Family History.—The only points of note in the family history were that the father had died of intestinal obstruction, the mother was suffering from angina pectoris, one brother had died of "brain fever," and one sister had succumbed to scarlet fever.

History of Illness.—The patient had suffered from measles at the age of 4, and had had "influenza" several times. It was stated that she had suffered from an attack of "influenza" two months before admission, but on close inquiry it was discovered that during the illness she had complained of some soreness of the throat, and a week or so after the acute symptoms had passed off the skin of her hands and feet began to peel. About this time she complained of a violent pain in the head, chiefly in the right frontal region. The patient had for years suffered from an occasional feeling of faintness, usually lasting for a few minutes. On November 14th, eleven days before admission, after sitting in a chair for some time, she found that she was unable to get out of it excepting with great difficulty, as there was great loss of power in the legs. There was no pain, and no loss of cutaneous sensibility was noticed. This diminution of the muscular power of the legs continued for three days, when the patient took to bed. On that day she had what was called a bilious attack, and vomited once; there was no headache. The loss of power gradually increased in severity, and also became more widespread in its distribution, so as to involve the arms. There were feelings of "pins and needles" in the tips of the fingers and toes, and it was also noticed that the child did not speak so distinctly. She continued in bed until brought to the hospital on November 25th.

Condition on Admission.—There was practically total paralysis of the lower limbs and of the muscles of the trunk and of the neck. The paralysis was of the flaccid type. Any attempt to raise the patient up from the bed or to turn her on to her left side was attended with great pain in the back. This suggested the possibility of a spinal meningitis, but there were no muscular spasms or other characteristic symptoms of that complaint. As tested by the dynamometer, the grip of the hands was feeble, but the patient was able to perform all movements. There was feeble action of the diaphragm. There was also paresis of both sides of the face, which was more marked on the right side than on the left; the paresis involved the upper part of the face as well as the lower, the patient being unable to completely close her eyes. The soft palate moved very little, if at all, with respiration; there was no tendency to regurgitation of liquids through the nose. The muscles of the limbs were flabby, but there was no evident wasting. The patient complained of a prickling pain at the bottom of the back on attempting to move and paraesthesiae of the feet and fingers. Tapping the spine in the lower lumbar region elicited very diffuse pain, but there was no pain on applying the hot sponge. There was some diminution of sensibility to touch in the soles of the feet. No other sensory disturbances were present. The plantar reflex was absent, the abdominal reflex was faintly present on both sides, the knee jerks were absent, and the supinator and triceps reflexes were diminished. The palatal reflex was abolished. There were no bedsores, or bladder or rectal troubles. The child was very precocious, and there was no loss of memory. The tongue was thickly furred, the pulse was 102, regular, the volume, force, and tension being normal. The apex beat of the heart was in the fifth interspace just internal to the nipple line. There was a faint systolic bruit, localized to the mitral area. The pulmonary second sound was accentuated. The subsequent history proved that the patient had a slight degree of incompetence of the mitral valve.

After-History.—The urine was normal, and the evening temperature was usually about 99°. On December 4th, the urine, which had been repeatedly examined before, was found to contain a large amount of blood and a few hyaline casts. The following day there was a moderate amount of blood and albumen present; on the third day the urine was free. By December 8th there was considerable return of muscular power; there was a moderate degree of foot-drop at that time. Examination of the cerebro-spinal fluid obtained by lumbar puncture revealed no lymphocytosis. On December 11th the electrical reactions were tested, and gave the following results: The face showed partial loss of reaction to faradism, especially on the right side; there was poor reaction to galvanism, but the K.C.C. was greater than the A.C.C. on both sides. The arms responded moderately to the faradic current, and with the galvanic current the K.C.C. was found to be greater than the A.C.C. There was complete reaction of degeneration in both legs.

