in the following way. A patient is rolled into the arena from the adjoining ward on a bed, and one of the students, named *Practicanten*, who have put their names on a list for the purpose, is called down. The history of the case is read to him and to the class, and he makes a physical examination of the patient, assisted by the professor, and then forms his diagnosis. The professor then analyses the case in every direction, in a way peculiar to the German school, and which we have never heard equalled by any other teachers, except the lamented Oppolzer; and from this it is that the English student derives benefit; there he finds the most ordinary every-day cases looked at in other aspects than that in which he has been accustomed to regard them, and the diagnosis arrived at by processes of reasoning quite new to him. True, he may not always himself have an opportunity of making a physical examination of the case, nor will he be able to follow its progress from day to day; but this is not what he goes abroad for. From time to time, the same patient will be again brought forward, or his case reported on; and, if death ensue, the autopsy will be conducted by the most accomplished pathologists, perhaps even by Virchow himself. Foreigners may always obtain seats within the arena; and Professor Frerichs and his assistants are most ready to afford them facilities for study.

Professor Traube's *clinique* is conducted more in accordance with our ideas, inasmuch as he goes round his wards with the class. He gives two courses: one intended for the junior students, the other for senior students and foreigners. Traube's speciality is diseases of the chest, and he possesses the most acute powers of auscultation. His ears are habitually stuffed with wadding, in order, it is said, to preserve the *membrana tympani* in perfect order.

Professor von Langenbeck is the great teacher of clinical surgery at Berlin, and one of the great centres of attraction there. His *clinique*, which is held in the University Hospital, some five minutes' walk from the Charité, is conducted in a similar manner to that of Professor Frerichs. After the case has been analysed and expounded, if an operation be necessary, it is performed. Here it is that the plaister of Paris bandage reigns supreme, any other form of fixed apparatus being rarely seen in Langenbeck's practice. Langenbeck has the reputation, amongst his own countrymen, of having a special liking for Englishmen; and, indeed, we ourselves, and many of our countrymen, have experienced the greatest kindness at his hands. He is always fortunate in the choice of his assistants, who are elected for three or five years respectively; and these appointments are much sought after, as they are likely to lead to a successful career. Englishmen will not find it difficult to cultivate friendly relations with these gentlemen, and so learn much which might otherwise escape them.

The surgical department of the Charité is under the direction of Professor Bardsleben, who succeeded to the post on the resignation of Jüngken, about two years ago. Although not so well known in this country as Langenbeck, yet Bardsleben holds a very high position in the profession in Germany. He is an admirable operator and teacher.

BLEEDING STIGMATA.

By FREDERICK JAMES BROWN, M.D., ROCHESTER.

SEVERAL years since, I attended a man suffering from purpura in connexion with organic disease of the viscera, in whom occurred spurring of blood from one finger and from one leg. I bring the case forward at the present time, so as to add to the general stock of experience in respect of bleeding stigmata.

Edward P., aged 45, died at Chatham on February 17th, 1857. The death was registered as follows:—Pleuritis (right), pericarditis (adherent pericardium), disease of liver and spleen, 2½ years; dropsy, 9 months; purpura hæmorrhagica, 5 months.

The *post mortem* appearances may be briefly stated thus. The pericardium was universally adherent; bony plates were found at its junction with the diaphragm. The cardiac valves were healthy. The right lung was entirely adherent; its structure was carnified. The left lung was healthy. There was serous effusion in the peritoneal cavity. The liver was enlarged; it had a rough granular surface, and yellow colour; its tissue was smooth, but very hard throughout. The bile in the gall-bladder was thin. The spleen was greatly enlarged; its surface was covered with thin lymph. The kidneys were healthy. The left suprarenal capsule was healthy; the right was not examined. The intestines were healthy. The outer surface of the stomach was dotted over with purpuric spots as large as peas. On the inner surface, there were large extravasations, one being three inches square. There was a tablespoonful of blood in the cavity of the stomach.

