sure on the outer side of the articulation the articular surface had been crushed in.

This case bears a very strong likeness to one described by Mr. Jonathan Hutchinson in the Pathological Society's *Transactions*, 1887.

Osteitis; Diffuse Gummatus Thickening of Synovial Membrane; Effusion. K. C., 11 years, was brought to me on February 15th, 1895, with swelling of the left knee, which had been present for about twelve months. On examination the lower end of the femur was enlarged, and there was extensive gummatus infiltration in the form of a crescent in the upper pouch of the joint; it was apparently in the synovial membrane, extending from there upwards in the connective tissue beneath the crureus muscle; the skin and muscle were free over this thickening. The rest of the synovial membrane was very lax, and there was a considerable quantity of fluid in the joint. There was a second slight thickening just in front of the external lateral ligament, and some fulness behind due to fluid. The joint could be over-extended, and there was slight lateral movement. There was no pain complained of, but there was tenderness on pressure. She had also ulceration of the soft palate. Just to the left of the middle line was a vertical slit with ragged edges, but above this was a little transversely-placed scar. To the left of the slit the faucial pillars appeared natural, except that there was a well-marked adhesion passing from the posterior pillar, just above the level of the middle of the tonsil, to the pharynx. In the position of the right tonsil was a honeycombed excavation, the size of a half-crown, but yet its ulcerated surface was quite clean. A lump had been first noticed on the palate two years before, four months after leaving the Fever Hospital, the throat becoming gradually more painful, with difficulty in swallowing. Eighteen months ago she attended for this at the Throat Hospital, Golden Square. On the right side of the neck, at the angle of the jaw, is an old puckered cicatrix from glandular trouble some eleven months before. The lump got red and swollen, and then broke down in five or six little holes. Latterly she had been deaf on the right side, but had had no discharge from ear. She had also double congenital dislocation of the hips, the heads being just below the anterior spines with marked tilting of pelvis. Her walk was very typical. Eyes never been bad. Left lower canine teeth pegged. As a baby she had a sore mouth and spots on the body. The mother had had spots about her like ringworms, and on the left breast are scars which from her description of their appearance seem to have been gummata. She had had one miscarriage three years ago, and seven children, all of whom are alive.

1. Girl; quite healthy.
2. The above patient.
3. Boy, aged 8; had sores on abdomen and at anus.
4. Boy, aged 6
5. Boy, aged 5
6. Girl, aged 2
7. Boy, aged 11 months

All healthy.

The patient was given pot. iodid. gr. v, liq. hyd. perchlor. m₃₀, inf. gent. co 3ss t.d., with pot. chlor. for gargle. She attended for three weeks, and derived great benefit from the treatment. The throat showed signs of cicatrization, and the fluid diminished somewhat in the knee-joint. After this she ceased attendance, and went without any treatment until June 25th, when she was again brought to me, and presented the under-mentioned conditions: The lower end of the left femur was enlarged as before, but the thickening of the subsynovial tissue on the inner side of the trochlear surface was not nearly so marked. Over the outer side, however, a very different tale must be told. Here there was a large gumma the size of a five-shilling piece; the central slough was completely separated at its edges, but firmly attached by its "wash-leather" base to deep structures. As I feared it might possibly open up the knee-joint in its separation, the child was admitted into the hospital. Her throat was now practically quite healed; the portions of soft palate on each side of the vertical slit before described had become firmly united to the posterior wall of the pharynx, so that this central opening was the only communication between the nasopharynx and parts below. She was in the hospital for some weeks, and after energetic treatment she lost all the fluid in her knee-joint, the slough gradually separated and left a clear granulating surface without any accident befalling the joint. She went out perfectly well and has remained so since.