Recovery.—The patient's condition steadily improved, so that by January 20th she was able to stand with the aid of some support on either side. On January 26th the anterior tibial muscles were still obviously weaker than the posterior tibial group. On March 2nd there was still an absence of knee-jerks, but the improvement had steadily continued, so that on March 11th the patient was able to leave the hospital walking very fairly well.

[I am much indebted to the kindness of Dr. de Havilland Hall for permission to publish this case.]

ITALIAN RED CROSS SOCIETY.—The Italian Red Cross Society has now a membership of 24,000. It has a capital fund of £160,000, and material valued at £80,000.

PNEUMOCOCCIC ARTHRITIS.

BY

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SINCE the isolation of the pneumococcus in 1880 and the subsequent demonstration by Fraenkel in 1884 of its connexion with lobar pneumonia this organism has gradually become recognized as the cause, not only of pulmonary disease, but also of many cases of meningitis, infective endocarditis, arthritis, and other inflammations of the serous and mucous membranes. In these cases, in which structures other than the lungs are infected, the clinical picture is often that of an intense septicaemia, the virulence of the parasite or resisting power of the tissues in such being respectively increased or diminished. In this connexion it has been found experimentally that subcutaneous injections of pneumococcal virus of full intensity into rabbits, mice, and guinea-pigs cause an acute—generally fatal—illness, like septicaemia, with characteristic *post-mortem* appearances, but there is no sign of pneumonia. An attenuated culture introduced beneath the skin does sometimes give rise to pneumonia or pleurisy, or both. As regards different species of animals, it has been found that in those least immune septicaemia is the more likely to occur; in those more immune, a local reaction, such as acute pneumonia.¹

Before the recognition of the pneumococcus various stray references to arthritis occurring in cases of pneumonia may be found. Cave,² however, in 1901, was the first to tabulate in the English journals a series of cases of arthritis in which the micro-organism had been demonstrated in the joint effusions. Thirty-one cases are mentioned, comprising all those published up to that date. Amongst these we find that the joint affection varied from synovitis, with thickening of the synovial membrane and effusion of serous fluid, to intense arthritis with complete erosion of cartilage and baring of the ends of the bones. The severer forms were the more common, the ratio of suppurative cases to serous being as 27 to 5. The larger joints (with the exception of the hip) were more often infected than the smaller. Several articulations were at times affected simultaneously, and often there was a widespread infection; thus 6 cases were complicated by endocarditis, 5 by empyema, 6 by meningitis, 2 by pericarditis, and 1 by peritonitis. Two cases are reported in which the joint affection preceded the commencement of the pneumonia by three and seven days respectively, and in three cases no pneumonia was ever present, but the character of the joint trouble was demonstrated by the pneumococci in the pus. The disease was much more common in males than in females, and affected the upper extremity rather more frequently than the lower; the knee, however, was the commonest joint to be attacked. Ten cases gave direct evidence of previous injury to the affected joint. Out of 31 cases as many as 23 proved fatal.

We have been able to collect 25 cases of pneumococcal arthritis which have been published up to the present time in the English and American periodicals since Dr. Cave's paper. These we give summarized below:

CASE I (recorded by Allen and Lull³).—F., 40. Left knee; suppurative; no pneumonia present; treated by incision; later amputation. Died.

CASE II.—M., 28. Right sterno-clavicular joint; suppurative; pneumonia commenced three days before; complications, right otitis media and abscess of thigh (pneumococci present in pus from both sources); incised. Recovered.

CASE III.—M., 52. Right ankle and sterno-clavicular joint; suppurative; pneumonia two days after; complication, empyema; incised. Recovered with stiff joint.

CASE IV.—F., 49. Right shoulder; suppurative; pneumonia two days before; complications, empyema, cellulitis of shoulder, septicaemia; incised. Died.

CASE V.—M., 23. Right knee; serous; pneumonia two days before; aspirated. Recovered.

CASE VI.—M., 51. Both knees; serous; pneumonia two days before; complication, septicaemia. Died.

CASE VII.—M., 58. Right knee; suppurative; pneumonia three days before; incised. Recovered.

