fact of simultaneous inoculation of the calves with my egg culture and with ordinary vaccine lymph may not have, in some occult way, influenced the manifestation witnessed on the areas wherein my egg lymph was inserted. So of course these experiments have to be repeated, and are indeed in course of repetition. They involve repetition of the process from its very beginning, that is, direct inoculation of the hen's egg with crusts of variola, with calf lymph, or with human lymph; tests by subculture in ordinary media, and in the egg, of any pure growth of microbe thus obtained, and inoculation of the calf elsewhere than at Lamb's Conduit Street, both with the primary egg cultures and with any successful subcultures in the egg, or in other media.

Should, then, further investigation confirm the results obtained in the preliminary experiments that I have described, it is possible that we may eventually be enabled to elaborate a method of specific treatment of individuals actually suffering attack by small-pox, somewhat comparable to that discovered by Behring in reference to diphtheria. Should this forecast be justified in the event, some such method would form a fitting complement to the process of preventive vaccination which now for well nigh a century has stood the test of time and of experience.

Dr. EDWARD HAUGHTON (Upper Norwood) alluded to the scarcity of works on variola of late years, or of reports of *post-mortem* examinations of variola cases, but thought that there was sufficient basis for a just conclusion in the researches of Goze and Feltz, Oesterlen, Niemeyer, and other foreign pathologists. According to these authorities, the *post-mortem* appearances were extensive, especially in the kidneys and suprarenal bodies, and the time required for their production was too long to be brought within the limits of conventional infection. The phenomena of the disease corresponded with the idea that urea and carbonic acid were in excess in the blood, and that the saline constituents were diminished in variola. It was a disease of septic poisoning, and vaccinia was of the same character, and had no scientific basis for its use. Sanitary conditions and meteorological were the keys necessary for understanding the phenomena of small-pox, which originated in bad hygienic conditions without any necessary previous infection. The engorgement of the lymphatic system constituted the temporary so-called "protection" which took place after various inoculations, but from its very nature could not be permanent.

Mr. DENHAM (Dublin) said there was no doubt that for the purpose of propagating vaccinia from calf to calf animals approaching puberty should be avoided. This especially holds good with heifers. He was quite convinced that when proper precautions were taken all the micro-organisms found in animal vaccine were extraneous; particles of hair were a great source of trouble. Professor McWeeney had in a large series of laboratory experiments satisfied himself on this point. It was highly important that all experiments made with both vaccine matter and variolous matter should be made in a laboratory entirely apart from any public vaccine station.

Dr. C. RENNER said that one of the merits of these beautiful experiments of Dr. Copeman was the supply of an additional link in proof of the identity of variola and vaccinia by which their undoubted mutual antagonism was explained. The experiment of inoculating calves with variola lymph had been so often successful as to be conclusive. The bacteriological test afforded an additional welcome proof. The only question was about the nature of the change. Was it a reduction of virulence, a culture which might be obtained by time, various admixtures, or, on the other hand, a definite permanent change? They had certainly not yet succeeded in reversing the process. Fortunately for practice he could certainly bear out the purification of the vaccine virus by being kept for some time in pure glycerine before using it, and the bewildering number of micro-organisms which had from time to time been found in vaccine were due to extraneous impurities which were eliminated by keeping in glycerine. As a result, he had never since adopting this practice heard complaints of bad arms so called, that is, undue inflammation; on the contrary, he had often been struck by the entire absence of an areola. He had also made cultures on eggs and different substances, and observed a diplococcus, but

had not as yet been so fortunate as to succeed in successfully inoculating animals with the same.

Dr. C. R. DRYSDALE expressed himself as much gratified by the fact that Dr. Copeman had so successfully repeated the experiments of Ceely and Badcock, and set the matter so completely at rest. He had, ever since conversations with Mr. Ceely and Mr. Badcock some ten years ago, been convinced that vaccinia was simply a modified form of variola occurring in the bovine species. It was fortunate that calves were more easily inoculable than cows, for in future there would be less difficulty than there had been formerly to make this question plain to the whole world. Vaccine then was merely modified variola, and acts just as an attack of variola, however weak, will protect against a powerful attack. Now that this point was cleared up, it would in the future be impossible to speak of the difficulty of saying what vaccine is. Dr. Drysdale called attention to the fact that in Berlin it was now illegal to use humanised lymph, and he thought that we in this country should endeavour to imitate that practice of Berlin in London, and also gradually to introduce the German ideal of vaccination accompanied by revaccination at the age of 12 years, a practice which has entirely got rid of variola from Germany, whilst this disease still lingers in the United Kingdom and France, owing to the fact that, after about 15 years of age, even well vaccinated patients might be occasionally infected with small-pox.

