the development of the segmental spinal-like cranial nerves was determined, not by the number of the skull-vertebrae, but by the visceral arches of the head and neck; and Gegenbauer has gone still further, and starting with the segmental nerves and visceral arches, determined from them the number of head-segments. Further, Balfour, in his *Plasmodonts*, has shown that the two halves of the body-cavity extend forward on each side of the neck; and that, on the appearance of the cleft of the visceral arches, each of these halves cuts up into a series of isolated compartments, one in each arch.

Milnes Marshall, quoting Stannius, shows how each visceral arch is supplied by two branches belonging to different cranial nerves—one running along its anterior, one along its posterior border. He points out how the first branchial arch is supplied along its anterior border by the glosso-pharyngeal nerve, along its posterior by the vagus; how the remaining branchial arches are supplied by the vagus, each arch by branches from separate stems; how the hyoid arch is supplied in front by the hyoidean branch of the facial, behind by the anterior branch of the glosso-pharyngeal; how the mandibular arch has the mandibular branch of the fifth nerve along its anterior, and the anterior branch of the facial along its posterior border, the latter being identified as the chorda tympani of birds and mammals. Finally, we must bear in mind how, in all vertebrates, the aortic arches of blood-vessels are formed by dividing over these branchial arches in the same manner as the segmental nerves.

I have dwelt at some length on the anatomical relations of these structures, in order to show that the guiding framework of the neck is the three postoral arches, and that the mandibular and hyoidean arches are highly specialised in regard to special functions; but the literature on this subject seems of the scantiest description: Ziegler and Virchow abroad, and Paget and Treves at home, seem to give us all we at present know. Yet there must be some close connection. If not, why do morbid growths occur so commonly in the neighbourhood of the lower jaw rather than in connection with the clavicle and first rib? The remains of the three first postoral arches persist, the lower ones aborting entirely, will, I think, explain this.

It has been asked whether the types that have been established for physiological tissues will be found to hold good, also, for pathological ones. Virchow says, "Yes;" and adds that every pathological structure has its physiological prototype, and that no form of morbid growth affixes which cannot, in its elements, be traced back to some model which had previously maintained at some time an independent existence in the economy.

Johannes Müller showed the law of correspondence between embryonic and pathological development; and Keimstock stated that connective tissue with its equivalents, as the common stock of germs of the body, could be shown as the general source of development of new formations. Reichert first noted that the body was made up of a more or less continuous mass of connective tissue-like constituents, in which muscles and nerves were imbedded.

Therefore, we say, in this connected framework of the branchial arches new growths develop; and in accordance with the same physiological law which regulates embryonic development *in utero*.

Again, Cohnheim has laid down that all tumours are the direct product of pre-existing cellular elements, and that these cells originate, not from mature tissue, but from embryonic cells, rudimentary relics of early embryo-life; and may not we ask if these fibromata of the neck are not of this origin, starting from the abortive, wasted, fibro-connective tissue of the gill-arches of early embryo-life?

Connective tissue is similar to embryonic tissue. Protoplasm increases, nuclei divide, without subsequent division of the cell; in this way the *myeloplaxes* of Robin are formed in the medulla of young developing bone, and the giant-cells of sarcoma. Embryonic cells follow embryonic tissues (the grade is easy) which are not utilised during the period of physiological development; and Virchow has shown that many of the enchondromata, common in the parotid region, have their origin in the islets of cartilage left in the neighbourhood of the gland after the atrophy of the branchial arches.

Finally, indifferent embryonic tissues may give a sarcoma, a lipoma, an enchondroma, a myxoma; but we know nothing which determines the growth of young cells into various forms of morbid tissue. Tumours occurring in early life, and referable to the embryonic state, are numerous enough, such as sarcoma or myo-sarcoma of the kidney and spleen, and it is extremely probable—aye, certain now—that some ovarian adenomata, the tumours of a certain size which start from the broad ligament of the ovary, from the parovarium or organ of Rosenmüller (the aborted Wolffian body of the female) date back in their origin to the embryonic period.