IV. PRIMARY GUMMATOUS SYNOVITIS.

Discrete Gummata in Synovial Membrane; Effusion.—D. G. first came under my notice in April, 1886, when she was 6 years of age. At that time there was an eruption of small scales on the extensor surfaces of the arms and on the buttocks and legs. Well-marked nodules were to be felt in the subcutaneous tissue of the buttocks and legs. There were enlarged glands and old cicatrices in the neck, and slight cough. She had had a similar eruption in the preceding spring. There was no history of any rash as a baby. Her father had recently died of phthisis; her mother had chest mischief with hæmoptysis; two brothers were quite healthy. There was no history of syphilis to be got from the mother; the only fact worth noting was a miscarriage just before this girl's birth. The case, then, appeared to be without doubt tuberculous, the rash being ordinary psoriasis guttata so common in tuberculous children, and the nodules those also found frequently in the same class of case. Accordingly she was treated with cod-liver oil and iron and arsenic. After a considerable interval she reappeared in my out-patient room on January 31st, 1893. She now had effusion into both knee-joints, especially marked on the right side. The joint capsules were rather lax, apparently from old distension, and in the synovial membrane were thickenings (gummata); the bone ends appeared normal. The upper end of the left radius was much thickened. There was a punched-out ulcer on the inner side of the right leg, just above the ankle. Several old white cicatrices were to be seen on the inner sides and calves of both legs. There were two glands in the neck, both just below the old cicatrices, which are rather pigmented and circular. She had not had bad eyes, and her permanent teeth were fairly good. Her treatment was pot. iodidi, gr. v, with cinchona t.d.s., and hyd. cum creta, gr. j. t.d.s. Iodoform and vaseline was used to the ulcers. On February 14th she had developed a small

ulcer on the outer side of the upper third of right leg. Her knees were about the same. The right knee was strapped with Scott's dressing and fixed, and her iodide was increased to 10 gr. twice daily. She stayed away till April 18th, going for some weeks without any treatment, consequently the effusion into the right knee was increased. The ulcers seemed a little smaller. The same treatment was repeated and continued till June 2nd, when she was much improved. As she was anemic she was given in addition ferr. carb. saccharata, gr. x t.d.s. June 27th. Now no fluid in left knee, and only very little in the right. As the ulcers were tardy in healing, ung. hyd. ox. rubrum was used. August 1st. Liq. hyd. perchlor. 3ss. was added to her mixture, substituting hyd. cum creta. When she attended on August 25th the fluid in both knees was practically gone, and there was very slight evidence of any thickening, and after September 18th she stopped her visits, considering herself well. She came back again on January 8th, 1895, with a fresh effusion into the right knee, with thickening of the synovial membrane between the patella and internal condyle. The left knee was quite sound, and her ulcers were quite healed. There was some small glands in neck, just in the region of the old cicatrices. Her voice was hoarse, but nothing was detected. Her old treatment was repeated, and in ten days there was a very marked improvement. Foolishly she again stopped attendance for a month, so that at the end of February there was more fluid in the right knee, slight effusion into the left knee, and some effusion into the left elbow-joint, which had prevented extension for a week. Her iodide, gr. x, was repeated, with an increased dose of liq. hyd. perchlor. (mxl). She rapidly improved, but she soon ceased attending, and has not been to the hospital since.

This condition of the knee-joints I have never met with in any other child, but it resembles exactly cases seen in adults. There is no doubt in this case that the patient was the victim of both tubercle and syphilis (which is far from infrequent), and, after reading the earlier notes, some might be inclined to consider the former as the sole origin of her trouble. If the knee-joints had been tuberculous, they would be included in the special form associated with König's name, but from an experience of several typical cases of the latter, the joints bore no real resemblance, and, besides, the diagnosis was sustained by the associated periostitis and characteristic ulceration.

The cases described above are fairly typical examples of the various forms of syphilitic joints, and my paper, to me, will have borne some fruit if it only induces others to record their experiences of a similar class of case.

PERMANGANATE OF POTASSIUM AS AN ANTIDOTE FOR OPIUM AND MORPHINE POISONING.

By ARTHUR P. LUFF, M.D., B.Sc., M.R.C.P.,
Physician in Charge of Out-patients and Lecturer on Forensic Medicine in St. Mary's Hospital.

In the *BRITISH MEDICAL JOURNAL* of June 22nd, 1895, there was published a paper by Dr. William Moor, of New York, advocating the use of potassium permanganate as an antidote in cases of opium and morphine poisoning. The paper gives details of the results of two experiments performed by Dr. Moor upon himself, which strikingly demonstrate his courage and belief in the powers of the antidote he recommends. On one occasion, three hours after a light supper, he took 3 grains of morphine sulphate, followed in about 30 seconds by 4 grains of potassium permanganate, both in aqueous solution. On the other occasion he took, about two hours after breakfast, 5 grains of morphine sulphate dissolved in a fluid ounce of water, followed in a few seconds by 8 grains of potassium permanganate, dissolved in eight fluid ounces of water. On neither occasion did he experience any ill effect from the narcotic poison. He recommends that in a case of opium or morphine poisoning 8 or 10 grains of potassium permanganate dissolved in water should be administered at once, and repeated at intervals of 30 seconds once or twice. He further advises that a weak solution of the antidote, about 1 grain to a tumblerful of water, should be administered by the mouth from time to time even after all the opium or morphine in the stomach is supposed to have been rendered inert. This is on account of the now well-known fact that morphine, after absorption into the circulation, either from the gastro-intestinal tract or from hypodermic injection, is excreted in considerable quantity by the stomach; the quantity of morphine thus excreted by the stomach after subcutaneous injection is about half the amount injected, and this excretion by the stomach continues for about one hour after the hypodermic injection of the morphine. It is for this reason that I have advised in my *Textbook of Forensic Medicine* repeated washing out of the