ANTERIOR COLPOTOMY.¹

By A. MARTIN, M.D.,

Docent in the University of Berlin.

THE more the results of modern gynaecology entitle us to undertake a surgical treatment of many organic diseases of women which do not prove amenable to medical treatment, the more we must feel bound to adopt conservative measures wherever we feel able to preserve female organs without endangering the patient's prospects.

The same conservatism must rule with reference to those cicatrices which are disposed to morbid transformation, and to endanger further on the general comfort of our patients. Undoubtedly the latter remark points particularly to abdominal section. In full appreciation of the great benefit and the high importance of this operation, we must recognise that the cicatrices of abdominal section prove to be very distressing to many women. Even when healing has been absolutely undisturbed, and when the result is a most satisfactory one in regard to the disease which required the operation, we see resulting serious discomfort from these abdominal cicatrices under different circumstances—as pregnancy, general want of strength, neurasthenia, physiological changes of the tissues at the climacteric period, which may prove dangerous to the abdominal cicatrix, not to mention those cases in which the defective tone of the tissues, and unwise behaviour of the patient during convalescence, or last, not least, wound infection results in an abdominal abscess.

Considering this we must derive great satisfaction from seeing that within the last years operative gynaecology has applied renewed and remarkably successful attention to vaginal operations. Amongst these there is found one which has as yet only a limited application, and which ought to be given the first place in vaginal *technique*—anterior colpotomy.

The anatomical conformation of the pelvis offers an entrance into the abdominal cavity through the anterior fornix which is easy and at the same time safe. There we do not meet any important pelvic organs; there we penetrate that territory in which the anastomoses of the lateral vessels are not accompanied by any large arteries or veins.

Experience proves that the bladder can be separated without difficulty from the cervix uteri, that the bladder can be pushed up out of the way, after which the peritoneum can be opened easily and with all surgical security, as the fold of the peritoneum can be freely exposed to our view. The ureters are beyond reach as they lie at the side of the cervix, and are pushed up with the bladder. The entire anterior surface of the uterus is exposed, after which the fundus can

¹ Read in the Section of Obstetrics and Gynaecology at the Annual Meeting of the British Medical Association held in London, July-August, 1895.

be easily pulled out into the vagina beyond the vulva, bringing with it the tubes and ovaries, and so exposing the whole of Douglas's pouch for inspection and surgical treatment. My *confrère*, Professor Dührssen of Berlin, was the first to carry out successfully this operation. It was his publication which led me to adopt it. As soon as I became free from the fear of injuring the bladder, I applied anterior colpotomy in a large number of diseases of the pelvic organs. Cases can be treated in this way which otherwise could not be without an abdominal section.

Fig. 1.

I beg you to allow me to give you a short description of the operation. The patient is placed in the dorsal position, with the legs raised on either side. A speculum being introduced into the vagina, the uterus is fixed with a pair of forceps invented by my assistant Dr. Orthmann, a combination of a uterine probe and volsella which grasps the anterior lip of the cervix so that one can draw down the cervical portion of the uterus to the vaginal introitus. You should fasten another pair of volsella forceps just under the orifice of the urethra about 3 inches from the cervical opening. The anterior vaginal wall is pulled upwards, a fold is raised which is to be incised vertically and peeled off laterally from the surface of the bladder and cervical body.

Hard fibres will be seen above the vaginal insertion, which are to be divided. The upper border is then pushed upward with the finger, separating the loose tissue between the bladder and uterus, thus carrying the former up out of the way behind the symphysis pubis. Occasionally the bladder is distinctly made out, at other times it is never seen. The peritoneum is found in the form of a fold between the bladder and uterus recognisable by its pellucid appearance; this is to be opened, when the abdominal cavity and contents are exposed to view.

