As regards the interpretation to be attached to the minute Gram-positive bodies that were described as organisms, and are so regarded by Captain Wilson, and which Dr. Arkwright looks upon as mere deposits of protein, it is clear that no final conclusion can be reached as to their being organisms until they have been obtained abundantly in unquestionably pure cultures. Hence, at the present moment it cannot be claimed that this work has proved that filter-passing organisms in the diseases in question have been grown in pure culture.

Captain Wilson and I are indebted to the courtesy of Dr. Arkwright and of the Editor of the *BRITISH MEDICAL JOURNAL* for having the opportunity of appending these notes to Dr. Arkwright's paper.

August, 1919.

By CAPTAIN J. A. WILSON.

About the end of June a series of films were handed by me to Dr. Arkwright. These films were stained by me by Kühne's methylene blue for a period of one hour, and were illustrative of the types of organisms isolated from the diseases mentioned in a preliminary note to this *JOURNAL*.¹ A few days later he was given subcultures of the organisms of trench fever and influenza. Inasmuch as his examination of these films and cultures is a direct negation of the published account of them, it is advisable that a statement should be made by me:

1. These films and cultures, when stained by Gram's method, showed cocci and diphtheroid bacilli.

2. It is also correct that microscopically the degenerated forms in these films were mistaken by me for filter-passing organisms.

3. The minute bodies which Dr. Arkwright suggests are but deposits of protein were the bodies originally described by me as filter-passing organisms. They are Gram-positive, they have not been found by me in controls, while they have been present in the Noguchi cultures and also in those in which the serum constituent was replaced by glycerin. During the past two months attempts have been made to obtain clean cultures of these bodies, but have been unsuccessful.

There is another point to which reference may be made, as it may be of use to others: Dr. Arkwright suggested that insufficient use had been made of the ordinary methods of cultivation; this is not correct. Adequate controls of the rabbit kidney and the inoculum were always made, and it was apparently only when the kidney and inoculum were associated anaerobically that growth took place.

In conclusion, it has to be stated that it has not been proved that a filter-passing organism has been grown in pure culture in any of the diseases for which the claim was made.

A THOMAS ARM SPLINT WITH A FLEXIBLE ELBOW.

By W. J. FOSTER, F.R.C.S.,
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In the treatment of fractures of the elbow-joint there is need for an improvement in the existing type of splint. I have got Messrs. Mayer and Meltzer to make a splint which I am sure will be of great use in general practice. It can be used for either right or left arm, and, although specially useful in fractures of the elbow, is more useful than the ordinary fixed Thomas arm splint for fractures of the humerus, as it has a more rigid extension bar below the elbow, enabling traction to be applied by a scarf knotted after passing over the elbow-joint and below the bar. It is also of use in some cases of fracture of the forearm, enabling the position of supination to be maintained, with at the same time a daily variation of the position of flexion and extension of the elbow, so preventing a stiff joint.

The splint is adjustable in length so that it can readily be made to fit an adult of any size. Using it as an emergency splint, it is quite possible to fix up a patient with a fracture of the upper limb in a safe position to be transported home without even taking his clothes off; or it can be used temporarily while obtaining any other splint.

The worst case of fracture of the elbow-joint I have seen was in a young lady; it was treated throughout with this splint and she recovered with almost a perfect range of movements; the shoulder could easily be touched with the elbow flexed; the range of extension was nearly full, and supination and pronation were perfect in the forearm. She was of course carefully massaged after the first week, and no doubt this was an important factor in producing so gratifying a result.

In compound fractures of the humerus, especially gunshot injuries, the advantage of recovery with an elbow-joint having a range of half or more instead of rigid adhesions, is very great. This can invariably be obtained provided the joint itself is not wounded and septic. With this range of movement, after perhaps months of treatment for a septic compound fracture of the humerus, the masseur has a good start, and can soon get the full range of movement back. Often the patient is able to restore movement to the full himself in a few weeks.

The line of the humerus is maintained much better than might be expected. A few short lengths of stout bandage (flannelette) are attached as usual from wire to wire by safety pins or paper clips. The strips of bandage should extend from the axilla to just below the level of the elbow-joint behind the arm. A

bandage rolled round the wires and arm, with a few turns separately round the forearm, completes the bandaging. The strap from the shoulder ring is first passed round the chest and buckled. The smaller strap on the outer side of the ring is buckled on to the wrist end of the splint. This wrist-shoulder strap is the important one in treating fractures of the elbow-joint. When first put up, the fracture should be left at right angles, and day by day, as the swelling diminishes, the strap up is taken half to one inch at a time until the elbow is flexed as much as is safe, with due regard to the amount of swelling present. Having reached the limit of flexion in about a week, the strap is let out again inch by inch until the forearm is extended. Extension need not be carried to more than half the normal. It is now possible to increase the daily range without producing undue pain or reaction; movement of two or three inches a day is attempted and a more acute angle of flexion reached. It is easy to detach the bandages from the forearm daily without removing the splint entirely for massage.