The patient had intermittent fever in the Baltic, and arrived in England suffering under thoracic inflammation. He went into a London hospital. Purpura appeared in September 1856. Black vesicles appeared in one leg, and under the nail of one finger; one vesicle appeared on the finger at a time, broke, and spurted out capillary streams of blood to the distance of a yard. I was present on one occasion; the streams or jets were as minute as hairs. The leg bled similarly, but I did not witness the spurring from the lower extremity. I do not remember whether it was the right or the left arm and leg, nor do I recollect whether there were any other purpuric spots on the extremities.

CEREBRAL RHEUMATISM.

By WILLIAM ANDERSON, F.R.C.S. Eng.,

Surgical Registrar, St. Thomas's Hospital; late House-Surgeon to the Derbyshire General Infirmary.

SEVERE cerebral complications in the course of acute rheumatism are sufficiently rare to warrant the publication of any instances which may throw light on the pathology of so fearful an addition to a disease of frequent occurrence; to this end are detailed the following well-marked cases.

CASE I.—S. H., aged 29, a labourer, was admitted into the Derbyshire Infirmary under the care of Dr. Ogle, on July 12th, 1869. The patient had been suffering, for a month before admission, from ordinary articular rheumatism, marked by pain and swelling of all the larger joints, febrile disturbance, and profuse acid perspiration. Two days before admission, a tendency to ramble and to get out of bed was noticed; but he was able to answer questions, and to converse rationally when his attention was fixed. On the following day, profuse sour perspiration occurred, and the symptoms passed off; but at night, the dryness and heat of skin returned, followed by the delirium. The joints still continued swollen. The patient was a married man, very sober and regular in his habits; he had always enjoyed good bodily health, but was of a nervous excitable temperament, and had suffered much from headaches. He had had a previous attack of rheumatic fever when nine years of age. His father and brother were both subject to rheumatism. On the morning after admission, he was apparently suffering from an ordinary uncomplicated attack of articular rheumatism, the knees were tender and swollen, and the skin yielded a profuse highly acid perspiration. No peculiarity of manner was noticed, although he was said to have rambled a little in the night. His pulse was regular and strong, although rapid, and the heart-sounds were normal; the tongue was large and white; the bowels open. A prescription containing colchicum with iodide of potassium and bicarbonate of potash was given. In the night, the dryness of skin and delirium were again observed; but, on the following morning, the skin acted well, and no intellectual impairment was present. The affected joints were less swollen and painful. The nocturnal delirium, still very slightly marked, recurred on the 14th, but as usual subsided towards morning, after free perspiration. On the night of the 15th, he was more unmanageable, and got out of bed several times; and, on the next morning, his manner was wild and excitable, not unlike that of a patient in the early stage of delirium tremens. There was, however, no peculiarity about the pupils, and his answers to questions were rational. His skin was dry and covered entirely with a milia eruption, each vesicle having a strawberry-red areola. No sweating had taken place during the night. His pulse was about 110 per minute, and rather bounding in character; the tongue was still white and moist. A warm bath (100 deg. Fahr.) was ordered. There was great difficulty in inducing him to go into the water; and, shortly after being replaced in bed, he sprang out with the blanket wrapped around him, and, before he could be stopped, ran down the staircase and into the grounds; he was there caught and was brought back into his ward. His struggles were then so violent that forcible restraint became necessary. At 6 P.M., he was delirious, talking in a wild disconnected way, but no longer violent. His face was flushed; the pupils slightly contracted; the features occasionally twitched into a sardonic grin. The skin was remarkably hot and dry; the areolæ of the milia vesicles were still bright red; the temperature in the axilla was 107 deg. Fahr.; respiration 30 per minute; pulse, full and bounding, 120. The heart's action was violent, but regular, and unaccompanied by any morbid sounds. A small quantity of non-albuminous urine was drawn off by the catheter. This fluid presented no microscopical peculiarity, but was not examined quantitatively for urea, etc. A blister was applied to the nape of the neck, an ice-bag placed on the shaven scalp, and a mixture containing fifteen grains of bromide of potassium prescribed. At 7.20 P.M., the face had become pallid; the features were drawn and the pupils con-

tracted. The skin was intensely hot to the touch, and the areolæ of the vesicles were fading completely away; temperature 110 deg.; pulse, less powerful and more rapid, 136; respiration noisy, 35; insensibility was complete. At 8.10, the face was cadaverous; the pupils were strongly contracted. At 8.20, the pulse was thready and uncountable; temperature 110.3 deg. The areolæ of the vesicles were no longer visible. At 8.30, he died. The pupils dilated widely a few moments before the cessation of the heart's action. At 8.40, the temperature was 111.4 deg.; and at 8.50, it was 109 deg.