A remarkable point about the operation is the small loss of blood. My 109 cases have never required ligatures or pressure forceps until the abdominal cavity was opened. Further operative procedures are to be carried out according to the requirements of the case, as I will indicate further on; these being completed, the wound is closed in the following manner with juniper catgut.

The uterus and adnexa are to be replaced in the abdominal cavity by pressing on the anterior uterine surface. A strong catgut suture is to be carried with a curved needle through the upper end of the vaginal wound, the cellular tissue at the base of the bladder, the peritoneum, and the anterior uterine

wall, near the fundus, taking a good hold of it, and out again on the opposite side in the same manner, and tied.

Two other sutures close the vaginal wound connecting it with the anterior surface of the corpus uteri, a fourth the cervix. A running catgut suture is used to close the vaginal wound more exactly between these deep sutures.

Fig. 2.

I will draw your attention to the different operations which may be performed either in the interior of the uterus or in the abdominal cavity, through this opening.

1. Take first the cases of myomatous tumours. These can be removed, wherever they are situated—subserous ones simply by excision after ligating the pedicle; intramural ones through an incision in the anterior uterine wall, which has been exposed, even if we have to enter the cavity itself.

By *morcellement* we can in time remove very large tumours, but should avoid those which extend to near the umbilicus. The special advantage of this method is to fix the anterior surface of the uterus to the vaginal wall, and so control the bleeding, if any. Should all the uterine tissue capable of function be removed, total extirpation can be carried out at once.

2. Movable retroflexed uteri can be easily replaced, and retained by vaginal fixation.

3. Peritoneal adhesions fixing the uterus are broken up with the finger, even when covering the entire surface of that organ. Any bleeding that occurs can be checked by a few sutures.

4. Cases of procidentia. In these we excise a part of the vaginal wall to make it of the proper length, fix the uterus to the upper part of the vaginal wall, which is very little disturbed, and so take the weight of the uterus from the remaining portions, retaining it in its normal position.

5. When the uterus is drawn downwards and forwards, both ovaries and tubes follow on the posterior surface as soon as they are freed from adhesions. The adhesions are easily broken up unless when fixed to the posterior surface of Douglas's pouch. Such cases I exclude from this operation, and believe to belong to the dominion of abdominal surgery.

6. Cystic ovarian tumours can be opened and brought outside, so as to expose the pedicle for proper ligation. In different instances I have emptied follicular cysts; no bleeding following, I returned the ovaries. In some I excised the diseased part, and retained the healthy, performing what we call "ovarian resection."

7. Anterior colpotomy offers great advantages in treating diseases of the tubes.

In cases of salpingitis chronica we can generally free and remove them when degenerated. In the same manner I have removed pyosalpinx (sactosalpinx purulenta) and hæmatosalpinx (sactosalpinx hæmorrhagica). Dührssen has removed already 2 cases of tubal pregnancy, Kossmann another, while I have also had one. We know that many a case of tubal atresia does not require removal, as hydrosalpinx can be opened and the opening made permanent, uniting the mucous and peritoneal edges. I have done this in 8 cases after colpotomy.

All these different operations having been performed according to the case, the uterus is replaced and fixed as

described above. The wound takes from 8 to 10 days to heal, so that about the twelfth day the patient may be allowed to leave bed. No local treatment is required. Feverish reaction is unknown in my cases.² In the majority urine was passed spontaneously from the first—the minority required catheterisation, including no more than is frequently seen from the recumbent position in other cases. In 4 cases I had to perform total extirpation, as there was not left a sufficient quantity of functional uterine tissue. I have done this vaginal operation in 17 cases of uterine myomata, but wish to repeat that I prefer abdominal section in all cases where the tumour is larger than two fists.

Fig. 3.

In 49 cases I freed the uterus from adhesions, which was generally done with three pairs of forceps, as soon as the abdominal cavity was opened and Orthmann's instrument removed. I fixed one after another into the anterior wall of the body, pulling down gradually the fundus, according to the progress of the freeing of the adhesions by my finger. Chronic peritonitis has never compelled me to stop the operation.