CASE VIII.—M., 42. Right shoulder; suppurative; pneumonia commenced about same time; complicated by cellulitis of shoulder. Died.

(CASES II to VIII recorded by Raw.⁴)

CASE IX.—M., 47. Left knee; suppurative; pneumonia present; no record of treatment. Died.

CASE X.—F., 30. Right sterno-clavicular joint; suppurative pneumonia five days before; complications, endocarditis and pericarditis; incised. Died.

CASE XI.—F., 32. Left sterno-clavicular joint; suppurative; pneumonia present (crisis two days before); incised. Recovered.

CASE XII.—M., 32. Left elbow; suppurative; pneumonia (crisis immediately before onset of arthritis); aspirated. Recovered.

CASE XIII.—M., 41. Left hip* and left knee (previous injury to both); knee serious, hip (?); pneumonia fifteen days before; knee aspirated, hip untouched; recovered with movable knee and stiff hip.

CASE XIV.—M., 26. Left knee; suppurative; pneumonia (crisis fifteen days before); complicated by pericarditis; incised. Died.

(CASES IX to XIV recorded by Herrick.⁵)

CASE XV.—M., 42. Right shoulder* and right ankle; sero-pus in ankle, no fluid in shoulder; pneumonia seven days before, complications, pericarditis, endocarditis (pneumococci present), meningitis (pneumococci present); aspiration of ankle. Died.

CASE XVI.—M., 79. Left shoulder, both knees; shoulder and right knee suppurative; left knee* clear fluid; pneumonia seven days before; complicated by meningitis (pneumococci demonstrated). Died.

CASE XVII.—F., 69. Right knee; suppurative; pneumonia ten days before; complication, endocarditis (pneumococci present). Died.

(CASES XV to XVII recorded by Howard.⁶)

CASE XVIII (recorded by Slaughter⁷).—M., 15. Right knee; suppurative (tubercle bacilli also present with pneumococcus); convalescent from pneumonia; septicaemia; treatment, incision; later amputation. Recovered.

CASE XIX (recorded by Raw⁸).—F., 41. Left jaw; suppurative; during double pneumonia; complications, acute glossitis and double empyema; incised. Recovered.

CASE XX.—F., 5 months. Left knee, suppurative; uncertain illness two weeks before; complication; suppurative otitis media; incised. Died.

CASE XXI.—M., 6. Left knee, right hip and wrist; knee and hip contained sero-pus, no fluid in wrist; no pneumonia present; suppurative otitis media three weeks before; incised. Died.

CASE XXII.—6 months. Right knee and interphalangeal joint; suppurative; no pneumonia; incised. Died.

CASE XXIII.—M., 14 months. Right elbow and knee; elbow contained pale yellow pus, knee clear fluid. (?) Pneumonia three weeks previously; complication, abscess of neck (thick yellow pus yielding pneumococci); incised. Recovered.

CASE XXIV.—20 months. Right hip; suppurative with complete disorganization of joint; no pneumonia; incised. Recovery.

(CASES XX to XXIV recorded by Dudgeon and Branson.⁹)

CASE XXV (recorded by Witt¹⁰).—M., 36. Right knee; serous; pneumonia ten days before; empyema and septicaemia; aspirated. Died.

In every affected joint, except those marked with an asterisk, which were not examined, the pneumococcus was proved to be present.

From these cases it is obvious that the knee is far and away the commonest articulation to be affected, as many as 15 cases out of 25 having this joint involved. The relation to pneumonia varies; in most cases the arthritis occurred a few days after the commencement of the lung trouble, but in some, especially among children, no pneumonia was present. In one of these infantile cases a pneumococcic suppurative otitis media seems to have been the primary focus of infection. Complications were present in the majority of cases, and were the cause of death in nearly all the fatal ones. As mentioned above, the incidence of arthritis is often indicative of an intense pneumococcic infection which may prove fatal in the same manner as a septicaemia due to non-specific micro-organisms.

