possible to enter the chest during the operation. A strip of gauze may be inserted in the wound to keep it open, but no tube should be introduced; I would then apply a large piece of sterile oiled silk over the wound to act as a valve, so as to allow the fluid to escape and no air to enter. Large aseptic dressings should be applied over the valve. The affected side may be well strapped to prevent movement. I would make the patient lie on or towards the affected side, so as to lessen movement and encourage drainage, prevent him taking any deep inspirations, and tell him to make deep nasal expirations, so as to expand the affected lung and drive the purulent fluid out of the pleural cavity. He should be instructed to inspire through the mouth and expire through the nose. I would also make him frequently practise the Valsalva method, or blow through a small tube. If the pus be very offensive or not draining well, the patient can be treated in a continuous bath and then no dressings will be required.

In these cases the pus is usually fairly liquid, is neutral, or may even be slightly acid in reaction, contains some peptone and a ferment which seems to have the power of digesting fibrin, and thus the lung is not likely to be irreparably collapsed or bound down by adhesions; there is, therefore, a fair chance of success if the operation be adopted early, and after-treatment intelligently carried out.

The variety of micro-organisms in the pus should be ascertained, and an appropriate vaccine, after the method of Sir A. E. Wright, should be used. Even the stinking empyemata from the *Bacillus coli* often do very well. Tuberculous cases are the most troublesome, and usually when the fluid becomes purulent there is a mixed infection. Cases of pyopneumothorax are best treated by drawing off the fluid and filling the cavity with sterile air or oxygen. Where the empyema is loculated the surgeon may remove a piece of the rib and use a drainage tube if he choose; he cannot do much harm. Unfortunately, Estlander's operation is often necessary, partly owing to early mismanagement of the cases. There must be some effort made to place the treatment of this disease on a more scientific basis than that on which it at present stands.

I have spoken strongly about the surgeons because I feel strongly, and I am anxious that they should remove this blur from their escutcheon. The old wheeze about the physicians not handling the cases over soon enough is now played out. There is still, however, plenty of work for the physicians; prevention is better than cure, and I think in the future their work should lie more and more in that direction. Our aim should be to protect the individual from the ravages of disease and the onslaught of the surgeon, and make the very existence of that individual less and less of a necessity.

REFERENCES.

¹ *Diseases of the Lungs and Pleurae*. By Sir R. Douglas Powell, Bart. Fourth Edition, 1893, p. 1. ² *Ibid.*, p. 93. ³ *Ibid.*, p. 10. ⁴ BRITISH MEDICAL JOURNAL, July 7th, 1906. ⁵ *Ibid.*, November 21st, 1903.

CEREBRO-SPINAL MENINGITIS COMPLICATED
BY PARTURITION.

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THE following case of cerebro-spinal meningitis during pregnancy is interesting from more than one point of view—the age and condition of the patient; the sudden onset of cerebro-spinal meningitis when the patient was in labour (whilst at the same time she declared that she did not know what was the matter with her and would not admit she was pregnant); its rapid course, leaving no time for any very active treatment to be of any service; the look of the patient, the character of the petechial and herpetic eruptions, without head symptoms, and the persistent vomiting, which, being in this case associated with pregnancy, did not command the amount of attention that under other circumstances it would have received.

M. W., who was in a neighbouring town up till Christmas, 1906, then returned home to a street in a working-class locality of Belfast. She was aged 15 years and 9 months, her mother giving the age in evidence at

the Coroner's Court as 14 years on May 23rd, 1907. She was admitted on March 5th, 1907, to the maternity department of the Ulster Hospital for Diseases of Women and Children as being in labour. She had always been a strong, healthy girl, well developed, and had never menstruated.

The history of the case as reported to me was that on March 5th, about 2 a.m., the patient was seized with violent pains in lower part of back and abdomen, accompanied with vomiting; the pains were paroxysmal, and she became so ill that a doctor was sent for about 4 a.m. He prescribed and gave some instructions to give her some relief, and later on returned, accompanied by another medical man; on consultation both agreed that the patient was in labour, but this she denied, protesting against anything of the kind. Her mother expressed her astonishment, as she never thought such a thing possible, owing to her age and appearance; the patient absolutely refused to give any information regarding her condition to any one.

The patient was admitted to the Ulster Hospital at noon, when the temperature was 101°, the pulse 100, full and bounding, strong uterine contractions occurred at intervals of about ten minutes; there was no vomiting, there was slight mucoid diarrhoea, the cheeks were slightly cyanosed; there was herpes about the nostrils and mouth but no rash at this time, the tongue was furred but moist, the pupils reacted normally; she had a wild, frightened appearance, was quite conscious, and complained of no pain in the head. The vagina was moist and dilatable, the os very slightly dilated, and the presentation vertex but very high up in the pelvis.