Post mortem examination (seventeen hours after death).—The body was purple in the dependent parts and around the neck. Rigor mortis had almost disappeared. The heart was perfectly healthy; the cavities were filled with tarry blood, without clots. The pericardiac fluid was normal in quantity and appearance. The lining membrane of the great arteries was stained deeply. The pleural cavities were normal. The lungs were congested posteriorly; otherwise healthy. The digestive system was healthy, but contained dark fluid blood, which flowed freely on cutting into the organs. The spleen was somewhat enlarged, congested, and pulpy. The genito-urinary system was healthy. The cerebral sinuses and vessels of the membranes were distended with dark blood. The subarachnoid and intraventricular fluid was somewhat augmented in quantity, but clear; it was not examined chemically. The cerebral substance was firm and apparently healthy; the grey matter was well-defined. The blood on microscopical examination presented no peculiarities.

CASE II.—T. S., aged 55, labourer, was admitted into the Derbyshire Infirmary on July 5th, 1869, under the care of Dr. Taylor, suffering from rheumatism of ten days' duration. On admission, pain in the larger joints was complained of, but did not appear to be acute. The articular swelling had subsided. The skin acted profusely, yielding a strongly acid secretion. The tongue was white, and the pulse quick but regular, and of fair power. The heart-sounds were normal. The general appearance of the patient was that of a fairly healthy man. Subsequent inquiry showed absence of any tendency to bodily or mental disturbance. A mixture containing iodide of potassium with carbonate of ammonia in decoction of bark was prescribed. The case progressed favourably until July 9th, when some slight wandering in his talk was observed for the first time; his symptoms were otherwise little altered. The urine was strongly alkaline, deposited phosphate of lime, and displayed very early development of masses of vibrios. The perspiration, at the same time, was profuse and highly acid. On the following morning he was better, and continued to go on well until the evening of the 12th, when, at about 7.30 P.M., after the nurse had been out of the ward for about an hour, he was found muttering inarticulately and evidently quite unconscious. When seen by the House-Surgeon, he was muttering constantly, pulling at the bed-clothes, and from time to time partly rising in the bed to point and gibber at vacancy, limbs and features twitching incessantly, pupils strongly contracted, and face pallid. The skin was dry and of a peculiar biting heat. Temperature in axilla 108.4 deg. Fahr.; pulse 140, bounding; respiration 36. At 8 P.M., his temperature rose to 109.2 deg. The muttering and twitching had given place to complete coma. An attempt was made by means of blankets to stimulate the skin to action, and five grains of calomel with a drop of croton oil were placed on the back of the tongue; no result followed. At 8.25, the temperature was 110.5. The pulse had now lost its bounding character and was very feeble. At 8.45, temperature 111.1 deg.; pulse 128, thready. At 9.10, he died. The results of the necropsy were, with the exception of a much higher degree of congestion of lungs posteriorly and a deeper straining of the arterial coats, in no respect different from those shown in the preceding case. The heart was quite healthy.

CASE III.—G. O., aged 31, a gardener, was admitted into the Derby Infirmary, under the care of Dr. Taylor, on January 3rd, 1870, suffering from acute rheumatism. His illness commenced seven days before admission, with pain and slight swelling in the ankles and knees, afterwards implicating in succession the shoulders, hips, elbows, and wrists. There had been free acid perspiration, but the articular pain and effusion were never well marked. The patient had never before the present attack had a day's illness in his life, and had never displayed any tendency to cerebral disturbance. On admission, he appeared to be suffering very slightly; his general aspect was that of a remarkably stout and robust man. The joints were not swollen or very tender on pressure; most sensitiveness was present in the shoulders. The skin was perspiring profusely; the secretion was very sour in odour; the pulse was strong and regular, but rather hard; the heart-sounds were normal. The tongue was white and moist. The bowels had recently been opened freely. On the following morning there was, on superficial examination, little change in his symptoms. His manner was cheerful, perhaps unnaturally so; his replies were ready and intelligent. He