stomach after the subcutaneous injection of poisonous quantities of morphine salts.

Moor states that up to June, 1895, thirty-five cases of opium poisoning occurring in America had been successfully treated by potassium permanganate. Since then six cases of opium or morphine poisoning treated by this method have been recorded in this country; five of the six recovered, the one lost being that of a man who had taken more than a pint of laudanum some hours before he was treated. The following is a brief account of the first five cases, which were treated and described by Nathan Raw:¹

CASE I.—A woman, aged 27, took 2 fluid ounces of laudanum. Previous to treatment she was profoundly comatose. Her stomach was washed out with a solution of Condy's fluid (3ij to a pint of water) until the washings were colourless. Afterwards 5ij of liquor potassii permanganatis were given every hour for four hours. Artificial respiration was kept up for two hours. The woman made a good recovery.

CASE II.—A woman, aged 59, took a large quantity of laudanum (amount not stated). Previous to treatment she was profoundly comatose; the respirations were only 6 per minute. The treatment was similar to that of Case I, but artificial respiration was not resorted to. Good recovery.

CASE III.—A woman, aged 52, took a quantity of opium (amount not stated). Previous to treatment she was profoundly comatose. The treatment was similar to that of Case II. Good recovery.

CASE IV.—The same woman (Case III) a fortnight later was again treated similarly for opium poisoning. Good recovery.

CASE V.—A chemist, aged 35, took over a pint of laudanum, and was not discovered until several hours later. He was treated in a similar manner to Case I, but died suddenly from respiratory paralysis.

CASE VI.—This case is described by Stanley Walker.² A man took in solution rather more than 16 grains of morphine sulphate. He was not treated till an hour and a-half after taking the poison, when he was in a semi-comatose state; 5 gr. of potassium permanganate, dissolved in half a pint of water, were administered, and about half an hour later vomiting occurred. The dose of potassium permanganate was repeated a second and a third time, vomiting occurring about half an hour after each dose. On account of the feebleness of the heart's action hypodermic injections of strychnine were given. The man made a good recovery.

Although it has been known for some time that morphine is readily oxidised by potassium permanganate, the latter being reduced to manganese dioxide, yet bearing in mind the fact that the contents of the stomach contain so many organic substances capable of rapidly reducing the permanganate, it seemed to me desirable to thoroughly investigate the property alleged to be possessed by potassium permanganate of destroying morphine before it is itself attacked and rendered useless by the stomach contents. In other words, I thought it desirable to ascertain whether, when morphine is mixed with the stomach contents, the addition of a quantity of potassium permanganate slightly in excess of that required to destroy all the morphine present, would actually effect and complete such destruction prior to the reduction of the potassium permanganate by the ordinary contents of the stomach.

The only published experiment I can find which is at all relevant to this question is one described by Moor in the paper previously referred to; to demonstrate the selective faculty of potassium permanganate for morphine, he mixed 250 grains of white of egg with 1 ounce of water, then dissolved in the mixture 1 grain of morphine sulphate, and added to the whole 1 grain of potassium permanganate dissolved in 1 ounce of water. After thoroughly mixing, not a trace of morphine could be detected. This experiment does not, to my mind, conclusively demonstrate the selective faculty of potassium permanganate for morphine, since the reducing action of white of egg on potassium permanganate is in no sense comparable to that exerted by the complex organic contents of the stomach. I therefore thought it desirable to take quantities of vomit, obtained from human beings, and, after adding a solution of a morphine salt to the vomit, to then add potassium permanganate in the quantity recommended to be used as an antidote, and after thorough mixing to ascertain whether any unaltered morphine could be extracted from the mixture.

