of temperature; the premolars were extensively diseased and required removal. The canines were repeatedly dressed with the solid nitrate of silver, this salt having the property of obtruding sensitive dentine. The result was satisfactory. There was no disease of the articulation or jaw other than that confined to the teeth and already described. The treatment to be immediately described in detail was carried out, the result being eminently satisfactory, the troublesome symptoms being relieved for about the space of two years. A few months ago the patient again came under my observation suffering from a slight relapse. On inquiry and examination it was found that one of her plates had been altered by another practitioner, and this alteration had allowed the jaws to relapse into a condition approximating that in which they were when I first saw her.

CASE II.—The second case was that of an elderly lady sent to me by Dr. Abbott Anderson. She sought his advice some months ago complaining of intense neuralgia, originating in and radiating from the right temporomaxillary articulation. She was practically edentulous and unable to separate the jaws more than a quarter of an inch without causing severe attacks of neuralgic pain, darting over the whole of the right side of the face and temple, accompanied by spasmodic trismus of the masticatory muscles, injection of the conjunctiva and lachrymation of and from the eye of that side. Various local applications had been tried without more than temporary success, and I saw her in consultation with Dr. Abbott Anderson in order that a thorough examination of the mouth might be made and the existence of dental disease, if any, discovered. There was no obvious physical sign of disease in the joint. Nothing likely to cause neuralgia was found within the mouth, but the patient having for the purpose of examination been anaesthetised and the jaws somewhat forcibly separated, it was found that for some days subsequently her pain was sensibly relieved. I suggested that the case presented so many points of similarity to that I have already described that we could not do better than treat it similarly. The patient had, when I saw her, in her possession two small plates, one for each jaw, but had not lately worn them as they were not comfortable. They were small partial dentures, filling gaps in the front part of the mouth only. In this they contrasted strongly with the dentures in the former case. As in the first case, treatment gave immediate relief to the more urgent symptoms. Practically the neuralgia was cured and the patient enabled to perform the movements of mastication without discomfort or fear of sudden spasmodic pain.

TREATMENT.

The principle in treating these and similar cases is the adaptation of well-fitting dentures so adjusted as to keep at all times the jaws as far as possible in their normal relative position by restoring the normal opposition of molar and bicuspid teeth. The chief difficulty, and one met with at the outset of the treatment, lies in obtaining accurate impressions of the jaws, for in the first case removal of the plates from the mouth set up pain and tonic contractions of the maxillary masticatory muscles; and in the second, the patient, in dread of causing onset of pain, would separate the jaws but to a very small extent, while any attempt to take models of the mouth resulted in causing muscular spasm.

PATHOLOGY.

Loss of grinding teeth, molars and bicuspid, lies at the root of the mischief. Directly consequent upon this loss occur degenerative changes in the masticatory muscles due to inaction; then follows relaxation of ligaments about the joint; the condyle of the jaw, and perhaps the interarticular fibro-cartilage, slips when attempts are made to open the jaws, in this way pressing upon some of the nerve filaments derived from the auriculo-temporal and from the masseteric branch of the inferior maxillary nerves supplying the joint. Indirectly, these nerve filaments are connected with the seventh or facial nerve, the motor nerve of all the muscles of expression to the face. Branches from the auriculo-temporal nerve form one of the principal chains of communication between the fifth and seventh nerves. From the main trunk of the inferior division of the fifth nerve are given off branches to the masticatory muscles and from the ophthalmic division of the same nerve, those supplying the conjunctiva and lachrymal gland. After having been for some time in a state of chronic irritation, the sensory tracts become traversed by exciting stimuli with extreme ease, and consequent discharges of neuralgic pain over the areas supplied by these nerves are frequent and violent.

From the facts which have been mentioned, namely, the conditions which were observed before and after treatment, it may be deduced that the loss of normal relationship existing between the articular surfaces of the temporomaxillary joint causes in a reflex manner both the paroxysmal pain in the sensory divisions of the fifth nerve and spasm of the muscles of the jaw. Two points favour this hypothesis: first, that the removal of the plates worn by my first patient caused immediate pain, replacement being followed by cessation of symptoms. Secondly, as already detailed, the relief

gained by artificial restoration of the grinding teeth in the second case.

