by her friends was that she was strange in her head, had been slightly delirious at night for some two or three nights, and had talked nonsense by day as well; that she took very little food and vomited frequently. Her own account of herself was given me with much precision: she remembered dates and facts accurately; and, as I found afterwards, her history of her past and present illness corresponded with the accounts given by those with whom she had lived.

She had been laid up in her situation for more than a week, but had had no diarrhoea: her chief complaints had been pain in her head and back, and almost constant sickness after every kind of food; her catamenia had been irregular for some months. She was aware that her back was rather bent, and that she stooped in consequence of it, but was sure that this had only taken place in the course of the last eighteen months. She had been housemaid to a family where a good deal of water had to be carried upstairs for baths; and a year and a half previously she had fallen upstairs while carrying two heavy water-cans, and then strained her back severely. She was able to continue at her work that same day, but was shortly afterwards laid up with pain and tenderness in her back; and then left her place, returning home to her mother's house, where she was laid up in bed for three months. During those three months, she was paraplegic; and her account of this paraplegia was as precise as could be; thus, first she had hyperæsthesia in the right leg, then loss of power of motion in the same leg; and, within a few weeks, the same sequence of events occurred in the opposite limb, although the ultimate loss of motor power in this left leg never was so complete as it had been in the right. For three months, she was quite unable to stand or lift herself, and at night-time her legs used to wake her up by their involuntary startings. Her sphincter ani never was affected, but she was occasionally unable to retain her urine.

After complete rest in bed, without doctor or physic, but with the most careful nursing upon the part of her mother, she gradually recovered power, first to move herself, and then to stand, and finally to walk. She obtained another situation, and had held this for twelve months, working very hard up to the commencement of her present illness. Curiously enough, as showing family predisposition, she had a sister suffering with chronic spinal disease.

Examination of the Patient.—She lay chiefly upon her back, I was told; but was rather curled up upon her right side when I first saw her, and nearly always afterwards assumed this posture by preference. She moved very little, but had complete capacity of motion, and perfect sensation in both arms and legs. There was slight ptosis of the upper eyelid of the right eye: her eyesight, she said, was bad; but she saw and correctly described objects upon the opposite wall of the ward. Both pupils were of equal size, and reacted naturally to light; the conjunctivæ were red and injected. There were occasional twitchings of the facial muscles. There was no fullness or tenderness of the abdomen, which was rather empty; no increased dulness over either liver or spleen. She had slight occasional cough, but no abnormal chest-sounds. The heart's action was regular, its sounds clear. She complained to me of a feeling of constriction across her chest, and of dull heavy pain in her occiput and down the back of her neck. Pulse 104, regular; temperature 101.6; respirations 23. Vomiting, headache, nape pain; previous (strumous?) vertebral disease; the nature of the fever; a morning temperature of 100.8, an evening of 101.6; no symptom of typhoid fever, except continued fever with night delirium; no evidence of pneumonia—these things, taken all together, guided me to the opinion I gave that the case was probably one of tubercular meningitis, the tuberculosis being secondary to some caseous pus collection in connection with her former spinal disease. The treatment consisted of milk, essence of beef, and one drachm of bromide of potassium every six hours.

Course and Progress.—September 19th. She had passed a quiet night; had had no vomiting. Fluid nourishment had been taken at frequent intervals of time in small quantities, and was well supported. Urine occasionally passed in her bed; but she appeared at once aware of this, and called the nurse's attention to it. There had been one action of the bowels, loose, dark coloured. The lips were dry and peeling; tongue red and dry. Morning, pulse 96, regular; temperature 101.4; respirations 20. Evening, pulse 105, regular; temperature 102.4; respirations 36.

September 20th. She had had a restless night; her mental condition was unaltered. She answered questions correctly. The skin was dry and harsh-feeling. The bowels acted once daily; the motion was dark and loose. Morning, pulse 110; temperature 101; respirations 40. Evening, pulse 96; temperature 101.4; respirations 32.