Another question is what to do with these adhesions in the posterior uterine surface attached to the anterior surface of the sacrum. Up to the present time I do not perform colpotomy on cases where I recognise such a condition. I have treated 9 ovarian and 13 tubal cases in this manner, and one of tubal pregnancy.

I have successfully fixed 13 cases of retroflexed and 7 of prolapsed uteri. Only one of these cases had any difficulty during convalescence owing to my tearing the bladder with my forceps; this was closed at once with sutures. When the patient was coughing very hard on the sixth day this wound opened, but has since healed spontaneously, the patient being free from any bladder discomfort on the nineteenth day.

A large percentage of the patients have been operated on within the past three months, so that one is not able to give definite results so early. So far I have not heard of a single case that has not been freed from the previous disorder, especially in those cases that were operated in the last quarter of the past and the first of the present year. I have not heard of a

² All the 109 and the 43 following cases recovered.

case of pregnancy following colpotomy so far amongst my patients.³ I have had 5 cases of pregnancy, all ending satisfactorily, done by the method we formerly employed of vaginal fixure. This experience agrees with that of others, amongst whom I may mention Mackenrodt and Dührssen.

No doubt we have more to learn, since our experience is too short, as the following will show. A poor woman who had been operated by colpotomy by Dührssen became pregnant. Having been infected with gonorrhoea during pregnancy, she was admitted into Gusserow's clinic. Labour began at

Fig. 4.

full time, the os did not dilate, and fever set in. She was delivered by Cæsarean section of a dead child, and in the end she died from secondary hæmorrhage. *Post-mortem* examination showed that the corpus uteri remained fixed, and that the line of union had yielded neither during pregnancy nor labour. There is no doubt that the free incision of the os uteri into the cicatrix of the fixation would have permitted the patient to be safely delivered at the proper time. This experience I consider of the highest value because it shows us how to proceed in such severe and extremely rare cases.

Gentlemen, whenever we propose a new operation, it is with doubts and scruples that we first make it public, so that by my experience up to the present time I wish merely to prove the soundness of its anatomical basis and its practicability. In the past by other operations there has been danger of uncontrollable loss of blood or of trouble following, in some cases, from the abdominal cicatrix, all of which is avoided by this operation of anterior colpotomy.

[In reply to various speakers Dr. MARTIN stated that in his 109 cases he had had no lesion of the intestine to deal with, although he had had frequently to break up numerous adhesions. He thought this operation allowed of a very clear view of Douglas's pouch, and the latter could be illuminated if necessary by placing a retractor or speculum in the wound in the anterior vaginal

³ I saw one patient pregnant in the eighth month at the end of November, 1895, feeling perfectly well. The uterus had developed quite normally; the head lay in the normal position.

vault along the posterior uterine surface. In this way everything could be done by sight, and adherent intestines, if necessary, snipped away from the uterine tissue. In all his cases he had no difficulty in seeing exactly what he was doing. He did not think the operation a good one when the uterus was adherent to the front of the sacrum; he preferred abdominal section for such cases. The incision in the posterior vaginal vault as practised by some was inconvenient, owing to the greater length of the posterior vaginal wall. With regard to the treatment of the tubes, in about 900 operations on the tubes he had found it was the exception for

Fig. 5

both tubes to be diseased. One could usually be preserved, and at the same time the ovary on the same side. He considers true conservative surgery to consist in the removal of only what it was absolutely necessary to remove. Even where both tubes were diseased, such as in hydro- and hæmatosalpinx, they could be emptied of their contents and yet preserved. The question of the simultaneous removal of the uterus was not yet settled, and he awaited further experience. Dr. Martin preferred a vertical to a transverse incision, as it displays the parts better, and there was less risk of tearing the uterus. He had formerly used silk and silver wire sutures, but had now entirely abandoned them in favour of juniper catgut, which he used for nearly all his work.]

RECRUDESCENT OR LATE RICKETS.

By EDMUND CAUTLEY, M.D.,

Physician to the Belgrave Hospital for Children.

