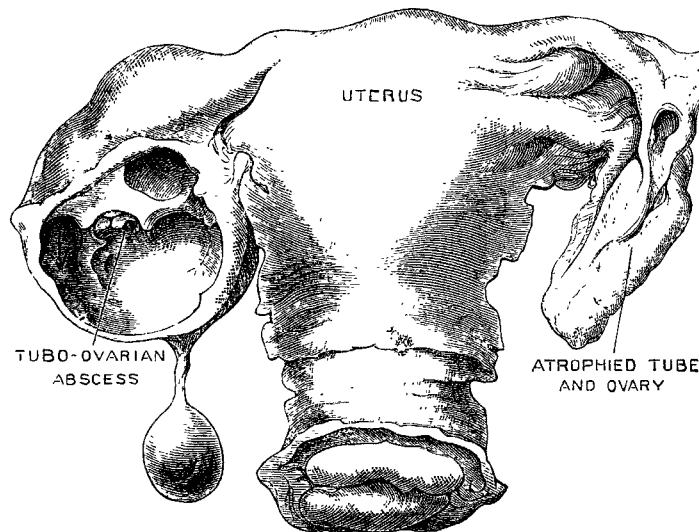


Hydro-salpinx.

reminding us of the ridges and furrows on the face of a stump after a circular amputation through the thigh or arm. In hydro-salpinx the tubes rarely attain a large size. This is due to the fact that as the tube distends the mucous and muscular coats atrophy. Examples of hydro-salpinx have been described in which the tumour was mistaken clinically for an ovarian cyst; but these specimens will admit of a different explanation. The largest examples of hydro-salpinx which have come under my observation have not exceeded six inches in length, with a diameter of three inches. The walls of these cysts were so thin that the fluid probably leaked through them in the same way that it exudes from a very tense ovarian cyst with attenuated parietes, and is gradually absorbed by the peritoneum. So thin are the walls in some of these hydro-salpinges, that even when very carefully manipulated during operation

they rupture; and it is exceedingly probable that these dilated tubes may cure by spontaneous rupture, the cyst walls subsequently atrophying. We know too well that such an event terminates the course of a pyo-salpinx, because it sets up fatal peritonitis; but the fluid in a hydro-salpinx would be tolerated by the peritoneum in the same way that it tolerates fluid from parovarian cysts when they spontaneously rupture. My reasons for such an opinion are founded on the following evidence. I have had many opportunities of making post-mortem examinations of the bodies of prostitutes, many of them having led a life of vice of the lowest form. In most of them double hydro- or pyo-salpinx existed. In three instances in which I examined the bodies of harridans I have found one or both Fallopian tubes represented by an impervious cord and the ovaries atrophied and unrecognisable. This induces me to believe that the frequency of tubal disease between the age of twenty and thirty-five years and its relative rarity after the fortieth year is to be accounted for by the fact that, if the individual survive the dangers incident to an inflamed and distended tube the diseased parts atrophy. The process is illustrated by the specimen represented in Fig. 9. It is the uterus and appendages of

FIG. 9.



The uterus of a harridan.

a harridan, aged forty-four. She has been for many years known to the police as a notorious prostitute. The uterus was shrivelled, the right ovary and tube represented by thin impervious bands of tissue. The left tube and ovary are represented by a small tubo-ovarian abscess, containing a small quantity of colourless fluid, and in the recess formed by the ovary some caseous material.