professed to be quite free from pain, and thought he was improving rapidly. The pulse was, however, found to be quickened and rather harder; and, on auscultation, a very faint rubbing was heard a little above and to the right of the heart's apex. The skin was acting very freely. The temperature in the axilla was 100 deg. Fahr. A blister was applied over the heart, and a mixture containing bicarbonate of potash and iodide of potassium was ordered. The bowels were acted upon by means of compound senna draught. No special change in the symptoms was noticed until about 5.45 P.M., when it was observed that his manner was strange and excited, and that his sentences were disconnected and incoherent. Within ten minutes, he became completely unconscious, and was then found with flushed face and strongly contracted pupils, the lips pouting and rubbing incessantly over the teeth, and the whole of the voluntary muscles twitching constantly. His skin was very hot, but moist, as if from a recent perspiration; the moisture, however, rapidly disappeared, and the skin had evidently ceased to act. The temperature in the axilla was 106 deg.; the pulse rapid, 120, full and bounding; respiration was quick, laboured, and unequal. The head was shaved, and cold applied to the scalp; sinapisms were placed upon the calves and on the nape of the neck, and additional blankets were piled upon him. The temperature fell slightly up to about 7.30 P.M., when the muscular movements terminated. At 8 P.M. the heat of skin had reached 108 deg.; this point it maintained until about 9.45, when it began again to rise, and at the same time the respiration became stertorous, and the face assumed gradually a death-like pallor. The skin was quite dry and very hot; the pupils were still contracted, the pulse growing feeble and more rapid. At 10.15, the temperature was 108.3; the pulse 150. At 10.50, the temperature was 108.4. At 11.45, the temperature was 109.4; the pulse thready and uncountable. At 12.25, he died; the temperature was 110 deg.; and at 12.55, it was 108. Rigor mortis set in about three hours after death. At the necropsy, fifteen hours after death, the pericardium, both visceral and parietal, was found minutely injected; the quantity of fluid was very small. There was no endocardial mischief. The other appearances were exactly as in the first case.

REMARKS.—The points for observation in the foregoing cases appear to be: (1) the extraordinary rise in temperature; (2) the rapidly fatal termination; (3) the absence of characteristic *post mortem* appearances, the condition of tissues and organs being similar to that seen in typhus fever.

Both the etiology and pathology of the affection are obscure. Numerous predisposing and exciting causes have been suggested, but each has been negatived as fresh cases have come under observation.

As predisposing causes, abnormal nervous susceptibility and constitutional debility have been advanced. Abnormal nervous susceptibility, hereditary or acquired, has been supposed to act as a combustible material to which the rheumatic poison plays the part of a lighted match; but in Cases II and III the most careful inquiry failed to elicit any history of such a condition. Debility, again, cannot be an essential element in the development of the complication, as in Cases I and III the patients were both powerful men, and showed no sign of prostration up to the very moment of manifestation of the symptoms; nor was the state of the other patient, T. S., nearly so feeble as that daily observed in cases of rheumatic fever. These facts, of course, do not show that the influences named may not be powerful predisponents in some instances, but the existence of others, still to be detected, is clearly indicated.

As an exciting cause, metastasis, in consequence of sudden retrocession of the disease from the tissues which constitute its usual points of attack, has been advanced; but that this is the cause has been abundantly contradicted by the reports of several cases; there is, however, no doubt that in some instances, as in that of G. O., the articular pain and swelling have completely subsided before the appearance of the cerebral symptoms, while the presence of lactic acid in the perspiration proves that the virus is yet latent; where this occurs, the blood retains a powerful enemy which may at any time turn its attack upon vital organs, unless speedy elimination by natural channels be effected.

Attempts have been made to establish a connexion between the cerebral phenomena and acute endocarditis or pericarditis, and there is no doubt that heart-disease is frequently present in these cases; but that the association is constant is disproved by the absence of any abnormality in the circulatory organs in the two first instances, H. and S.

The morbid appearances, as already mentioned, are not characteristic. The most constant and noticeable phenomenon is the dark non-coagulable condition of the blood, but the microscopical character of the fluid is natural, and a series of chemical investigations are yet required to detect the presence of a definite poisonous agent. Rapid contamination of the blood by accumulation or speedy new development of the *materies morbi* of rheumatism, may probably be the origin of the evil.