The following is a brief description of the method employed in each experiment: A known quantity of a morphine salt in solution was mixed with vomit, and after thorough agitation, a known quantity of potassium permanganate in solution was added and the mixture agitated at intervals for half an hour. It was then mixed with alcohol acidulated with acetic acid, filtered through linen, and the filtrate evaporated at 35° C. to a syrup; the syrup residue was extracted with successive quantities of absolute alcohol, which were filtered and the

alcohol evaporated off; the residue was then extracted with water acidulated with acetic acid, which would dissolve out any morphine, and the acidulated liquid was filtered; the filtrate was rendered alkaline with ammonia and then shaken with twice its volume of hot amyl alcohol, which, after separation, was removed, and the extraction with amyl alcohol repeated a second and third time; the amyl alcohol extracts were mixed, filtered, and evaporated to dryness over a water bath. The residue was then dissolved in a little water acidified with acetic acid, the solution filtered, concentrated, and a slight excess of ammonia added; it was then allowed to evaporate spontaneously, and the residue was carefully examined for morphine.

Experiment I.—Five gr. of morphine acetate were mixed with 3ijss of vomit, and 8 gr. of potassium permanganate dissolved in 3viij of water added. No morphine could be extracted from the mixed substances.

Experiment II.—Five gr. of morphine acetate were mixed with 3iij of vomit, and 7 gr. of potassium permanganate dissolved in 3viij of water added. No morphine could be extracted from the mixed substances.

Experiment III.—Three gr. of morphine acetate were mixed with 3iv of vomit, and 4 gr. of potassium permanganate dissolved in 3iv of water added. No morphine could be extracted from the mixed substances.

Experiment IV.—Three gr. of morphine acetate were mixed with 3vj of vomit, and 4 gr. of potassium permanganate dissolved in 3iv of water added. No morphine could be extracted from the mixed substances.

These experiments demonstrate the selective faculty of the permanganate for morphine in the stomach contents, and confirm Moor's conclusions as to the value of potassium permanganate as an antidote for opium and morphine poisoning. When the quantity of morphine that has been taken is known, I should advise the administration of a quantity of potassium permanganate slightly in excess of the morphine; if it is laudanum that has been taken, and the quantity is known, 6 grains of potassium permanganate should be administered for each fluid ounce of laudanum taken. If in any case the quantity of morphine or opium taken is unknown, from 8 to 10 grains of the permanganate should be administered according to the severity of the symptoms.

It should be given dissolved in from 4 to 8 ounces of water. The stomach should afterwards be washed out two or three times, at intervals of half an hour, with a weak solution of permanganate, in order to decompose the morphine that has been absorbed and that is being excreted into the stomach. In cases of poisoning by the hypodermic injection of morphine I do not think that the hypodermic injection of the permanganate would be of any use, but the washing out of the stomach with the weak solution of the permanganate should certainly be resorted to. In cases of threatened respiratory failure strychnine or atropine (the former preferably) should be administered hypodermically, in order to stimulate the respiratory centre, and artificial respiration should be resorted to if necessary.

THE TREATMENT OF OPIUM POISONING BY PERMANGANATE OF POTASSIUM.

By F. P. MAYNARD, M.B. Durh., D.P.H. Camb.,
Surgeon-Captain I.M.S.

WHILE officiating as Resident Physician at the Medical College Hospital, Calcutta, I had unusual opportunities of seeing and treating cases of opium poisoning. After reading Dr. Wm. Moor's paper on the treatment of such cases by permanganate of potassium in the BRITISH MEDICAL JOURNAL of June 22nd, 1895—a treatment originally suggested by Dr. Barber Smith in 1884—I decided to give the method a trial, and the following briefly related 19 cases seen during the last three months are the result.

SOLUTIONS.

In the treatment of the cases the following solutions were used:—
No. 1 solution: R potass. permang., gr. x; acid. sulph. dil., 3ij; aq. Oj. As this does not keep well, the sulphuric acid has to be kept separately, and the quantities in the stock mixtures are so arranged that 5ij of the permanganate and 3ij of the sulphuric acid concentrated solutions added to a pint of water provide the proper amount for use.

No. 2 solution: R potass. permang., gr. ij; aq. Oj. This is also kept in a concentrated stock mixture, and though used by me as here given, would probably act better if mixed with sulphuric acid like No. 1.

No. 3 solution: R potass. permang., gr. j; aq. mxx; for hypodermic injection.

¹ BRITISH MEDICAL JOURNAL, July 13th, 1895, p. 76.

² BRITISH MEDICAL JOURNAL, JANUARY 11th, 1896, p. 82.