The patient remained in much the same condition until 2 p.m., when the pains became almost continuous, the breathing was very rapid and distressed, the cheeks and lips more deeply cyanosed, the pulse rapid and irregular. I was at this stage summoned by telephone to see the patient, who was reported as being in the maternity ward and in labour. Almost immediately I had a second message to say patient was in a state of collapse, and replied to give a hypodermic of strychnine. I went immediately, and found the patient in bed lying on her right side; the legs were flexed on the thighs and the thighs on the abdomen, and the forearm on the arm; she was conscious, pupils slightly dilated and equal, the face cyanosed, the breathing rapid and difficult, and the pulse quick and irregular; she was to all appearance in labour, was nervous and frightened-looking, but did everything she was asked.

I had her turned on the left side and made a vaginal examination; the passage had the feeling as if contracting on the finger, the rugae being well defined, the os, which was slightly dilated, admitting the tip of my finger with difficulty. I was able to make out the presentation a vertex, with the left hand on the abdomen I could feel the uterus hard and contracting. Her attitude and appearance did not harmonize in my opinion with the stage of labour, and I felt that there might be some lesion in the chest. On examining the chest I arrived at the opinion that there was well-marked congestion of both lungs; the heart was rapid and irregular, but I was unable to make out any valvular lesion. I was unable to procure a sample of urine. Neither the face nor extremities were oedematous. She was very sensitive to the touch (hyperæsthetic). The breasts were well developed, the secondary areola was well marked, and on pressure fluid exuded through nipples. The fetal heart sounds were heard very indistinctly, but I observed some dark spots over the lower part of the abdomen and thighs. I learned that these had developed since her admission to hospital; they were dark in colour, irregular in shape and size, some flat, others raised like a small blister, and on pressure the colour did not disappear; these, with her look and condition, suggested cerebro-spinal meningitis. She very quickly got worse, though still remaining perfectly conscious, complaining only of the uterine contractions and pain in the back; there was no pain in the head, but great pain and difficulty in swallowing, and heavy breathing. Death supervened about 3.50 p.m.

The patient's condition was so serious when I first saw her that I felt no obstetrical interference would prove of any service, or obviate a fatal result to either mother or child. Rapid dilatation of the os and removal of the fetus might have been attempted, but I felt that had I

endeavoured to do anything of the kind death would have followed even more quickly, and I question whether I could have saved the child had it been alive. Removal of the fetus by Caesarean section might have been adopted, but I doubt very much if the child could have been saved.

Post-mortem Examination.—The body was that of a stout, well-built, well-developed small woman. No marks of any kind on the body other than the dark, spotted rash (as described) over the abdomen and thighs. The examination was made on the evening of her death, but rigidity was already well marked. The membranes of the brain were congested and the blood vessels full of blood, and there was a greater quantity of serous fluid than ordinary in the cranial cavity. The brain was natural in appearance, but there was more serous fluid than normal in the ventricles, and the blood vessels were congested. The spinal cord was not examined, as the evidence of cerebro-spinal meningitis was so manifest. The pleurae were congested, and the pleural cavity contained more serous fluid than normal. The lungs were dark and markedly congested. The pericardial cavity contained more serous fluid than normal. The heart was slightly enlarged; valves healthy; *ante mortem* clot present. The peritoneum was congested, and spotted all over with black spots of various sizes and different shapes, as if a quill pen had been dipped in ink and shot over a sheet of blotting paper. There was more serous fluid than normal in the pelvic cavity. The uterus was enlarged, extending up close to the xiphoid cartilage—in other words, the size corresponded with a uterus at full term; peritoneum over it was congested and contained dark spots. On opening the uterus a full-term male child was removed; it was a well-developed, healthy-looking infant; the skin was healthy and without any spots or marks of any kind. The placenta, membranes, and cord were normal in size and appearance. The mesenteric glands were congested, which has been shown lately in Germany to be important from a diagnostic point of view, a point confirmed by Professor Symmers. The liver was enlarged and full of blood. The gall bladder was full of bile, and mucous membrane covered with dark spots. The spleen was enlarged and full of blood. The kidney, suprarenal capsules, and pancreas were congested. The stomach contained a little food, with some dark, grumous matter which was evidently the medicine the doctor had prescribed that morning; there were dark spots over the mucous surface, which was also congested. The small intestines were congested and contained very little undigested food; Peyer's patches were congested, and the walls of the intestines were spotted. The large intestine was congested and almost empty; the walls were spotted. The bladder was empty; its mucous surface was covered with small dark spots. As this case occurred in the earlier stages of the epidemic, I regret that bacteriological examinations were not made.