I am confident that if the majority of cases of fractured elbow were treated throughout by a flexible splint of this type the results as regards stiffness would be much better. If the acute flexion is not attempted in the first few days, when the swelling is often very great, the danger of ischaemic paralysis of muscles is diminished, if not entirely avoided. I have seen such paralysis follow acute flexion in two cases of fracture of the lower end of the humerus close above the condyles although they were treated with special care; the lower end of the upper fragment projecting forwards combined with the swelling in acute flexion compressed the main vessels, and in a few hours caused irreparable damage to the muscles. With this splint, and care in not forcing acute flexion too early, this accident should not occur.

Traction can be applied to the lower fragment by the pull of a scarf over the front of the joint, the ends being taken down and knotted over the fixed extension bar; in this way the return of the lower fragment to its normal position is favoured, although in fractures close above the condyles this is often impossible, except by an operation, and even then difficult. It is not possible in many cases of fracture of the elbow-joint to get an ideal result from a radiographic point of view. This is of little importance, provided the joint is strong and if it has a wide range of movement.

In the event of the case requiring throughout, or temporarily, a fixed elbow, a stout cord from the wrist end below the forearm to the extension bar, with the wrist-shoulder strap combined, enables a fixed elbow at any angle to be produced.

¹ *BRITISH MEDICAL JOURNAL*, February 1st, 1919.

This is preferably an ambulatory splint. When used in bed the patient should be supported on a bed rest. No sling should be allowed.

In the treatment of fracture of the shaft of the humerus the extension pull by a scarf to the iron below the elbow is very good and firm. It does not pinch the arm as in the ordinary bent Thomas arm splint. The scarf should be adjusted daily for the first two weeks at least.

If a radiogram in the standing position shows any portion of the humerus to be out of line in an antero-posterior or side view, it is often possible to correct the deformity by arranging that a bandage or scarf should pull the displaced bone in the right direction, using one or both side wires as fixed points.

I should not use this splint for fractures of the surgical neck of the humerus, as I have found they do well by putting a pad in the axilla and bandaging the arm to the chest wall. Early massage and passive movement, of course, are essential.

It is important that the shoulder ring in this splint should be as nearly as possible the right size, as either extreme is very uncomfortable. In the splint, as now made, the ring is a fair average size, and will fit almost any adult. The smaller one for children is more difficult to average, and probably a third smaller size may be required.

It is possible to use this splint for fractures of the forearm in selected cases. It will maintain the desired supinated position, and the elbow-joint will not become stiff. By using the adjustment for length it is possible to get slight extension of the bones of the forearm. At any place required a small piece of Gooch splinting can be slipped in to assist in steadying or straightening the fracture.

It is for fractured elbows in particular that the splint will find its chief use. I do not accept a radiogram in one direction of any fracture. It may not show the fracture at all, or the fracture may look perfectly straight one way and be crooked in the other direction.

LEUCINE: ITS OCCURRENCE AND SIGNIFICANCE IN THE URINE.

BY
RICHARD W. ALLEN, M.D.LOND.,
LONDON.

PHYSIOLOGICAL and pathological chemists alike agree that leucine occurs very rarely in the urine of healthy people, and that its presence is indicative of serious disturbance in the digestive system, and especially in the performance of the liver functions. Leucine is found commonly in cases of acute yellow atrophy, less frequently in acute phosphorus poisoning, and in isolated cases only of icterus gravis, advanced cirrhosis, advanced heart disease with disorder of the liver, pernicious anaemia, leucocythaemia, and erysipelas. It has been reported in one case of severe diabetes and as associated with cystinuria.

The following case raises serious doubts in my mind as to whether it may not be a much more common phenomenon, and one at times devoid of such grave significance as one would gather from the literature.