September 21st. Her posture was unchanged; she was quite constantly lying upon her right side, and curled up, resting her head upon her right hand, and complaining of pain at the back of her neck when her head was moved. She answered questions deliberately, though

not always correctly, forgetting recent things. When asked to show her tongue, she did so. There was more marked ptosis of the right eyelid, with increased secretion from the eyes. The pupils were equal, and equally sensitive. She swallowed what food was given her easily and well, but would not attempt to feed herself. The tongue was dry; the bowels acted once *per diem*; urine passed chiefly unconsciously under her. Morning, pulse 100; temperature 101.2; respirations 24. Evening, pulse 99; temperature 102; respirations 40.

September 22nd. Simple semiautomatic acts, like putting out the tongue and taking nourishment, were fairly well performed, but no more complex intellectual acts. The patient lay in a drowsy, half-dreaming state, in which she occasionally muttered. She groaned when disturbed. The skin appeared hypersensitive to impressions of cold or touch: the slightest touch of the soles of the feet was responded to by the drawing up of her legs. The eyelids were much gummed-together, but she was still able to open the left; she did not appear to see with either eye. There was no reflex movement when her eyes were rapidly approached with a finger. She was restless, tossing about the limbs, throwing off the bedclothes, and clutching and picking at the coverlet. No action of the bowels had taken place. The urine passed involuntarily. Morning, pulse 100; temperature 101.6; respirations 60. Evening, pulse 105; temperature 100.6; respirations 30.

September 23rd. She was not quite so drowsy nor so restless. The tongue was cleaner and less dry. Nourishment was taken more readily. She had no sickness, and opened her eyes. The ptosis of the right lid was scarcely noticeable; vision doubtful; abdomen more sunken; any movement of the head was followed by evident signs of pain. Morning, pulse 104; temperature 101.4; respirations 30. Evening, pulse 100; temperature 99; respirations 36.

September 24th. She remained in the same semicomatose state. The pupils were dilated, not reacting to light. The eyelids were half open. Occasional movements were made by all her limbs. She was setting aside imaginary objects with her hands; but these motions were tremulously performed and badly coordinated. The muscles and tendons of the hands were twitching much when I held her hand to count her pulse. She mumbled indistinctly to herself when roused, and called out sharply when her pillow was moved. Pulse 120; temperature 98.8; respirations 30.

September 25th. The coma became more profound; swallowing impossible; the breathing quicker, and at times catching and irregular; the pulse irregular, and scarcely perceptible at the wrist. A slight convulsion shortly preceded death.

At the *post mortem* examination, twenty hours after death, old caries of the second lumbar vertebra was discovered, with a collection of caseous pus upon its anterior aspect. The spinal cord had evidently been compressed in some measure by this old abscess, and the sheath of the cord still bore distinct marks of pressure-thickening in this situation. The cord itself was here very soft, and easily broken down; but there was no evidence of recent disease visible either in the cord or theca. Scattered miliary tubercle was found in both lungs, and in the sheath of the bronchi, but no extensive deposits; also in the kidneys. There was abundant lymph at the base of the brain, with matting together of the nerves; some excess of fluid in the ventricles, but no flattening of the cerebral convolutions, and therefore little compression.

There remain two more cases to narrate and some remarks to append, which must stand over for a second communication.

A CASE OF STARVATION.

By THOMAS ELLIOTT, M.D. Dub.

THE difference and diversity of medical opinion exhibited in the Penge case induce me to record the following case, which I trust may interest such of the readers of the BRITISH MEDICAL JOURNAL as notice medico-legal questions. It was not alleged, in this case, that the deceased had not received food; but it was clearly proved at the coroner's inquest that it had been insufficient. For five or six months, though she complained at times to her husband of not having enough to eat, she remained in this sad plight; and when at length relief from the parish official came, it proved to be of little avail. It not being a case of acute starvation, the *post mortem* examination did not reveal anything particular beyond the extreme emaciation.