The character of the fluid found in the joints varies from turbid serum to thick pus. Often in one patient its nature is different in each of the situations in which it occurs. Thus in one of the cases in children reported by Dudgeon and Branson the fluid from the elbow was a pale yellow sero-pus, from the knee a clear serum, and from an abscess in the neck a thick yellow pus. These writers state that in their opinion thin pus is of ominous import in pneumococcal infections. This is not borne out by our own case described below, and certainly in ordinary pyaemic joints we think that there can be no doubt that the patient's chance is better when the pus is thin.

As regards treatment, the proper procedure in all cases in which the fluid on aspiration is at all pus-like is to open and drain. The operation must of course be carried out with as great regard to asepsis as in opening a perfectly healthy joint. Frequently the only organism present is

the pneumococcus, and the most disastrous results may obtain from the introduction of other pyogenic bacteria.

REPORT OF CASE.

The following is a description of a case recently under our care:

I. By Dr. Wrangham.

The patient, a lad of 16, on February 16th was feeling out of sorts, but continued at work. In the afternoon he lifted and carried a heavy sack of corn, and immediately afterwards complained of a severe pain in the back. He was brought to me, and had the appearance of being seriously ill. He had been shivering; his expression was anxious; face and lips pale. The pulse was 140, and temperature 103°, but on examination no physical signs were detected in the chest. On the following day, however, definite signs of right lobar pneumonia developed. On the 23rd and 24th the temperature gradually fell (there being no definite crisis) from close on 101° to normal. Two or three days before this, namely, on the fifth day of illness, the right knee became painful, and in a short time fluid began to collect. The pain and swelling increased, and, on the day following the fall of the temperature to normal and clearing up of the consolidated lung, there was a second rise of temperature to 100.8°. The knee was kept at rest on a splint at first, and fomentations were applied; but as sleep was seriously interfered with on account of the pain the splint was subsequently removed and the limb supported by a pillow. On the 25th, about a week after the commencement of the joint affection, as the temperature remained up and the effusion appeared to be considerable, the knee was aspirated with the greatest care, and a little over 4 oz. of greenish-yellow sero-pus was removed. This was sent to the Clinical Research Association, whose report was as follows: "Direct microscopical examination of various smear preparations of the pus did not show the presence of tubercle bacilli or other organisms, but after incubation of the centrifugized deposit from the fluid, inoculated upon the surface of inspissated human blood serum, pure cultures of Fraenkel's pneumococcus were obtained." Relief of the pain followed, but the pyrexia continued, and the fluid soon began to reaccumulate. Moreover, the patient seemed to be losing ground; he was pale and thin, and, though he took nourishment fairly, had little desire for it. The pulse ranged between 90 and 100. Under these circumstances I asked Mr. Secretan to see the case with a view to further operative measures.

II. By Mr. Secretan.

On March 3rd I saw the patient with Dr. Wrangham. His condition was as follows: He appeared wasted, and had the typical sallow complexion of suppuration. The temperature, strangely, had fallen that morning to 98.8° F. The right knee joint was swollen, painful, and tender, being moderately distended with fluid. There was no redness of the skin, but some slight oedema around. The joint was held in the semi-flexed position, and could not be moved owing to the pain.

I introduced an exploring needle into the joint and drew off a syringe of greenish pus. This, although somewhat thin, was, I was told, considerably thicker and more pus-like than the fluid withdrawn four days previously. Taking this into consideration and the lad's general condition, although the temperature had fallen (temporarily we afterwards found), I decided to open and drain the knee.

Under an anaesthetic I made two incisions in the capsule, one on either side of the patella, letting out the remaining fluid, amounting, roughly, to about 4 oz. I then thoroughly irrigated the joint with formalin (1 in 500), and inserted a tube, having holes cut in its sides, right through from one incision to the other, behind the patella. As the destructive changes did not seem to be very intense, and having regard to the thin character of the pus, I deemed this sufficient drainage. Had the condition been more acute I would also have opened the joint posteriorly through the outer part of the posterior ligament—the only way I think that a really satisfactory drainage can be procured in bad cases with the patient lying recumbent.