In each of the preceding cases, cessation of the acid perspiration and unusual dryness of skin immediately preceded the attack, although cutaneous action had previously been free; in the first case, the inflammatory milium eruption pointed to an attempt to expel some morbid material by that outlet, and the evident relation between the checked transpiration and development of delirium was significant, as was the complete disappearance of the cerebral symptoms on the restoration of the acid cutaneous secretion.

It is probable that the poison, when it has reached a state of sufficient concentration, so vitiates the general circulation that the functions of the whole vital economy are more or less checked or perverted; secretion, excretion, and nutrition are, to some extent, in abeyance, while waste goes on apace and adds fuel to the fire; the nervous system (we have no reason to assume that the brain is alone attacked), as the most sensitive part, manifests its functional disorder the most strikingly, and gives rise by its influence on the nutritive changes in the tissues to the marvellous elevation of temperature, as well as to the high nervous and vascular excitement of the first stage, masking while increasing the concurrent mischief going on elsewhere, and leading, finally, to rapid death by coma. An effect of the rapid destruction of tissue-elements which directly leads to the increased heat, is displayed in the early supervention and disappearance of rigor mortis. The slight increase in the quantity of intraventricular and subarachnoid fluid is not sufficient to explain the symptoms, and is, perhaps, merely secondary. Analysis of the effusion shows that uræmic poisoning is not present.

As regards the treatment of this condition, it is to be feared that when once the rapid rise of temperature sets in, all efforts will fail to check the fearfully swift course of destruction, but in most cases there is a premonitory stage of more or less marked delirium, although this, as in the case of G. O., may be brief and scarcely noticeable. In other instances, an unnatural nervous excitement, resembling the early symptoms of delirium tremens, may warn us of the advancing mischief. At such a period, it is probable that remedies may have the power to avert the threatened evil. The great indication appears to be the elimination, as speedily as possible, of the poison from the system; and with this view, Trousseau advises sinapisms or blisters to the joints, to encourage the articular manifestations of the disease if these have abated. Warm baths, wet packing, purgatives, and other methods may be suggested to further the same end.

Opium has been recommended by Dr. Todd, but, except through its action upon the skin, it appears doubtful whether the addition to the blood of a drug which itself tends to produce a condition of coma, can lead to a beneficial result in a disease the symptoms of which progress to a similar termination. Hydrate of chloral, as suggested by Dr. Murchison, would be a safer remedy; but in the employment of any form of sedative, we cannot expect very happy results until the cause of the condition has been removed, especially when we consider the probability that the nervous phenomena form but one link in the chain of symptoms, and that the nervous system may but share the disease with other vital parts of the organism.

PROFESSOR FLOWER'S HUNTERIAN LECTURES ON THE TEETH AND ALLIED ORGANS IN THE MAMMALIA.

Delivered at the Royal College of Surgeons of England.

LECTURE XIII.—Friday, March 17th.

Cetacea are divided into two suborders: those possessing true teeth, the Odontoceti; and those having baleen or whalebone, the Mysticoceti.

The Odontoceti or Toothed Whales are further divided into two principal families—the Delphinidæ and the Physteridæ. The common Dolphin is homodont and monophodont, having a single set of numerous conical slightly recurved teeth, with enamelled crowns, adapted for catching and holding fish. These teeth are not set in distinct alveoli, but in an imperfectly divided groove. In the Porpoise, the crowns of the teeth are not conical, but expanded and compressed laterally. In the Grampus (*Orca*), the teeth are fewer in number, and are much larger, being used for catching and killing larger animals than those on which the Porpoise and Dolphin feed.

In the Blackfish (*Globiocephalus*), the teeth are few in number and small. This genus, of which there are many species, is very common in the seas of the north of Scotland. The food consists almost entirely of cephalopods. The teeth are very simple, and are about twelve in number on each side, confined to the fore part of the jaw. They have a great tendency to disappear in old age. In one species of *Globio-*

cephalus, there are no teeth in the upper, and only three small ones on each side of the front part of the lower jaw.