I feel more than ever inclined to believe this to be the true explanation, for recently my first case came again under my observation complaining of slight recurrence of all symptoms described. Upon questioning her carefully, I found that her dentist in the country had for some reason altered one of her plates, reducing the molar and bicuspid opposition, and allowing the jaws to relapse into a condition approximating to that in which they were when I first saw her. I have only to add that six months have elapsed since treatment of the second case without the return of any untoward symptoms.

A CASE OF TETANUS TREATED WITH SUBCUTANEOUS INJECTIONS OF CORROSIVE SUBLIMATE: RECOVERY.

By SURGEON-MAJOR HAROLD HENDLEY,
Indian Medical Service.

(From Notes taken by Hospital Assistant VAISHAN RAM.)

PARDHANA, a Hindu boy aged 9, son of a hillman in the Kangra District, Punjab, was first seen on August 10th, 1896, when it was stated by the father that he had been suffering for two days from stiffness of the neck and difficulty in mastication, associated with a considerable amount of pain.

On examination marked rigidity of the muscles connected with the lower jaw, neck, right arm, and thigh was discovered; and any movement of these parts was attended with very considerable pain. The temperature was 101.2° F., the pulse 96, the bowels constipated.

He was given calomel gr. iv, and a mixture to be taken every four hours of sodii salicylatis gr. v, pot. bicarb gr. iijss, 8 parts, chloroformii ℥ij, aq. ʒij.

On August 11th his temperature was 99.8° F., the bowels had been moved once; his condition was much about the same.

On August 12th a very considerable amount of pain was complained of over the front of the chest, more especially over the cardiac area; and a slight systolic *bruit* was audible at the apex. A belladonna plaster applied over the area of greatest pain resulted in some relief.

On August 13th slight spasms became evident over the whole body at intervals of fifteen to twenty minutes. Chloral hydrate gr. ij was given thrice daily. A fair amount of sleep was obtained.

On August 16th risus sardonicus and opisthotonos were well marked; the paroxysms became very frequent, occurring at times every two or three minutes, and any movement of the patient increased their frequency. The bowels were again constipated, the temperature 100.2° F., the pulse 100, small and weak. Pain was very considerable; next to no sleep was obtained, and, in spite of the considerable amount of fluid nourishment taken in the shape of milk and soup, the patient had become considerably emaciated. Chloral hydrate, 2 gr. every hour, was now given and the calomel repeated.

From August 17th to 26th, by pushing the chloral hydrate and so producing sleep, some control over the paroxysms was obtained. On the latter date, however, the patient became much worse; the paroxysms increased in severity and frequency, and a fatal ending seemed not far off.

As the chloral hydrate appeared to have no longer any effect upon the course of the disease, it was determined to have recourse to a method of treatment used successfully by Celli.¹ The chloral hydrate was continued, and subcutaneous injections into the buttocks of corrosive sublimate in 0.0059-gramme doses were given twice daily, commencing on August 27th. After the first two injections the spasms markedly decreased in frequency and severity.

On September 2nd—that is, after eleven injections—the paroxysms had entirely ceased, and from this date, when the injections were stopped, recovery was sure and, considering the previous state of the patient, fairly rapid. Small doses of chloral hydrate were continued up to September 8th.

¹ Reported in the *Medical Annual* for 1896.

The muscles of the body generally gradually recovered tone under a course of massage carried out on Eastern methods.

REMARKS.

It is noticeable that, as in Celli's case, very marked amelioration in the patient's condition occurred after the second injection. After a very careful inquiry, no cause for the occurrence of the disease could be discovered. The early symptoms seemed to point to conditions which might admit of the case being classified as one of rheumatic tetanus.

NOTE ON THE TECHNIQUE OF SERUM DIAGNOSIS OF ACUTE SPECIFIC FEVERS.

By A. E. WRIGHT, M.D.,

Professor of Pathology, Army Medical School, Netley.