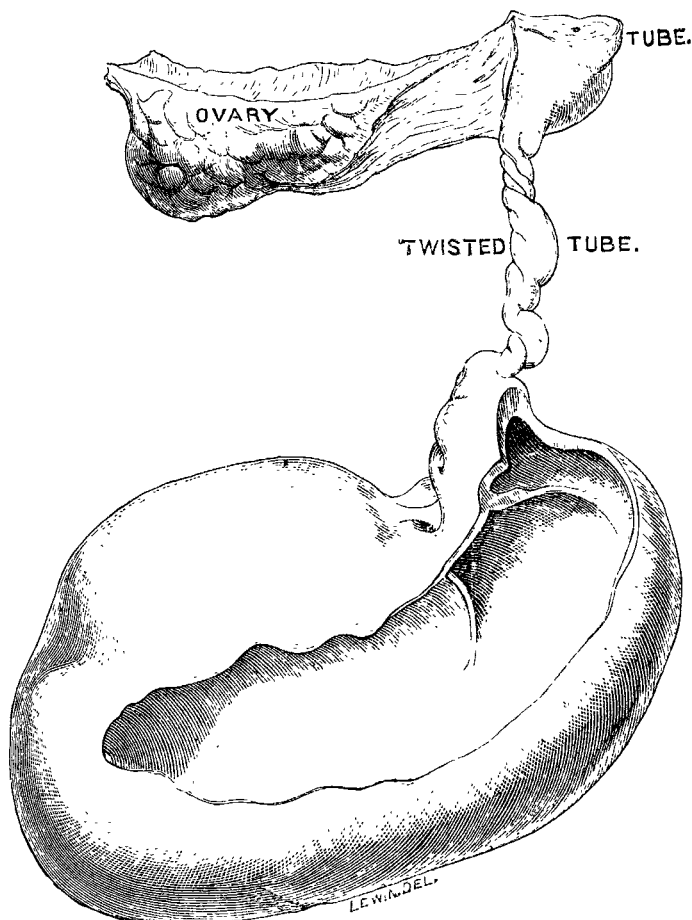
It is well known that ovarian cysts are prone to undergo axial rotation, and in some instances the torsion may be so severe as to detach the cyst from its connexions. Axial rotation occurs in connexion with hydro-salpinx. The only specimen known to me occurred in the practice of my colleague, Mr. Henry Morris. I assisted at the operation, and was able to observe the condition thoroughly. (Fig. 10.) The cyst is a typical hydro-salpinx; the fluid contents were of a chocolate colour. The portion of the tube intervening between the cyst and uterus was tightly twisted three times and a half. The cyst wall was adherent by strong adhesions to the adjacent parts of the meso-metrium and pelvic peritoneum, and it doubtless received its nutrient vessels from this source, for its relations with the bloodvessels which normally supply this part of the tube were thoroughly cut off.

Intermitting hydro-salpinx—It has been stated on clinical evidence that the fluid in a hydro-salpinx may escape through the uterus, the blockade of the uterine end of the Fallopian tube being raised. Such a condition is termed "hydrops tubæ profluens," and the escape of fluid takes place at irregular intervals. Profuse discharges of pus and fluid occur in connexion with pyo- and hydro-salpinx, accompanied by a diminution in the size of the tumour. Such are easily accounted for by the formation of fistula. There is no reliable pathological evidence that such discharges escape into the uterus by way of the Fallopian tubes.

Hydro-peritoneum and tubal disease.—It has been frequently pointed out that one important advantage accruing

to the individual from occlusion of the abdominal ostium of the tube in septic salpingitis is great diminution in the risk of the inflammation extending to the peritoneum. Apart from this, even mild forms of tubal catarrh, not sufficient to give rise to fatal peritonitis, nor even severe enough to seal the ostium, may cause what is called hydro-peritoneum. Mr. Alban Doran² has especially investigated this condition and discussed its probable causation in an admirable paper communicated to the Obstetrical Society of London. Hydro-peritoneum he defines as a collection of fluid in the peritoneal cavity which cannot be referred to any tangible organic disease. By this we may presume he means that the accumulation is not due to the ordinary causes of ascites, such as heart, liver, or renal disease. The definition is purely clinical; Mr. Doran is of opinion that hydro-

FIG. 10.



A hydro-salpinx with twisted pedicle.

peritoneum is caused by salpingitis of a mild type with an unobstructed tube. It is easy to understand that the constant irritation caused by inflammatory products dripping from the tube into the peritoneal cavity would induce an exudation of fluid. The subject is one of some importance, and demands more attention than it has yet received at the hands of those who conduct post-mortem examinations. Its clinical import is obvious enough.

The effects of salpingitis we have considered by no means exhaust the list; such important conditions as *tubercular salpingitis*, *papilloma of the tube*, and *tubal pregnancy*, must remain for some future occasion.

² Papilloma of the Fallopian Tube and the relation of Hydro-peritoneum to Tubal Disease: *Obstet. Soc. Trans.*, vol. xxviii., 1886.

