these cases, was only to ascertain, whether syncopes and intermissions of pulse were necessary symptoms of this affection, (a question by the way which he decides in the negative). Now, not to mention that abscesses, situated in the heart, are rather infiltrations of pus among the muscular fibres, it would be hard to conceive such a cavity left completely empty of pus, except we are to regard it as the consequence of the softening down and subsequent removal of a large tubercle, for these have not unfrequently been found in the heart's substance. But every thing in the history of the case, as well as in the constitution of the individual, disproves such an opinion; as he was of an eminently robust habit, and the attack was sudden, bearing in it all the characters of an acute inflammation. I may here also refer to the authority of Andral, who states, that he never found tubercles in the heart, except they existed at the same time in other parts of the body. In the case under consideration, there was no symptom of such, and the lungs, superficially examined, shewed no sign of their presence.

The heart is deposited in the museum of the Park-street School.

ART. VIII.—*Remarks on the Pathology of Abscesses on the Surface of the Neck, with illustrative Cases.* By R. FRORIEP, M. D., Berlin.

ANATOMICAL CONSIDERATIONS.—The cellular tissue of the neck is disposed so as to be continued from the upper part of the neck beneath the under jaw, chiefly in *three* principal parts; namely, first, on the anterior inner side of the vessels of the neck to the side of the trachea, as far as the superior border of the mediastinum; secondly, on the external side of the same vessels to the space above the first rib, from which the cellular tissue divides,

partly toward the mediastinum, and partly to the axilla; thirdly, on the side of the neck down to the adipose tissue, between the clavicle and the scapula, and between the latter and the lateral surface of the thorax downwards. It follows, from this arrangement, that fluids which are formed in the cellular tissue of the neck, if they make progress, extend in one of these ways, in case such formations have not their seat immediately under the skin upon the external surface of the fascia superficialis.

Besides the loose cellular tissue, we know that two separate fasciæ are to be distinguished in the neck; the fascia superficialis (colli), which corresponds to the fascia superficialis of the remainder of the body, and the proper fascia colli, which is analogus to the sheaths of the muscles, as they are most perfectly developed in the extremities, (for example, as fascia lata femoris), and, in strong muscular subjects, receives a texture as manifestly fibrous as the fascia of the thigh or of the arm themselves.

Between the cutis and the fascia superficialis lies upon the under jaw and along its inferior edge as well as upon the whole upper fourth of the neck, a thick layer of a fibrous cellular tissue, furnished with many adipose cells, in which inflammations and suppurations become isolated with as great facility as in the fibrous layers of cellular tissue in general. But on the boundary of the superior fourth of the neck this fatty layer terminates, passing here into a layer of laminar cellular tissue, lying immediately under the cutis, the continuation of which may be followed, above and behind the fibrous cellular tissue of the region of the chin. This laminar cellular tissue is continuous over the edge of the clavicle and of the sternum, on the external surface of the neck, without forming a firm attachment to these parts. Beneath it, in the middle line, a small quantity of loose cellular tissue exists, and on both sides the fibres of the platysma myoides muscles, and deeper still, a second layer of laminar cellular tissue, which lies upon the posterior surface of the platysma myoides, and may be pursued into the fascia

superficialis of the face, and also of the chest, but is somewhat closely attached upon the edge of the lower jaw-bone and the anterior side of the clavicle, so as in these situations to afford some obstacle to the progress of fluids which are effused under the fascia superficialis; and if the fascia superficialis be cut across in the middle of the neck and reflected upward and downward, it appears to be immediately continuous in these places with the fascia colli, which is also attached to the edge of the lower jaw and to the clavicle. This second layer of the fascia superficialis, owes its origin merely to the circumstance of the muscular expansion of the platysma myoides existing in the tissue of the fascia itself. Immediately behind it, and connected with it by a loose, irregular, cellular tissue, lies the fascia colli propria, which is displayed in muscular men as a perfect tendon sheath, and possesses the following arrangement. Upon the middle line, over the largest and the superior part of the trachea, it consists of a simple but very strong lamina, which, laterally, immediately at the edge of the sterno-hyodeus muscle splits into two lamina, the most superficial and stronger of which, proceeding laterally, reaches the anterior edge of the sterno-cleido-mastoideus, gives this a covering before and behind, again unites into one lamina at its posterior edge, and then reaches the muscles of the neck, where it is not necessary here to pursue it. The lamina which lines the posterior surface of the sterno-cleido-mastoideus is continued, interiorly, by two cellular lamina, which form a sheath for the omo-hyoideus muscle, and also pass into the sheaths of the muscles of the neck. The deeper lamina of the fascia colli of the middle line, proceeding laterally separate from the superficial lamina already described, forms sheaths for the sterno-hyoid and sterno-thyroid muscles, and for the bundle formed by the jugular vein, carotid and nervus vagus; it overlays, moreover, the thyroid gland at its anterior surface with a very firm lamina, which is intimately connected at the edge of the gland with a cellular tunic, which lines its posterior surface, and thus forms