A WORD ABOUT ONE PHASE OF FEVER.

By J. MORTIMER GRANVILLE, M.D., M.R.C.P.

WHATEVER may be the nature of the materies morbi of Typhoid or Continued Fever, it cannot be doubted that its first attack on the previously healthy but now infected organism, is directly upon the nervous centres. We may infer the precise *locale* of the onslaught from the symptoms. Particularly those centres, whether cerebro-spinal or ganglionic, which preside over and, in truth, perform the functions of alimentation, comprising digestion, absorption, circulation, assimilation, disassimilation, and excretion, are affected. One of the first objective symptoms is acceleration of the heart's action, which, I take it, is due to the suspension or partial arrest of the inhibitory control of the vagus, a property it owes to the filaments it receives from the spinal accessory. The respiratory centre is also set free, and the movements of the lungs become more rapid, not merely in consequence of the heart's quick movement, but from the same cause which accelerates the speed of the central organ of the circulation, namely, *defect of control*. The heat of the body increases, and diarrhoea occurs, both presumably due to the arrest of function in the sympathetic, and local congestions occur from the same cause. Not to go into detail, which would only be to waste space, it may be briefly asserted that the phenomena of fever are, at the outset at least, those which we should expect to be produced by any force or influence which gave, as it were, a staggering blow to the principal nerve-centres of organic life. As a rule, the first effects of the accession or attack of fever pass off within a few hours, though not until they have been replaced by other results of the malady, which serve to perpetuate some of the earlier symptoms, notably the quickness of the pulse and the high temperature. Sometimes, however, it happens that the nerval or primary nerve-stage, or phase, of fever is prolonged, placing the life of the patient in imminent peril in the first few days, or even hours, of the illness, and throwing the practitioner on his beam ends as to treatment. What is to be done when we find ourselves face to face with this formidable danger and difficulty?

The patients who are placed in jeopardy, and too often die, in the accession-stage of fever, are, not unfrequently the very last we should have expected to succumb. They are often young and vigorous, and apparently have had nothing previously the matter with them. They are, however, nearly always *neurotic*, in the received acceptance of this term, and often constitutionally excitable, to the extent of exhibiting hysterical phenomena; but their general strength is not impaired, and it is all too early in the disease to think seriously of a fatal termination, yet they are gone like the flame of a candle before a puff of wind, to the horror of their friends, though not necessarily to the discredit of the practitioner. When a patient who has just been attacked by fever suddenly sinks almost without warning, there is no time to cast about for modes of treatment; we need to be prepared and able to act at once. It is useless to rely on alcoholic stimulants. I believe these not only fail in such an emergency, but often do mischief by exhausting the nervous energy, presumably by overstimulation of the nerve-centres, just as a fainting horse may be done to death by a careless driver with a persuasive whip. An effort is made, but the life is pumped out in making it. As to food, the digestive and assimilative functions are in abeyance, or nearly so; and if we hunt the *materia medica* through, it is doubtful whether we shall find any remedy which will act precisely in the manner required and with needful celerity. If the vital force be not sufficient to resist the "nervous shock" of the poisoning, the patient must die, not of the disease, but of the great nerve-depression produced by its onslaught.

The suggestion I have to make may be made in a few words, and it will, I think, at once strike the practitioner as both rational and practicable. I recommend that, in the face of this instant peril of death from nervous depression in the first days of fever, recourse should be had to the *bain électrique*, or electric bath, the bed being insulated, which is readily effected by moving the bedstead a few inches away from the wall, and, in doing so, without in the least degree disturbing or distressing the patient, placing the castors on small pieces of plate glass. The prime conductor of an electric machine is then to be brought into contact with the patient, preferably over the solar plexus as the centre of the sympathetic system, and the body charged with static electricity. The effect will be to *neutralise the depressing effects of the poison*, and to enable the patient to tide over the premature crisis, which, if life can be prolonged, will be found to pass in a very brief period.