THE ORIGIN OF THE FACIAL NERVE.

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AN editorial in the BRITISH MEDICAL JOURNAL of last September draws attention to some most interesting clinical observations on this subject. For many years after Sir Charles Bell no one had any doubt that the innervation, both nuclear and peripheral, of the whole facial musculature was from what we know as the seventh nerve; the latter was demonstrable by the simplest of dissections, and the former appeared to be true when microscopic investigations were made. Later observations of obscure clinical cases showed that paralyzes of ocular muscles were sometimes associated with more or less paresis of the orbicularis palpebrarum, and also that affections of the tongue musculature were associated in some cases with paresis of that sheet of muscular anastomosis known as the orbicularis oris. In 1887 Mendel¹ attempted, by those experimental methods which had been utilized to great advantage by Gudden, to demonstrate that these coincident paralyzes of facial and ocular or glosso-pharyngeal

muscles depended upon certain anatomical facts; that the facial musculature was not a unity, and its nerve supply did not spring from one source, the seventh nucleus; he asserted his experiments showed that "the frontalis and orbicularis palpebrarum muscles, although peripherally supplied by the facial nerve, are 'eye muscles,' and form the oculo-facial group whose central innervation is the oculo-motor nucleus." Later workers following his idea, similarly cut off the orbicularis oris muscle from the seventh nucleus and attached it to the twelfth.

The work of Mendel has been widely accepted; it has been taught by most English anatomists, and it appears in all the latest textbooks. In fact, the theory does not appear to have been contested until June, 1903, when I had the good fortune to demonstrate to the Ophthalmological Society a series of embryological researches which showed that Mendel's hypothesis was scarcely possible; but that contrarily, the facial musculature was a morphological unity, and that its nerve supply, both nuclear and peripheral, had always been throughout the vertebrate line from the homologue of the facial nucleus. The papers read before the Ophthalmological Society appear in the *Transactions* of 1903² and 1904,³ and these are based on work published in 1899 in the *Journal of Anatomy*.⁴

Briefly these researches may be summed up as follows: In the early vertebrates there is no facial musculature. With the development of eyelids and nictitating membrane, first observed in the sharks, the nearest available musculature is adapted for the service of these new eye appendages; this musculature is the muscles of the spiracle (the spiracle is the first gill-cleft behind the eye, and has its representative in man in the ear tube). In those sharks which have a small development of eyelids the filching of the spiracle muscles is of the smallest; in those sharks where the eyelids and nictitating membrane are highly developed, nearly the whole of the spiracle muscles have gone over to the service of these appendages, and the spiracle has become atrophied, and only remnants of the muscles proper to the lost gill can be traced. In these sharks I traced the development of the spiracle musculature in a series of embryos; it was that common to every gill, and in more developed embryos the growth of the new eyelid musculature from the spiracle musculature was followed. In all these fish the nerve supply could be traced from the conjoined nucleus of seventh and fifth, a nucleus known to anatomists as the "facial complex."

The progressive growth of the stolen spiracle muscles in the service of the face can be traced to their full development in the facial muscles of man. From earliest to latest conditions they are arranged in two layers, superficial and deep; and there is always a most marked intercommunication of the many "muscles" of the face, in fact the facial musculature is not made up of so many distinct muscles, but of two sheets of muscle which have many slips, and to these slips we give, for convenience of distinction, names, for example, orbicularis palpebrarum, levator anguli oris, orbicularis oris, etc. The incorrectness of this separative nomenclature cannot be better shown than by citing the orbicularis oris, which has been demonstrated by no less a distinguished anatomist than Professor Alexander Macalister⁵ to be nothing but the interlaced endings of the levator labii superioris, depressor labii inferioris, levator anguli oris and buccinator muscles, and not a separate entity at all.

Mendel's hypothesis requires the overthrow of these anatomical facts as to the ancestry and lineage of the facial muscles and nerve in three points: (1) The splitting of muscle sheets which are a morphological unity into arbitrary areas. (2) The shifting of a primitive nerve supply. (3) The shifting of nerve cells from a cranial nucleus of one order to nuclei of quite a different order.

On these three points:

1. That the first is not true can be further demonstrated by the curious phenomenon to which I have called attention as "nose-blinking." In 20 per cent. of human subjects the slightest blinking of the eyelids produces simultaneous contraction of the levator labii superioris alaeque nasi, an action demonstrated by Flourens as early as 1842 to be under the sole influence of the facial nucleus. The phenomenon shows that Mendel's hypothetical "oculo-facial" and "naso-facial" muscle groups are still a unity.
2. If there is one thing that is constant in anatomical relations it is the nerve supply of a muscle; be that