a portion of a perfect covering of the thyroid gland. But the fascia colli, in the middle line, on the anterior surface of the thyroid cartilage forms a single lamina, which, however, pursued downwards upon the middle line, is found to divide, at the upper border of the thyroid gland, into two laminæ, which, at the inferior edge of the same, become again closely connected by a dense cellular tissue, yet afterwards they proceed downwards as two separate laminæ. The thicker external one of these then descends a short way as a single lamina, but afterwards it likewise splits into two very thick fibrous laminæ; the first of which unites with the superior edge of the sternum, and, laterally, forms the part of the fascia colli, already described, which invests the sterno-cleido-mastoideus with a sheath; whilst the second lamina proceeds straight downwards between the interior edges of the sterno-hyodei muscles to the posterior surface of the sternum, becomes here firmly attached, and is then continuous with the superficial cellular tissue of the anterior mediastinum; laterally it gives off sheaths for the sterno-hyoid and sterno-thyroid muscles, and then enters into connexion with the sheaths of the vessels of the neck; still more profoundly upon the middle line, a third lamina of the fascia colli proceeds downwards, as a covering of the trachea, and joins the cellular tissue of the posterior mediastinum, and the sheaths of the cervical muscles at their attachments to the transverse processes of the vertebræ. Between the three laminæ of the inferior part of the fascia of the neck, on the middle line just described, two interspaces are found, one between the superficial lamina, attached on the external side of the sternum, and connected with the sheath of the sterno-mastoid, and the second, which is applied to the posterior surface of the sternum, and is in connexion with the sterno-hyoid; the other, between the last and the immediate covering of the trachea itself. Both of these interspaces contain a very loose adipose cellular tissue, which is, in the first of them, isolated by means of a laminar layer of cellular substance, which connects laterally the super-

ficial lamina with that covering the sterno-thyroid muscle. The deeper space, on the contrary, is in immediate connexion with the cellular tissue of the lateral parts of the neck, and is separated from that of the mediastinum merely by one or more cellular laminæ, which bring the second and third laminæ of the fascia colli into connexion.

Between these various lamina, thus forming partitions for all the muscles and vessels of the neck, there is every where found a loose cellular tissue, in some places containing fat; at the inferior half of the neck, anteriorly, the following spaces containing adipose cellular tissue, are to be remarked; first, a triangular space immediately over the superior edge of the sternum; second, a much larger one immediately behind this, but separated from it by a firm cellular layer; third, a cellular space proceeding upwards from the second, between the thyroid gland and the trachea on one side, and the sheath of the vessels on the other; this space passes upwards into the cellular tissue in which the submaxillary gland lies; fourth, the cellular space between the posterior edge of the sterno-cleido-mastoid, the posterior side of the vessels of the neck, and the anterior surface of the scaleni muscles. In this space lies the greatest number of the more superficial lymphatic glands of the neck, and it is continued, inferiorly, along the carotid and subclavian into the mediastinum; superiorly into the cellular space between the ascending ramus of the lower jaw, and the muscles of the neck; fifth, the space between the scaleni and the edge of the trapezius (*cucullaris*). This contains the brachial plexus, inferiorly, is immediately in connexion with the adipose cellular tissue of the axilla, and superiorly, by means of the cellular space behind the ascending ramus of the lower jaw, unites with that marked number four.

