The child now passed temporarily out of my care, being transferred to the Ilford Isolation Hospital. Here it was kept for several days, during which its condition was reported to be quite satisfactory. It was then sent back to the mother. When the child was over a fortnight old the mother naturally began to doubt the soundness of my prognosis, which had already been belied by the child living as many weeks as I had assured her was his maximum expectation of days. She expressed herself anxious for further advice, and I was making arrangements for the infant to be seen by Mr. W. H. Clayton Greene, when, during the third week, meningitis set in, and the little one died on October 11th in a storm of convulsions. It was thus twenty-three days old on the date of its death. Owing to the fact that both mother and child left the district a few days before the latter's death I was unable to witness the end. For the information about the date and manner of the infant's death I am indebted to Miss Roberts, the matron of the Maternity Home, who obtained it in a personal interview with the mother.

Another point arising in connexion with this case is the frequency of myelocoele when compared with the other types of spina bifida. Sir John Bland-Sutton is quoted by many authors as stating that myelocoele is the commonest variety of spina bifida; he admits, however, that of all cases that survive birth probably two-thirds are meningo-myelocoeles. Of the seven cases of spina bifida of which I have personal knowledge the one here described is the only case of myelocoele; one was a meningocele, one a spina bifida occulta, and the remaining four were diagnosed as meningo-myelocoeles. I have yet to see my first case of syringo-myelocoele.

In reference to the frequency of spina bifida in general practice the experience of a local practitioner of thirty years' standing is instructive. He has met with but two cases during this period in a practice which, to my knowledge, is exceptionally busy.

THE ACTION OF THE INTRINSIC MUSCLES OF THE FOOT AND THEIR TREATMENT BY ELECTRICITY.

BY

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Most of the intrinsic muscles of the foot and the long flexors of the toes play important parts that do not seem to have been recorded. The flexors of the toes raise the longitudinal arch of the foot, because when the weight of the body is thrown forward, as the heel leaves the ground in walking, their action is to draw the heel towards the toes, acting as bowstrings across the arch from heel to toe. For this reason the correct way to land from a jump is to have the whole weight of the body borne between the balls of the feet and ends of the toes, and, when patients are doing this or being given heel raising exercises in the standing position, they should be told to "grasp the floor with the toes," which thus become the fixed points from which their flexors act.

Flexor brevis digitorum has the strongest arch-raising action, owing to its insertion into the second phalanges, placing it at a disadvantage in bending the toes compared with flexor longus. The flexors of the toes should be used to assist progression in walking fast or running, and most people use them for this purpose. They thus support the arch at the moment when the greatest strain falls upon it. Flexor brevis hallucis, pulling from the cuboid to the first phalanx of the great toe, probably assists considerably in supporting the transverse arch.

The transverse arch is maintained chiefly by the dorsal interossei, and this is their most important action. In a demonstration given recently at the Royal Society of Medicine, I think I showed this clearly, using the method I shall describe shortly, and giving a clear picture of these muscles with their bipennate origins, drawing the metatarsal bones together. To describe the action of one of these muscles will suffice to explain the action of the rest. We will consider the second metatarsal bone as the "keystone" and as the middle line. When the second

dorsal interosseous muscle contracts, it performs the following rôles, in the order given. These rôles have been carefully observed during electrical stimulation, first of individual muscles and then of the group as a whole.

1. Feeble contraction. Abduction of first phalanx from middle line.

2. Stronger contraction. Flexion of metatarso-phalangeal joint *plus* the pull on the extensor tendon. End of toe brought into contact with the ground. (In voluntary movement this contact is of course strengthened by the long and short flexors.)

3. Powerful contraction. The fixed points from which the muscle acts are now (a) the second metatarsal bone, (b) the insertion of the tendon into the first phalanx. As the muscle contracts, the third metatarsal bone is drawn towards the second—that is, towards the middle line. In voluntary movement the second metatarsal is fixed by the opposition of the first dorsal interosseous muscle, which also fixes the first phalanx of the second toe while it is drawing the first metatarsal bone towards the second, and so on. As each metatarsal bone is drawn towards the second, it is pulled into a plane below that of its more mesial neighbour, so that the second metatarsal—the keystone—is raised upwards. This movement is aided by the metatarsals being brought into line with the arch of the cuneiform bones.

The following is the method by which all the muscles I have mentioned may be exercised and brought into a state of efficiency, even when they are wasted and unhealthy from prolonged pressure and disuse. It demonstrates conclusively also the actions I have described above.