I must content myself on the present occasion with a simple statement of the plan of treatment, only adding that I believe the way

static electricity acts is to conserve the nerve-force, which is the strength of life, in the centres; at the same time sensibly relieving that most distressing feeling of exhaustion, which is, in itself, a fruitful source of mischief in the emergency—by the mental depression it produces, and the consequent loss of the aid of the cerebral centres in prolonging life. It is probably needless to point out that the patient can be fed with a wooden spoon or porcelain feeder, ordinary care being taken not to make contact, by any conductor, with the ground. Obviously, this suggestion only relates to an adjunct to the treatment of fever, in an emergency which arises in no small proportion of cases, and which is most embarrassing to the practitioner, as well as perilous to the patient. It is, however, of more than sufficient promise to warrant a trial.

ON A CASE OF GASTROSTOMY: WITH REMARKS ON THE OPERATION.¹

By THOMAS F. CHAVASSE, M.D. EDIN.,
Surgeon to the Birmingham General Hospital.

JAMES F., aged 52, was admitted into the General Hospital, Birmingham, on July 8th, 1883. There was no family history of malignant disease. He had always appeared a healthy man until six weeks before admission; it was then noted that difficulty attended the swallowing of solid food; a month later, solids could not be made to reach the stomach.

On admission, the patient was somewhat haggard and worn-looking. On attempting to swallow milk, there was an evident oesophageal obstruction. A sound passed into the gullet was arrested eight inches from the teeth. Gentle manipulation, with sounds of various sizes, failed to pass through the stricture. After the attempts so made, swallowing greatly improved; so much so, that a slop-diet and very finely minced meat could be taken with a little difficulty. The patient thereupon declined any operative measures.

In October, the man was readmitted to the hospital, the oesophageal obstruction being complete, and no solid food passing to the stomach. The sound failed to relieve. The patient's weight was 6 st. 10½ lbs.

On October 30th, the first stage of the operation of gastrostomy was performed, the soft parts of the abdominal wall being divided by an incision four inches long, commencing opposite the ninth rib, and drawn parallel to the edge of the left rectus muscle. The peritoneum was opened half an inch externally to the linea semilunaris, and the anterior wall of the stomach at once exposed. A silver wire-suture was passed in a longitudinal direction through the outer coats of the stomach, cut long, and its ends left projecting about the middle of the parietal incision. This suture had for its object the drawing forwards of the stomach-wall. Silk-sutures, threaded and used as in ovariectomy, were then passed transversely through the peritoneal and muscular walls of the viscus, and through the whole thickness of the abdominal parietes, three-quarters of an inch beyond the edges of the primary incision. Two were passed above, and two below, the wire-suture. These four silk-sutures being tightened, the stomach was kept in contact with the abdominal wall, and the edges of the parietal incision were brought into direct apposition, as though union by first intention were required. The silver wire-suture was left projecting considerably beyond the abdominal wall. The operation was conducted antiseptically, without the spray. Ether and chloroform were used as anaesthetics. The patient was ordered to be fed by peptonised enemata every four hours.

On October 31st, marked bronchitis was developed. Teaspoonfuls of egg-flip, and of milk and lime-water, were ordered to be given alternately by the mouth every second hour. The pulmonary condition subsequently improved, but never got quite well.

On November 2nd, the wound was dressed, and the second suture removed. Two days later, the third suture was removed; and the day after, the remaining silk stitches were taken away.

On November 8th, the second stage of operation was done. The stomach was opened by a very small oblique incision, just internally to the wire-suture. Two ounces of warm milk were injected into the viscus, through a piece of catheter which was left *in situ*. The whole proceeding caused no pain. The next day, the patient complained of severe pain in his stomach, and the bronchial irritation was much increased. Gastric juice was abundantly poured out into the dressing.

On November 10th, he had severe coughing all night, and, in the

morning, a small piece of omentum was found to have been forced through the lower part of the wound.