DISEASED MEAT.—A general dealer of Manuden, Essex, has been fined at the Guildhall Police-court £10 and £2 2s. costs for sending for sale to the London Central Meat Market four quarters of diseased cow beef totally unfit for human food.

NORTH - EASTERN HOSPITAL FOR CHILDREN, HACKNEY-ROAD.—The congregation and friends of St. Thomas's-square Chapel, Hackney, maintain two cots at this hospital. In aid of this object a sale of useful and fancy articles was opened last week by Mrs. Garrett Anderson, M.D., in the schoolroom.

ABSTRACT OF THE

Bowman Lecture.

By J. W. HULKE, F.R.C.S., F.R.S.,

SURGEON TO THE MIDDLESEX HOSPITAL, AND TO THE ROYAL LONDON OPTHALMIC HOSPITAL.

(Concluded from p. 1146.)

"DEPRESSION," which, except by Oriental oculists, who yet employ it, had fallen into disuse, was in 1854 revived by Sir William Bowman, and tried by him in the Royal London Ophthalmic Hospital, and Mr. Hulke cited a very accurate and interesting note of a case recorded in Sir William Bowman's own words. In 1860 he and his colleagues at the Royal London Ophthalmic Hospital adopted the flap method of removal with the aid of traction, and himself invented a scoop which is known by his name, and is still in use in exceptional cases. In the *Ophthalmic Hospital Reports*, vol. iv., 1865, he published a paper on *Extraction of Cataract by a traction instrument, with iridectomy, with remarks on Capsular Obstructions*, in which he embodied the steps, principles, and difficulties of the operation, the accidents that might occur, the course and treatment, and the results by that method obtained by himself up to that date. In secondary needling operations, he pointed out, how by the judicious use of two needles the perilous drag upon the ciliary processes might be averted, one serving as a point from which the other needle works, and so taking all the strain off the peripheral attachments of the capsule. In the second portion of the paper he refers to the detection and treatment of capsular opacities due to accretion of degenerative products, or wrinkling of the capsular membrane, and ends with a valuable summary of his conclusions in relation to the subject of "scoop extraction." Up to about 1850 extraction was generally performed in London in the manner now designated "flap extraction," to distinguish it from a later procedure devised by A. von Graefe. The operation then demanded much greater dexterity than at the present time; no speculum was used, but the operator himself raised and fixed the upper lid and the eyeball with his finger-tips, while his assistant fixed and depressed the lower lid. The knife used, although called Beer's, more nearly resembled Sichel's. In London, so far as the lecturer was aware, Sir William Bowman was the first surgeon who employed chloroform "in extraction." In the first case the eye was lost, owing to the violent straining in vomiting causing extrusion of the vitreous and retina, with choroidal hæmorrhage. So serious a disaster would have deterred many men from the further trial of chloroform, and its advantages in respect of the performance of the operation were so manifest that Sir William Bowman persevered in its use, and, in order to inspire confidence in his patients, he experimentally inhaled it to complete anaesthesia himself. His conviction of its extreme usefulness in extraction was soon shared by others, and its employment quickly became general. One inconvenience attending the use of Beer's knife was the difficulty of making with it a uniformly, curved, regular section of cornea. With the narrower knife devised by Sichel, the operator could regulate the corneal incision with great nicety, and in Sir William Bowman's hands this knife quickly replaced the so-called Beer's knife previously in general use. The excellence of the knives made by Suers of Paris, and exhibited by him at the International Exhibition in Hyde Park, was then unrivalled. Mr. Hulke speaks of seeing him in the theatre of the Moorfields Hospital chop with one of these knives a piece of close-textured, hard bone, so severely as to very distinctly score its surface, and then pass the same knife, its edge perfectly uninjured, to Sir William Bowman, who then and there used it in a couple of extraction operations, so admirably was the metal tempered. Later still, Sir William Bowman used the yet more narrow knife, known as Graefe's, and adopted the form of extraction which bears the name of this illustrious oculist. Some cases of detached retina were treated by Sir William Bowman at the Royal London Ophthalmic Hospital in 1864 by direct puncture of the sclerotic over the site of detachment, and then turning the needle slightly round so as to allow the fluid to escape along its shaft. The results, however, did not encourage an extensive trial of this method. On the concep-