After the operation the knee was put up in a straight back splint. The joint was syringed out every day with 1 in 1,000 formalin, and after forty-eight hours the long tube right through was replaced by two smaller ones, one from each incision. These were gradually shortened.

The patient's condition rapidly improved, all pain and tenderness soon disappearing. His temperature, however, although normal in the mornings, persistently rose every evening to 100°. A week after the operation, as there seemed to be a little pocketing of the discharge below the patella, I made a small incision at this point on one side of the ligamentum patellae under eucaïne. I think, though, now that this was unnecessary, as it made no difference at the time to the evening rise of temperature, which gradually fell some days later to normal. The side tubes were left out a little over a week from the operation, and the wounds soon healed. Passive movements were begun in about a fortnight, and diligently persisted in. Movement, however, from the first was very good.

The patient's condition six weeks after the operation was excellent. He could walk fairly well with the aid of a stick, and the range of movement in the joint was from the straight position to a right angle.

[We have now had an opportunity of examining our patient six months after operation; the movement in the joint is perfect, and the lad is able to walk and bicycle without the least difficulty.]

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VASO-DILATATION IN HAEMOPTYSIS.

By EDWIN TEMPLE SMITH, M.B., M.R.C.S.ENG.,

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I HAVE ventured to report the following case for two reasons: One, that it appeared to be one of haemoptysis of a somewhat rare origin—namely, rupture of an atheromatous pulmonary vessel, and analogous to that condition met with in cerebral haemorrhage; to use a loose expression, and without regard to its etymological significance, I looked on the case as one of "pulmonary apoplexy." The other, that I wish to record the effects of treatment at a time when such diametrically-opposed methods as lowering blood pressure with vaso-dilators, on the one hand, and raising it with vaso-constrictors, such as adrenalin, on the other, are being indiscriminately advocated in visceral bleedings. The clinical picture is as follows:

A short, fat, thick-set man, of 13 st. weight and aged 52 consulted me at 2 a.m., having walked about a quarter of a mile, complaining of "coughing up blood." He said he had been doing so with brief intervals for four hours. On giving him a basin, a slight cough brought up half an ounce at a time of bright blood. Having cleared his trachea, in a few moments he was ready to do so again, and in the course of a few minutes he had brought up several ounces, and the bleeding could only be described as profuse. His appearance was happy and not at all perturbed, only he said he "wanted it stopped."

I satisfied myself that the blood came up through the glottis, and was not a haematemesis. He said that he had had a headache for several days, but had been otherwise well. His temporal artery was atheromatous; he had an arcus senilis, and his pulse was full, hard, and strong. He did not look like the subject of lung disease, and examination of his heart disclosed no obvious lesion. These facts took but a few moments to arrive at, and seemed to suggest that the bleeding was due to plethora, to use an old-fashioned but descriptive term; and, using similar phraseology, antiphlogistic measures, and those tending to lower blood pressure seemed indicated.

Amyl nitrite was given freely on a towel, and phlebotomy done at the bend of the elbow, about 10 oz. of blood being abstracted. As soon as the nitrite was given the next clearing of the air passages produced only blood-stained mucus. The next cough showed mucus only. After that there was no further cough, the cause of it, blood in the tubes, being removed.

He then walked home, taking a mixture of sodium nitrate, nitroglycerine, and Epsom salts every two hours, and a mercurial purge. I advised a hot mustard foot-bath, rest with the head elevated, and a spare diet. Next morning I saw him. He had had no more blood-spitting, and said he felt much better even than before it began. His headache was gone. I learned that soon after getting home he went "queer and cold" for a short time, probably a slight syncopal attack from the action of the nitrites. No lung lesion has been detected, and the patient has been quite well since. He has been a tolerable drinker, and his urine is slightly albuminous.