If we now apply the knowledge of these spaces containing cellular tissue, with the view of exposing, in a general manner, the prognosis of suppurating inflammations of the different parts of the neck, it will be found to follow, that suppurations

in the fascia superficialis should have little tendency to take a profound course, but incline rather to extend upon the external surface of the chest. If, however, the purulent effusion take place between the fascia superficialis and the fascia colli, in consequence of the firm attachment of the fascia superficialis to the clavicle, it is stopped at the inferior border of the neck, and here compelled either to burst externally through the fascia superficialis, or internally through the fascia colli. If the lymphatic glands which descend over the brachial plexus on the external side of the cervical vessels suppurate, the pus will more probably make its way through towards the axilla and the sides of the thorax. If the secretion of pus occur in the deep lying cervical glands on the posterior edge of the sheath of the carotid, or the cellular spaces between the under jaw and the anterior edge of the cervical muscles, (as most frequently is the case in scrofulous subjects,) the natural progress of the pus is along the posterior edge of the cervical vessels downwards, to the origin of the subclavian, and from hence into the mediastinum. Again, if the cellular parts or the glands, in the space in which the sub-maxillary gland lies, suppurate, the pus easily finds its way downwards, along the thyroid gland and the trachea, and on account of the deep situation of this space, may extend far, and reach into the mediastinum, without being recognized externally. Finally, if the pus occurs in the cellular space immediately above the manubrium of the sternum, either by original formation in this place, or by a suppuration of the fascia superficialis having made way into it, the great probability is, that if an exit for the pus be not procured by artificial means, it will penetrate into the mediastinum.

The following cases are illustrative of these general remarks. They refer to the cellular spaces of the neck, which have been indicated by the numbers three, four, and five.

CASE I.—*Suppuration of the Cellular Tissue between the Clavicle and the Scapula—Denudation of the Ribs and of the Pleura.*

The 22nd January, 1834, Christian Kunze was received into the department for sick children, in the Charité, Berlin. This boy, who was well formed, had some time before fallen down a stairs, and received contusions chiefly in the right shoulder and the region of the hip. His parents had let a considerable time pass before they called a medical man, and concealed from the latter the cause of the injury; so that he considered, that he had to deal with a disease of the hip-joint, from constitutional causes; and for this applied stimulating means, which gave rise to a smart fever, assuming the nervous type, and rapidly exhausting the strength of the patient. In this state, greatly emaciated, with facies hippocratica, small rapid pulse, loss of consciousness, and low delirium, the patient arrived at the Charité; the dry tongue, together with the lips and the teeth, was covered with a firm brown mass of coating. Several collections of matter were found on the body; namely, the affected hip-joint was swollen, deeply reddened, and shewed evident fluctuation; the head of the femur was luxated backwards and upwards; the right shoulder was also considerably swollen, red, and fluctuating; the humerus also seemed to be pushed upwards; above the shoulder was found on the right side of the neck, a large abscess, which extended from the middle of the neck, posteriorly to the spine of the scapula, and anteriorly under the clavicle; moreover, there existed a fracture with collection of pus at the inferior end of the radius of the right hand, and also fracture, with suppuration of the middle finger of the first phalanx. All these purulent cavities were opened, and by this means freed of about two quarts of matter, which was in the shoulder and hip-joints, sanguineous and unconnected, but in the other places, whitish yellow, and tolerably consistent. In spite of the most careful treatment, it was not possible to preserve the life of the patient for longer than

six days. The following was the result of the dissection, which was performed forty-eight hours after death.