The day following, the permanent wearing of the tube in the stomach was discontinued, and the wire-suture was removed. The withdrawal of the tube considerably diminished the bronchial irritation. The patient was now fed four times daily, through the gastric fistula, thrice with an egg and four ounces of milk, and once with the finely minced meat from a chicken's breast. His weight on November 14th was 5 st. 10½ lbs. The patient at this date got up regularly, and went about the ward. Both appetite and digestion were good. A week later, his weight was 5 st. 8½ lbs.

On November 28th, the report says that, owing to the patient having gone into a cold passage, he had coughed all night, and in the morning his expectoration was bloody, and pneumonia of the right lung existed. Late in the afternoon of the same day, death took place quite suddenly.

Post mortem examination, sixteen hours after death. The body was much emaciated. There was hepatisation of the upper lobe of the right lung. The trachea was adherent behind to the oesophagus, but there was no direct communication between the canals. Immediately above the aortic arch, a very tight stricture of the oesophagus, caused by a new growth, commenced; and the remainder of the tube, as far as the stomach, was implicated by this neoplasm. Microscopically, the growth was found to be epitheliomatous. The stomach was attached to the abdominal wall by firm adhesions, surrounding for three-fourths of an inch an artificial opening in its anterior wall. A small piece of omentum passed between the stomach and the anterior abdominal wall, and appeared externally as a granulating surface. A mass of invaded glands existed near the cardiac orifice, one of which was suppurating in the centre.

REMARKS.—In the record of this case, I would direct attention to the mode of securing the stomach. Four silk-sutures only were used; and the organ was drawn up, as it were, to the surface, and the edges of the wound then approximated by the same stitches. Adhesion readily took place, while the wire-suture was a sufficient guide for making the necessary opening into the viscus.

The exact method of fixing the stomach in this operation is variously advocated. With some surgeons, a tedious method of inserting a double row of sutures is preferred; this plan is probably most serviceable when it is necessary to speedily undertake the second step of the operation; but if five days, or a week or more, are to be allowed to pass before the opening is made, it would appear to be an unnecessarily tedious procedure.

In a case in which one of my colleagues completed only the first portion of the operation, the stomach was secured to the edges of the skin-incisions on each side by short silk-sutures. Pneumonia proved fatal on the fifth day, and yet, at the *post mortem* examination, even in a weakly, worn-out patient, adhesions were found which would have been sufficient for practical usage.

Mr. Howse, whose name will always be associated with this operation, has of late endeavoured, and with success, to obtain the necessary adhesions without using any sutures at all. In answer to a letter, Mr. Howse, with great kindness and courtesy, has given his consent to my publishing his present method. I cannot do better than use his own words in reference to his last case. "The plan I adopted was the outcome of many experiments in colotomy and other abdominal operations. In colotomy, I never make use of a suture now. In this case of gastrostomy, I simply used two forceps, clamping the stomach, but not so tightly as to cause sloughing. The two forceps had each of their blades sheathed in thick rubber, and were put on the stomach at different levels, so that an interval was left between them, by which the blood-supply might pass as freely as possible.....They (the forceps) were taken off on the sixth and eighth days, and the stomach not opened until the tenth day." Mr. Howse goes on to say that the length of time allowed to elapse between the first and second steps of the operation was unnecessarily long, but was thought advisable in a first case performed after the manner detailed. The incision through the soft parts, Mr. Howse writes, "was my usual one, through the skin parallel with the costal cartilages, through the rectus muscle vertically, separating but not cutting the fibres, so as to make a kind of sphincter muscle." It seems, therefore, that, for the present at all events, the exact mode of securing the stomach must be decided by the condition of the patient and the date at which the organ must be incised for feeding purposes.

Between the first and second steps of the operation, nourishment by the mouth was not altogether forbidden; in fact, each day there was a tendency to increase the quantity administered, provided that the swallowing of the same were not too painful or too tedious. This procedure exercised a marked benefit, by diminishing the sensations of

¹ Read before the Birmingham and Midland Counties Branch.