I have advised abstinence, occasional purgation, and a timely phlebotomy when he gets an oppressive headache.

As regards the site and etiology of haemoptysis Foxwell quotes Dr. Reginald Thompson as follows:

- (1) The pulmonary circulation is the usual source of haemoptysis, slight or serious; (2) the pulmonary circulation is the only source of profuse haemoptysis, except in aneurysm of the aortic circulation or the existence of a haemorrhagic diathesis; (3) anatomically and pathologically the evidence is all against bronchial haemoptysis.

Presumably, therefore, the blood came from a branch of the pulmonary artery in the lung.

In the limited literature at my disposal I can find no reference to the condition I have termed pulmonary apoplexy, except in Douglas Powell's article in *Quain's Dictionary*, in which he gives as a last possible cause of haemoptysis "primary atheroma of the pulmonary artery within the lung."

As regards treatment: To have given adrenalin in this case, as seems to be advised latterly, without any qualification as to its particular indication, would, I believe, have caused a fatal haemorrhage.

The use of the nitrites, as advocated by F. E. Hare, lately of Brisbane, I have long been familiar with. Foxwell, in his scholarly *Essays in Heart and Lung Disease*, published in 1895, advocated this. He says:

Anything which keeps the blood in the systemic circulation, and so produces anaemia of the lungs, is beneficial. We know that the splanchnic area can contain all the blood in the body; any therapeusis, therefore, tending to fill this area must be good. Large doses of the nitrites, which relax the systemic arterioles, should thus prove of service.

Having imbibed this principle as a student, I have always treated haemoptysis with the nitrites and nitroglycerine as adjuvants to other remedial measures.

In the case reported above probably no one would deny the indication for the vaso-dilators. But in haemoptysis from primary lung disease the case may, perhaps, not be so obvious. Yet I believe in the great majority of cases, if not in all, the parallel holds good.

Though a constant user of suprarenal gland or its active principle ever since its introduction, in various conditions, I could never see its *rational* in the treatment of haemoptysis. If it be good in this connexion (we know it constricts the arterioles generally and raises blood pressure) it cannot be for this latter, but for its former (constricting) effect. In this case it must be conceded that the pulmonary vessels are acted on by the same vasomotor mechanism as those of the systemic circulation, and synchronously with them. And furthermore, that the vessel-constricting power of the drug, as regards the pulmonary vessels, is strong enough to counterbalance the manifest disadvantage of its also admitted pressure-raising action.

But can these premisses be admitted? I doubt it. Foxwell, in speaking of ergot in these cases, says:

Even were it good to contract the arterioles of the lungs, how do we know that ergot will do this? The calibre of the pulmonary vessels is under very different governance from that of the systemic ones, and I am aware of no evidence tending to show that ergot can contract them.

Mitchell Bruce says "the arteries become distinctly smaller under ergot, and the blood pressure rises." I take it that adrenalin will act in much the same way, and that by acting on the muscular tissue of the vessels directly or through the nerves supplying them.

Foxwell says:

Also, the vessel in the neighbourhood of the bleeding point is diseased, and its muscle fibres degenerated, and therefore the drug will act less upon them than upon the fibres of all the other arteries of the body; the injured arteriole it will not contract, but it will raise the pressure of the blood within it by its effect on all the health arterioles, with the result of increasing the bleeding.

Without absolutely denying the possibility, it would seem clear, on *a priori* grounds, that the specific action of adrenalin of constricting the bleeding vessel is hardly likely to take place. If virtue it has, then, in this connexion, that virtue must lie in the secondary effect of its constricting action—namely, the raising of the blood pressure. Now this is a *reductio ad absurdum*. Nature's own remedy for this and all other bleedings is in lowering the blood pressure by means of faintness. Our own general treatment for haemoptysis is in the same direction—recumbency, quiet, and morphine.