The opening of the right hip-joint discovered a dislocation of the femur, the head of which lay upon the external surface of the ilium posteriorly and superiorly: the great trochanter, and a part of the neck of the thigh bone were torn off, and drawn upwards by the operation of the glutei muscles. The acetabulum was normal. The ligamentum teres, and the capsular ligament, were torn, and gelatinously softened. The cartilaginous covering of the head of the femur was partially absorbed: moreover, nearly all the soft parts in the neighbourhood were infiltrated, and the upper half of the thigh bone deprived of its periosteum, by the deposit of a thin unconcocted pus, which flowed out from an incision made into the thigh. Over the ischium there was a cavity filled with dirty yellow pus, forming a short sack, in which two of the transverse processes of the sacrum were laid bare, but not denuded of their periosteum or become carious. A similar destruction was found at the right humerus; the os humeri was luxated upwards, without laceration of the capsular ligament, the cartilage of the head of the bone was absorbed, and the articular cavity filled with pus. In the elbow joint the epiphyses of the os humeri were loosened immediately at the cartilaginous intermediate layer, so that the external and internal condyle were separated, and a considerable quantity of matter was found in the joint itself. At the inferior end of the radius, the epiphysis was also broken off, and the inferior half of the radius bared of its periosteum. The wrist joint was filled with matter. In like manner the metacarpal end of the first phalanx was separated at the epiphysis, and the joint filled with matter. But the largest quantity of matter was found in a cavity of the size of a goose egg, which, on the right side of the neck, projected between the sterno-cleido mastoid, and the trapezius, (*cucullaris*,) and anteriorly and interiorly on the clavicle over the first rib, by a smaller, yet a considerable opening, was connected

with a very large sac of matter on the outside of the thorax: this inferior cavity extended down to the edge of the fourth rib, and reached from the point of insertion of the costal cartilage, to the posterior fourth of this rib, or to the posterior border of the scapula. All the four ribs were in the middle of the cavity bared of their periosteum, exhibiting a rough surface, and between these denuded places of the second, third, and fourth ribs, the intercostal muscles were for the length of an inch perfectly destroyed, so that the inferior abscess sac was separated from the right cavity of the chest, merely by the thin membrane of the costal pleura. The purulent cavity in the neck, and that on the external surface of the thorax were distinguished from one another also by this, that the former possessed a tolerably thick lining wall, consisting of condensed cellular tissue, (probably in consequence of inflammation of this tissue), on the latter, contrariwise, a new cellular tunic of such a kind was not to be detected. This, as well as the circumstance, that the upper cavity was connected with the under by a somewhat narrow opening, would perfectly justify the idea, (if any doubt could prevail on the subject), that the pus had sunk down from the surface of the neck to the thorax.

It is not necessary for our purpose to quote more of the appearances which this case presented; there were suppurations likewise in several places of the adipose cellular tissue; and the viscera of the head, the chest, and the abdomen, were unaltered, except some enlargement of a few of the mesenteric glands.

Case II.—*Abscess of the Cellular Tissue behind the Inferior end of the Sterno-cleido Mastoid, and Communication of the same with the Heart, by means of the Vena Cava Superior, and with the Lungs, by the anterior Mediastinum.*

On the 14th January, 1834, John Knuth, labourer, ætat 28, was admitted into the Charité, and had then, on the right side of the neck, above the clavicle, and under the sterno-mastoid, a glandular abscess, which, by means of cataplasms, was matu-

rated and opened. Several purulent sinuses were exhibited in different directions, particularly towards the shoulder, which were opened, and then the suppurating surface took on the aspect of a scrofulous herpetic ulcer. Active granulations were produced, by dressing with stimulating ointments, and the patient's condition was very satisfactory. In the beginning of the month of April, however, induration exhibited itself in the part, discoloration also in various places, and finally, copious secretion of pus, which flowed more particularly by pressure from below upwards. Several new sinuses were now evident, into which the probe penetrated in various directions. At this time the constitution of the patient became affected, vehement thirst came on, with a small rapid pulse, and continued cough. The external wound was kept open by tents. In the month of May, all the phenomena of tubercular phthisis has gradually formed, and pressure in the neighbourhood of the sinus gave issue only to a small quantity of ill-conditioned matter. On the 8th May, the fistulous abscess was again cautiously probed, and at this the thin elastic catheter which was used for the purpose, took for the first time a direction downwards, and to the left, so as to appear as if penetrating into the anterior mediastinum. But the probing instrument had scarcely been a few seconds in the fistula, when the patient's face lost colour, his eyes became fixed, and his arms assumed almost a cataleptic stiffness. He fell into a faint, from which, however, he was easily revived in the usual manner, and then some frothy blood was thrown up by coughing, and from the fistula also, some matter mixed with blood issued. The pulse was little changed, and not more excited than before the exploration; but a feeling of tightness attacked the chest, so that immediately twelve ounces of blood were drawn from a vein. The above described condition, which was brought on by the probing, now occurred frequently, the pectoral anxiety increased, the respiration became disturbed in the highest degree, and at length became abdominal; and the extremities became stiff and immoveable. Finally,

death occurred on the 16th May, with all the phenomena of pulmonary disease. Dissection disclosed the following appearances:

The external opening of the abscess of the neck was situated an inch and a half above the anterior half of the right clavicle: it had the appearance of a purulent surface upon an indurated base. Between this surface and the clavicle lay a row of swelled, hardened, and partly suppurated lymphatic glands. The purulent surface was continued laterally under the sterno-cleido mastoid, by a canal about an inch wide, which was lined in all directions by indurated cellular tissue. Inferiorly, a funnel-shaped cavity existed in the surface of the abscess, into which, without the least difficulty, a thin flexible catheter could be introduced its whole length interiorly and inferiorly. This was left so, and the clavicle cautiously taken away; it was then found, by a long and difficult dissection, that the commencement of this fistula existed precisely in the angle formed by the union of the subclavian and internal jugular vein, that is, where these unite to form the vena cava superior. In this angle the venous tunic was perforated by an opening of the size of a crow's feather. This opening had smooth, loose edges, overlaid with pus. The coats of the vein were neither in the jugular, nor subclavian, nor in the vena cava superior, inflamed, nor otherwise altered; the probe introduced through the opening, went immediately by the superior cava into the right auricle of the heart, and, beside, it was a coagulum of blood, in which not the smallest trace of mixture of pus could be observed. The portion of the surface of the abscess which was prolonged under the inferior part of the sterno-mastoid, sent forth two very narrow fistulæ, containing but little matter, and not surrounded by a cellular lining, into the superior part of the anterior mediastinum, in which a tumour of the size of a walnut, filled with the peculiar cheesy tubercular matter existed, which was in connexion with the superior lobe of the lung, here incorporated with the mediastinal pleura. The right lung

was full of tubercles, in all stages of development, amongst which were several middle-sized cavities. The left lung also contained an innumerable quantity of softening tubercles, with some small cavities. In the abdominal cavity, a small quantity of fibrous exudation was observable on the intestines; excepting which, all was in the normal state, and no trace of purulent deposit was found in any organ.

This case furnishes instructive and interesting data, in reference to the connexion of the cavity of an abscess with the cavity of a vessel, and also in reference to the question, as to whether tubercles stand in a causal relation with this connexion; but these circumstances are here omitted, and it is sufficient for our purpose to have quoted this rare case, as an example of the sinking of matter on the external side of the vessels of the neck into the mediastinum. As to the third variety of purulent deposit in the neck, in which the pus is formed at the inner side of the cervical vessels, between these and the windpipe, and sinks into the anterior and posterior mediastina, cases of this kind are found in all surgical works.

We would briefly add the following notes of a third case, the pathological interest of which is apparent. A man, aged 30, (in Prof. Dieffenbach's division for surgical patients in the Charité), had several fistulous openings along the left side of the trachea, from the middle of the neck to the manubrium of the sternum, through which, for a long time, a considerable quantity of pus had been evacuated, until one day this evacuation suddenly ceased, although the fistulæ still remained perfectly open. By degrees a series of symptoms set in, which in a little time placed it beyond doubt, that a deposit of pus had formed in the anterior mediastinum. Soon afterwards, a small swelling arose between the sternal ends of the cartilages of the third and fourth rib, which became red, fluctuated, and being opened, gave free issue to the matter out of the mediastinum. Soon again, a similar pointing of matter formed over the middle of the sternum, where also now a fistula exists,

which by a round opening in the sternum, leads into the mediastinum, and affords here a second exit for the pus. The general condition of this patient is satisfactory, and leaves ground for hoping, that in his case the deposit of matter will not terminate unfavourably.—*Medizinische Zeitung*, July 9, 1834.