Ann G., aged 57, a married woman, was admitted from South Noranton into the Mansfield Union about 6 P.M. on Thursday, September 27th, 1877. Being extremely deaf, it was impossible to elicit any history of the case from her. As gleaned from the coroner's inquest, it appeared that, her husband being short of work, they had lived in a destitute condition for five or six months, and she had been without

sufficient and proper food, her diet consisting of bread and milk, tea and sugar, and occasionally a little butter. On the 13th September, relief, consisting of four pounds of bread, one pound of sugar, one ounce of tea, and one pound of rice, was given her by the relieving officer of her district. Again, on the 20th September, further relief—bread, tea, sugar, meal, milk, and meat (three pounds)—was given her; and on the 27th September she was removed into the workhouse by order of the Board of Guardians. Her condition at my visit the following morning was as follows. She was very feeble; her eyes and cheeks were sunken, the bones projecting, and the whole body greatly wasted—in short, only a framework of skin and bones. As stated before, she was extremely deaf. This deafness had existed for years, as subsequently learned. Her mental powers appeared to be tolerably clear, as in reply to a question she correctly informed us she came from South Normanton. When leaving her home, she said to her husband, "I shall go to the union; you must keep on the house, and if I get better I shall soon come back". There was no paralysis. Her heart and lungs were apparently healthy. There was no cough. The abdomen was so sunken that the abdominal aorta, near its bifurcation, could be plainly seen thumping against the parietes. Examination revealed no cancerous or other disease. The pulse was somewhat quickened, but full; the tongue red and parched. There was no difficulty in breathing or swallowing. When food was given, she ate and drank ravenously. The bowels were costive.

Diet.—Four ounces of bread and butter, with three-quarters of a pint of tea, had been given her the previous evening on admission; and for breakfast this morning she had had the same amount of bread and butter with a pint of tea. She was ordered, in addition to this, as much milk as she could take, two eggs, four ounces of rum (at her own request), and a little mutton, if she could take it; but this she could not.

Sunday, September 30th. She was much weaker, and inclined to sleep a good deal. The bowels were moved. On Tuesday, October 2nd, she was very much weaker, apparently falling into a state of coma. She died early on Wednesday morning, October 4th.

The *post mortem* examination was made on Thursday, October 4th, twenty-eight hours after death. Rigor mortis was well marked. There was extreme emaciation, but no external mark of violence or injury. The height of deceased was 5 feet; and weight, 46 lbs., or 3 stone 4 lbs. The *abdomen* was first examined. The parietes were extremely thin, with almost an entire absence of fat; and the muscular tissue was pale and wasted. The omentum contained but little fat, and was transparent. All the abdominal veins were very full and prominent—in fact, were congested. The stomach was pale, and contained about four ounces of partly digested food in a fluid state. There was nothing remarkable about its coats. No disease or stricture of the pylorus existed. The intestines were pale, and required to be removed carefully, as at parts they were easily torn. The duodenum internally was abundantly stained with bile. The small intestines contained a little chyle, and the large intestines semiliquid feces. No disease could be detected in either small or large intestines. The liver was healthy and of a fair size. There was plenty of bile in the gall-bladder. The spleen was small. The kidneys were healthy, and suprarenal capsules absent. The bladder was empty and healthy; the uterus healthy, three inches in length; os uteri patulous, with muco-gelatinous fluid exuding from it. The right ovary was a small, hard, nodulated tumour, apparently the result of fibrous transformation; and on section, which was with difficulty made, was found to contain a little thick brown secretion. The left ovary was a cyst of about two inches in diameter, filled with a light brown fluid, and having upon its external surface several small membranous cysts, and also a small warty or cauliflower growth, which cut like cartilage. The aorta was free from aneurism or other disease. *Thorax.* The heart was small; its right ventricle contained fluid venous blood; the left ventricle was contracted, and contained a large firm clot. There was no valvular disease. As regarded the lungs, there were old pleuritic adhesions on both sides. The lungs were otherwise tolerably healthy and free from tubercle. The *oesophagus* was free from stricture or other disease. *Head.* No inflammation of the membranes was found; but there was effusion on the surface of the brain, and the veins were full and prominent. The effusion was of a slightly milky hue, most likely due to the albumen in the fluid. There was no sign of recent or old lymph, of pus, or tubercle. No flattening of the surface of the brain was present. The brain-substance was tolerably firm. The lateral ventricles contained a little fluid.