A lady, aged 24, had lived most of her life in America, had not had malaria or indeed any severe illness at all till six weeks after her arrival in England in June, 1917, when she was confined to bed for over a month with well marked jaundice. The temperature was 101° F. during the first week, but subsequently subnormal. Recovery was apparently complete by the end of September, 1917. From Christmas, 1918, to April, 1919, she suffered from a very bad cold, of which she still has traces. For the past seven months she has had numerous severe headaches relieved by violent sickness, usually in the evening; the vomit appears never to have been bile-stained. For the past three weeks she has awakened daily with a headache more or less severe, and was sick daily for the first two weeks; this has been checked by a milk diet. Ten days ago the motions became clay-coloured, and remained so for two or three days, during which time she was slightly but definitely jaundiced. Her periods and bowels are, as a rule, free and regular.

When I saw her first she looked pale, thin, and anaemic, but showed no trace of jaundice. She complained of a feeling of weight and constriction in the epigastrium and of slight headache, but of no other pains. Physical examination revealed nothing abnormal in the chest or abdomen beyond slight tenderness to pressure over the gall bladder; the liver and

spleen appeared of normal size. A thorough blood examination was quite satisfactory, a Wassermann test and its more sensitive "Stern" modification were very definitely negative. The motions were very dark brown and no abnormal constituents were detected. A catheter specimen of the urine, examined within two hours of passage, was normal in colour and specific gravity, amphoteric to litmus, contained no sugar, albumin, blood, casts, bile salts or acids; a few *B. coli* and staphylococci were present. Crystals of phosphates, uric acid, or urates were absent, but well-defined crystals of leucine were present in great numbers, unaccompanied by any of tyrosin; that they were leucine was confirmed in the usual manner. On re-examining the urine a few hours later, to my great surprise, I failed to find any crystals of leucine, and considerable concentration of the urine failed to effect their deposition. Repetition of these experiments on two other occasions has given the same result—namely, copious crystals within two hours of passage of the urine, complete disappearance a few hours later.

The only explanation I could see of this phenomenon was that not only was the liver permitting the passage of leucine but also of the proteolytic ferment which normally splits up the leucine in the body. The correctness of this view I was able to confirm with a specimen of leucine kindly given me by the Medical Research Committee.

As there is no possible error in my observation of the facts, I am impelled to raise these two very important questions: (1) May not leucine be a very much more common constituent of the urine than it is commonly supposed to be, the failure to detect it being due to over-long keeping of the specimens before examination? (2) If this be so, is its presence of such serious import as all the textbooks would lead us to believe?

P.S.—Three weeks after the above was written several examinations failed to demonstrate even a trace of leucine in the urine, and the patient was enjoying normal health except for an occasional slight headache.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

GLIOMA OF CEREBELLUM.

WHILE the following case has some intrinsic interest, it might have had a still more interesting medico-legal aspect as a compensation case.

During the third wave of the influenza epidemic in February, 1919, I was called to see a man, A. B., aged 42, a white lead worker, and found him to be suffering from occipital headache, extending down the back of the neck, vomiting, and furred tongue; the temperature was 101°. It was also noticed that his speech was slurring, slow, and hesitant. After three weeks' rest in bed, under treatment with sodium salicylate, potassium iodide, and aspirin, he seemed to improve somewhat, and walked down to the surgery for his weekly certificate. It was then noticed that he had a staggering gait. There were marked tremors of hands and arms, but no intentional tremors and no nystagmus. The knee-jerks and pupil reflexes were active. He was sent home to bed. The headaches and vomiting became more severe, especially if any attempt was made to stand erect. The bowels were very constipated. The question of lead poisoning was raised by his wife. There was no blue line, no paralysis, and the symptoms were not typical of lead encephalopathy.

He was admitted to the Warrington Infirmary on April 17th. The fundus was examined but there was no optic neuritis. Treatment was of no avail, and he died on May 8th. Although it was thought that he was suffering from an intracranial tumour, no definite diagnosis was made, and, as there was a suspicion on the part of the patient's wife that he had lead poisoning, the case was reported to the coroner. The coroner refused an inquest, and gave a certificate that death was due to "natural causes."

The uncertainty of the cause of death and the possibility of legal action for compensation afforded strong motives for further investigation. The wife was pressed to give permission for a *post-mortem* examination. This was granted, and on May 12th the skull was opened and the following condition found:

Marked flattening of the cerebral convolutions; excess of cerebro-spinal fluid at base of brain. On the posterior aspect of the left hemisphere of the cerebellum was a mass of diffident material which was readily evacuated, leaving a smooth-lined cavity large enough to hold a walnut. The lateral ventricles were greatly dilated.