It is generally assumed that rickets is a disease of early life only, developing during the period of the first dentition. Even such a great authority as Charles West states that he has never seen the disease commence later than 3 years of age, although he has known the symptoms become more and more grave up to the end of the fifth year. Sir W. Jenner in his classical Lectures on Rickets refers to the case of a boy in whom the symptoms did not manifest themselves until he was a little over 3 years of age, and the case of a girl, aged 9,

just beginning to suffer. In more recent years well-marked cases have been described, occurring even at a later period of life. Drewitt showed, at a meeting of the Pathological Society in 1880, a boy, aged 10, in whom the disease was well marked. The committee appointed to investigate the case came to the same conclusion, and two years later, when the boy died, the usual signs of rickets were found in the bones. Clutton¹ gives details of a case in a girl, aged 12, in whom the symptoms had been present for twelve to eighteen months, no deformity having been previously noted. She was backward as a child, dentition delayed, and did not walk until aged 3½ years. Mammæ were well developed, and catamenia had been present for four months. The chief characteristics were great enlargement of the epiphyses, extreme bowing of the legs and exaggeration of the clavicular curves. He refers also to a case under Mr. Pitts; a girl, aged 14, who had been treated as an out-patient four years before for flat foot. At that time no rachitic changes were noted. The disease came on gradually at the age of 12, and more rapidly during the six months previous to coming under treatment. No history of rickets in infancy; she walked at the age of 12 months, and could run six months later. The chief characteristics were general epiphysal enlargement, extreme distortion of the legs, genu valgum on the right side and genu varum on the left, poor nutrition, stunted growth, and absence of sexual development.

Ransford² records the case of a girl, aged 14, in whom the epiphyses were enlarged and genu valgum ensued. Palm³ refers to a girl, aged 6, who came under the care of Mrs. King at Pekong for well-marked rickets. The bones became straight, and a lateral curvature disappeared in the course of four months' hospital treatment. Duplay⁴ mentions a girl, aged 17, with the radius and ulna of each side affected.

Barlow and Bury⁵ refer to two cases in which there were very active manifestations at the age of 11, and which proved *post mortem* to be undoubted rickets. In one case certainly, in the other probably, there had been previous infantile rickets. The authors regard the cases as remarkable recrudescences of the disease.

The present case is closely allied in character to the cases of Barlow and Bury, and the photographs of their patients resemble remarkably the photograph of the present patient. The following are the notes of the case:

M. T., female, aged 11, came under my care in June, 1895, for anorexia, vomiting, and feverishness of one week's duration.

Family History.—Older and younger children are strong and healthy.

Past History.—This is somewhat imperfect on account of the mother having recently deserted the family. Measles and chicken-pox at the age of 4; an elder sister states that the disease first commenced at the age of 4, that the child has never been able to walk well, and latterly has been unable even to stand.

Present Condition.—Head dolichocephalic; receding small forehead, a little prominent in the middle line; skull asymmetrical, the right parieto-occipital region being somewhat flattened; flattened vertex; sutures and fontanelles all closed; eyes wide apart; bridge of nose flattened; dilated nostrils; prognathos; upper jaw a little beak-like in the middle line, being elongated antero-posteriorly; palate not highly arched; teeth up to date, gums receding, and lower central incisors loose; earthy complexion; anæmia. Chest flattened laterally below the level of the nipples; marked beading, especially of the fourth to seventh costo-chondral joints, prominence of the angles of the ribs behind; Harrison's sulcus not present; no heart or lung disease detected. Abdomen large and doughy; flabby muscles, flatulent distension; enlarged liver and a little enlargement of the spleen. Back arched. Upper limbs: exaggeration of clavicular curves; scapulæ normal; humeri small, epiphyses enlarged; great enlargement of radial epiphyses on both sides; old greenstick fractures of the radius and ulna on each side, most marked in the ulna, especially on the left

¹ St Thomas's Hospital Reports, 1884, vol. xiv

² BRITISH MEDICAL JOURNAL, 1887, i, 1213.

³ Practitioner, vol. xlv, 1890, pp. 275 and 320

⁴ Gaz. des Hôpitaux, Paris, 1891, p. 1397.

⁵ Keating's Cyclopædia of Diseases of Children, vol. ii 235