REMARKS—In arriving at a conclusion in this case, we are not much helped by the *post mortem* examination, beyond the fact that it did not reveal enough in any organ to account for death. The effusion on the surface of the brain, as judged from the general appearance and *ante mortem* symptoms, was looked upon as mere cedema of the mem-

branes, and but the sequel of the case—the secondary, but not the primary, cause of death. The emaciation and previous history alone remain to guide us; and we are, therefore, forced to the conclusion that it was a case of malnutrition, or, in common parlance, chronic starvation.

WHY DENTAL CARIES IS SO GENERAL, AND HOW TO PREVENT IT.*

By ALEXANDER STEWART, F.R.C.S.Ed.

I HAVE endeavoured in this short paper to show that dental caries has but one proximate cause, and can be largely, if not altogether, prevented by means so readily available that they would no doubt come into general use if generally known; and, as the condition of the teeth now enters, or ought to enter, into the consideration of every case of chronic constitutional disease, the general prevention of dental caries is obviously a subject of great practical importance. It should, I think, find a place in every medical text-book; as dental works are not in the hands of the profession generally, and treating fully the cure of dental caries by operative means, they give scant space to its prevention. Further, its operative cure being delegated by them to dental practitioners concerns medical men but little, whereas its prevention as a matter of hygiene concerns them greatly.

Knowing, from former experience in medical practice, that the medical attendant is frequently consulted in cases of toothache—cases of children and those who are unable or unwilling to go to a dental practitioner—and that they, therefore, have great opportunities of inculcating the necessity of prevention; and that the medical officers of hospitals, dispensaries, and other public institutions where cases of ill-health from chronic toothache are daily observed have still greater opportunities, I have been induced to bring this subject before the Association by the hope of making the members allies in spreading a knowledge of the preventive means I recommend, as they are simple and rational, and have for years been advised by me in the special treatment of the teeth, with unflinching effect.

In recent dental works (Tomes's *System*, 1873, and Sewill's *Guide*, 1876), the chemical origin of dental caries—the destruction of the calcareous enamel by acidity—is fully discussed and acknowledged; and all who are engaged in treating the teeth have daily evidence of its truth. The following proofs of the solution of the calcareous salts of the teeth by the acids to which they are exposed in the mouth are taken from the works I have named. Some teeth placed in a cider-cask disappeared entirely. The enamel of teeth kept for two years in a solution of lactic acid (1 to 100), and of citric acid (1 to 1,000 of water) had become friable and easily reduced to powder. Fluid containing ordinary food was found to produce effects precisely similar in appearance to caries of teeth in the mouth, acetic and other acids being formed by decomposition. Teeth placed in water containing a small quantity of saliva with fragments of bread became softened in twenty days. With solutions of sugar, the naked-eye appearances of dental caries were exactly imitated; the solutions acquired a distinctly acid reaction.

Mr. Tomes discusses the subject at length in an appendix, and fully proves his conclusion, "that dental caries is an effect of external causes in which so-called 'vital' forces play no part, and that it is due to the solvent action of acids".

The chief sources of the acids that destroy the teeth are: the fermentation of food left on and between them after meals; acid drinks; some articles of food, as fruit, cooked and uncooked, salads, pickles, etc.; mineral acid mixtures; acid mucus from the gums; acid saliva from pregnancy and diseases of the system; acid fumes in some processes of manufacture, etc.

Premising that some few have teeth with enamel so dense that it is almost indestructible, that it is more often so thin and permeable as to be readily destroyed; and that most teeth, being unequally enamelled, have one or more parts of their surface thinner than the rest, and so the first to be acted on, I shall introduce a few cases and observations from my note-book showing the action on the teeth of acidity from some of the abovenamed sources.

Mrs. M., aged about 40, in somewhat delicate health, with teeth remarkably beautiful in shape, colour, and arrangement, had suffered from facial pain of a neuralgic character for some months. Warm and cold liquids in the mouth brought on paroxysms; and all the teeth, but more especially the upper incisors, were sensitive to cold

* Read in the Section of Surgery at the Annual Meeting of the British Medical Association in Manchester, August 1877.