The foot is placed in an ordinary porcelain arm bath containing a sufficient depth of warm water to reach just below the external malleolus. The heel rests on a carbon electrode, to which is connected one of the terminals of a Smart-Bristow coil. Another carbon electrode, connected with the other terminal, is held in the left hand. It is dipped into the water in front of the toes. The right hand manipulates the core of the coil so that a surging faradic current is sent streaming through the intrinsic muscles of the foot. Experience will teach the operator how the position of the electrodes may be altered so as to obtain contraction of the different muscle groups at will, and their action is thus displayed in a particularly useful and pleasing manner.

As we proceed to carry out this treatment and place the electrodes in the required positions a clear view is gained of the transverse arch of the foot, rising and falling in time with the contraction and relaxation of the dorsal interossei. It is seen that this is a powerful action and emphasizes the importance of these muscles. The best position for the electrodes varies in different patients, but as a rule in treating the transverse arch I have them on each side of the front of the foot. The longitudinal arch, lateral and medial, is best operated with the heel on one electrode as first described. No stimulation of the long flexors takes place with this technique, and the action of the short flexors of the toes in raising the longitudinal arch will come as a complete surprise to those who see it for the first time, as it is so very marked. The long toe flexors and tibialis posticus can be stimulated in turn by detaching the cord from the electrode at the heel and fixing it to a disc electrode covered with a handful of wet lint so that it can be applied to their motor points, the other electrode occupying a suitable position in the bath. Flexor longus hallucis and flexor longus digitorum when stimulated in this way will be seen to raise the longitudinal arch to a very marked extent.

As to the indications for the application of the above technique as a method of treatment, these are several. It is applicable when the preliminary stages of flat-foot are curable by physiotherapy, and to the after-treatment of those more advanced cases which have been wrenched and fixed in plaster or have undergone surgical operation. Regarding the first class, there are many people walking about the streets suffering from what they describe as tender feet, and these people, experiencing pain on movement of the tarsal joints, avoid this as far as possible by planting their feet flatly on the ground with the toes pointing too far outward. This leads them through the successive stages of flat-foot.

Common causes of tender feet are deformity of the first metatarso-phalangeal joint owing to the fashion, common to almost the whole of civilization, of wearing boots shaped like a lead pencil, and, in women, the wearing of high

heels, because this tilts up the metatarsals at the back so that their heads press too much downward at the metatarso-phalangeal joints and cause sprains. The splintage of the foot in too tight a boot also causes atrophy of the intrinsic muscles from pressure and disuse, so that they become unhealthy and accumulate fatigue products and probably uric acid. The circulation of the whole foot becomes impaired in these cases, the tarsal joints suffering in common with the rest of the part. Walking in the manner above described entails the relaxation of all the arch-raising muscles, with obvious results.

Faradic treatment given in the manner I have explained yields surprisingly rapid results in such cases. The nutrition of the whole foot is quickly improved, and in most cases metatarsalgia disappears. As a preliminary to voluntary exercise after surgical operation it is highly to be recommended. It is waste of time, and discouraging to the patient, to begin re-education before these muscles are in at least a fair state of nutrition, and I regard it, after seeing the surprisingly good results that it yields, as essential in the satisfactory treatment of flat-foot. It is often impossible or extremely difficult to develop the small muscles by voluntary exercise alone. This applies especially to those cases that have been repostered by surgical methods, so that the muscles are relaxed after a long period of overstretching with the accompanying atony.

It is very important that the treatment should be given with care and intelligence, because the muscles are completely at the mercy of the operator, and treatment must progress by easy stages from a gentle beginning, otherwise the muscles will be over-fatigued and the condition aggravated. The contractions must be rhythmic, they must not last too long, and they must be divided by periods of complete relaxation. A Smart-Bristow coil is almost essential, as the best results cannot be obtained with the other coils in common use at the present time.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

LABOUR IN A CASE OF ENCEPHALITIS LETHARGICA.

THE following case came under our care at the Aberdeen Maternity Hospital, and as the condition seems to be very rare, these notes may prove of interest.

Mrs. L., a primipara, was admitted to the Aberdeen Maternity Hospital on February 12th, 1921, with the history that she had been suffering from "sleepy sickness" for ten days. The patient was stated to be nearly at term.