IN view of the great and growing importance of serum diagnosis the following method of applying the serum test may be of interest:

The blood, which is readily obtained in sufficient quantities from the finger tip by breaking off one of the points of a steel nib, and by then pricking the back of the finger near the nail, is drawn off into a pipette, such as is represented in Fig. 1. This pipette is converted into a blood capsule by sealing it in the flame at the points indicated in the figure by the letters *xx*. After twenty-four hours, or as soon as the blood has duly separated into serum and clot, the ends of the blood capsule are broken off and the separated serum is drawn off by a capillary pipette, as indicated in Fig. 2. The amount of serum which is drawn off is indicated by placing a mark *y* on the outside of the capillary pipette. The serum is then blown out into a watch glass, and is diluted first 5-fold by filling up the capillary pipette four times in succession with normal salt solution, and by blowing this salt solution out into the serum in the watch glass. In this manner any desired dilutions are obtained. It is convenient to make 5-, 10-, 25-, 50-, and 100-fold dilutions of each sample of serum.

Having diluted the serum in this manner a small quantity of the diluted serum is allowed to run up into the sedimentation tube represented in the diagram by Fig. 3. For the sake of clearness, let it be supposed that diluted serum has been allowed to run up the tube to the point indicated by the letter *a* in Fig. 3. This point is now indicated on the outside of the sedimentation tube by a red mark. Having filled in the tube in this manner with the desired amount of diluted serum, the point of the capillary pipette is now turned upwards, so as to admit a bubble of air into the point of the capillary pipette.¹ The diluted serum now occupies the position indicated in Fig. 3 by the space *c* to *d*, the bubble occupying the space between the letters *b* and *c*. Having thus introduced our bubble of air, which is to serve the purpose of an index, the end of the capillary pipette is immersed into the emulsion of either typhoid or, as the case may be, Malta fever bacteria, and the emulsion is allowed to run in until it reaches the point *a*. We have now introduced an equal quantity of diluted serum and of typhoid or Malta fever emulsion into our sedimentation tube. The next step is to mix the bacterial emulsion with our diluted serum. This is easily done by aspirating by means of the india-rubber tube the contents of the capillary pipette two or three times in succession into the mixing chamber *z*. Having thus obtained an intimate mixture of an equal portion of the diluted serum and of the bacterial emulsion, we blow the contents of the tube down into the stem of the pipette, taking care not to blow it down too near the end of the pipette, and we seal the point of the pipette in the flame. We then label the capillary pipette 1 in 10, if we have mixed an equal volume of 5-fold diluted serum with a bacterial emulsion, 1 in 20, if we have employed a 10-fold diluted serum, and so on. We then put up a control tube of the bacterial emulsion mixed with normal serum or with salt solution, and finally

we place the whole series of sedimentation tubes upright in an ordinary test tube labelled with the name of the patient and the date. Figs. 4 and 5 represent such capillary pipettes after the lapse of twenty-four hours. In Fig. 4 the dark shading seen at *x* represents a pellet of either typhoid or Malta fever bacteria which have been immobilised and agglomerated by a serum from a person who is undergoing, or who has undergone, the specific fever which corresponds to the variety of bacteria which have been employed. Fig. 5 represents the control pipette which in the case of the eminently motile Malta fever or typhoid bacteria remains evenly turbid.

Fig. 1. Capillary pipette for drawing off blood from finger. Fig. 2. Method of drawing off serum from blood capsule. Fig. 3. Sedimentation tube filled in and ready for mixing. Fig. 4. Sedimentation effect produced by specific serum. Fig. 5. Control tube.

In conclusion, I may mention that Mr. A. E. Dean, jun., 73, Hatton Garden, E.C., is, at my suggestion, making sero-sedimentation tubes of stout glass. Provision is made in these tubes for preventing the escape of the contents when the tubes are placed upright so as to allow of sedimentation taking place.

¹ The capillary pipette, as represented in Fig. 3, is somewhat too short. The calibre of the stem perhaps also unnecessarily wide. This convenient implement for drawing blood was suggested to me by Professor Ehrlich.

THE Duke of Fife has consented to preside at a dinner in aid of the Alexandra Hospital for Children with Hip Disease on Thursday, April 8th, at the Hôtel Métropole.