The most remarkable modification among the Delphinidæ is presented by the Narwhal (*Monodon*). This animal inhabits the Arctic seas. At a very early stage, it is stated to have a small row of rudimentary teeth, which disappear, leaving none in the lower jaw, and only a pair in the upper. In the female Narwhal, these two teeth remain in a horizontal position, deeply imbedded in the maxilla, and having the pulp-cavity completely closed by osteodentine. In the male, one of these grows to a great length, and is marked by a spiral track directed towards the left; in some cases, the whole tooth undergoes a spiral curvature in the same direction. It was the tooth of this animal which gave rise to the old idea of the horn of the unicorn. The pulp-cavity is persistent nearly to the front of the tooth. The tooth is almost entirely composed of dentine, without any coating of enamel; the ivory is of good quality, but never very great in quantity. An aborted tooth in the Narwhal can always be distinguished from a growing one by the state of the pulp-cavity, which in the former is filled with osteodentine, while in the latter it remains open. There seems to be no good evidence of the right tooth ever being developed and the left remaining rudimentary. It appears, indeed, that it is invariably the left tooth which becomes developed to so great a size. It occasionally, but rarely, happens that both the teeth are developed; in such cases, the spiral twist runs in the same direction in both teeth; and hence some have supposed that the specimens were not genuine. It is plain, however, that a full sized tusk could not be fitted into the small alveolus of an aborted tooth. This arrangement of the spiral twist in the double-toothed Narwhals is an example of want of bilateral symmetry, rare in the construction of vertebrate animals, though not uncommon in the heads of the Cetacea.

The Pontoporia, a small Dolphin found near Buenos Ayres, has a long beak, and two hundred and twenty teeth in all, the largest number known in any Mammal. The teeth have a broad cingulum round the base. The fresh-water Dolphin of the Ganges has a very long compressed snout and many teeth. Anteriorly, the teeth are very long and pointed; posteriorly, they are much compressed. In this animal, alone among the Cetacea, there is an indication of bifurcation in some of the roots.

The Physteridæ have next to be considered. In the Physeter or Sperm-Whale, there are no functional teeth in the upper jaw; but rudimentary teeth are found imbedded in the gums. The lower jaw is long and narrow, and has about twenty-five teeth on each side; the two rows nearly approach each other. The teeth are loosely set in a long groove, and are almost entirely held in place by the gum. In the young animal, they are pointed; but, as age advances, they become rounded by wearing against the gum of the upper jaw. The teeth near the middle of the series are the largest; the anterior and posterior smallest. The pulp-cavity becomes gradually filled with osteodentine; there is no enamel, but this substance is present in the Grampus and Dolphin. The teeth are largely made up of dentine, with a layer of cement often half an inch thick. Stalactitic masses of osteodentine are sometimes found lying loose in the pulp, as if from partial ossification. The animal lives to a great extent on cephalopods.

In some of the Southern seas there is occasionally found a small Whale about ten feet long, having the same characters in miniature as the Sperm-Whale.

All the other Whales of the family Physteridæ have very few functional teeth. One of the best known is the Hyperodon or Bottle-nosed Whale of our coast, which attains the length of twenty-five feet or more. In the upper jaw, there are no teeth; in the lower, generally only two in front, quite concealed by the gum. In a fetal Hyperodon, Eschricht found twelve or thirteen minute teeth on each side, in each jaw. The Hyperodon has a number of minute horny tubercles scattered over the palate—as if forming a transitional stage to the Whalebone-Whales.

About a dozen existing species, and many fossil, have been classed together under the name Ziphius. They have no teeth in the upper jaw, and only one (in one species, two) pair of developed teeth in the lower, which are larger in the male than in the female. Rudimentary teeth have also been found concealed in the gum. The developed teeth differ in position. In the Ziphius Indicus, they are placed in front; in some species, they lie half-way between the anterior and posterior parts of the jaw. The tooth projects like a tusk, and works against a groove in the upper lip, surrounded by a hard substance. The structure of these teeth is curious; they consist in a great measure of cement, with a little cap of dentine at the top, having its small pulp-cavity—the main pulp-cavity being filled with osteodentine. In the Ziphius Layardii, the teeth, which are placed in the middle of the