She was very drowsy, but could be roused to answer questions sensibly. She had a dull, vacant, mask-like facies, no wrinkle being present on the brow or face. The eyelids drooped, and could not be raised to the full extent. Movements of the face and tongue were sluggish, but there was no limitation of ocular movements and no nystagmus. Reflexes were normal with the exception of the knee-jerks, which were exaggerated, and the abdominal reflexes, which were absent. The pupils responded sluggishly to light. The patient was very constipated and the mouth was very dirty. The child was presenting by the vertex, and the head was engaging the brim of the pelvis; the foetal heart sounds were heard distinctly in the middle line below the umbilicus, and the rate was normal.

On February 13th the patient became restless and seemed less lethargic; attempts to bear down were noted. Shortly after this the membranes ruptured and the os was found to be fully dilated. Bearing-down efforts were poor during the second stage and seemed to be sluggish, but the patient did not seem to appreciate much pain, though when questioned she stated she felt the pains. The head was delayed at the outlet, owing as it seemed to insufficient expulsive powers; delivery was therefore completed with forceps under a very light anaesthesia of chloroform and ether. The child weighed 9 lb. 9 oz. The placenta came away thirty-five minutes later, and during this time the patient became very lethargic; this condition continued for twenty-four hours, and it was with great difficulty that she could be roused at all. During this time it was noted that the left pupil was smaller than the right, and that there was a left external strabismus; there was incontinence of urine. On being questioned she would stop in the middle of her answer and apparently go to sleep. On February 17th she became less lethargic and took at times some interest in life, displaying interest in the baby when it was shown to her. When questioned regarding it, she had no recollection whatever of the labour. The baby was quite healthy and showed

no signs of drowsiness or oligopnoea at birth or after. On the tenth day of the puerperium the patient was transferred to the City Hospital, her condition being much improved.

It will be seen that in this case pregnancy seemed to be unaffected by the disease, but the lethargy was exaggerated for the first few days after labour, and especially for the first twenty-four hours. The patient slept through the first stage of labour without giving any sign that labour was in progress, and the end of the second stage was delayed on account of defective expulsive efforts. The third stage was normal in every respect and no excess of blood was lost. The puerperium, except for the conditions noted above, was uneventful and the uterus underwent normal involution.

We are indebted to Professor McKerron for permission to publish this case.

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Aberdeen.

HERPES AND VARICELLA.

THE following case illustrating the herpes-varicella association may be of interest to record for the following reasons: First, there seems no possible doubt as to the varicella infection having been passed on from the herpes case, as both patients were inmates of the same house, standing by itself right out in the country; moreover, during the possible incubation period of the varicella no visitors came to the house nor had any cases occurred in the neighbouring farms or villages as far as I could ascertain. Secondly, taking the incubation period of varicella as fourteen days it would appear that herpes can remain infectious for at least seven days from its eruption.

On January 27th I was called to see a girl aged 25 who was complaining of pain in the right iliac fossa, simulating appendicitis. On January 28th a few vesicles were noted in this area, and on the following two days a typical herpetic eruption came out over the right buttock, groin, vulva and inner side of thigh; there were no vesicles elsewhere on the body. Three weeks later, on February 18th, the patient's small brother, aged 4 years, developed the typical eruption of varicella; during the whole intervening period he had been in and out of his sister's room daily.

I might add that I was quite unable to elucidate the origin of the herpetic infection; the patient, however, worked in a clothing factory some four miles away from her home.

Desborough.

G. F. P. GIBBONS, O.B.E., M.B.Lond.

IN view of the recent reports of the apparent relationship between herpes and varicella, the following cases appear worthy of note: During the first week in January, 1921, I saw a girl, aged 9 years, who had a typical varicella rash. One week later a younger sister was brought to me complaining of pain in the fifth right intercostal space, and on the following day there appeared a herpetic eruption confined to this region.

Both children soon got well, but during their convalescence a third child in the same house had an attack of varicella. There were no other cases of varicella which I attended at the time, so I was led to suppose that the herpes in the second case acted as a link between the two cases of varicella.

Fochriw, Glam.

T. STENNER EVANS, M.B., B.S.Lond.

TREATMENT OF LOCAL LEISHMANIASIS.

THE note by Colonel Erskine Risk on the treatment of Baghdad boils by scraping (February 19th, p. 267) leads me to say that it is by far the most satisfactory method of treatment hitherto suggested.

During 1917 and 1918, while serving in Mesopotamia, large numbers of Indians suffering from these sores came under my care, and I had ample opportunity to observe the results of treatment. My routine treatment was to scrape the sores thoroughly with a sharp spoon, and then to cauterize the base with pure carbolic. I treated more than two hundred cases in this way, and the average length of time which elapsed before the sores were completely healed was seventeen days. I found that sores on the face healed more quickly than on any other part of the body after scraping.