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.

air. They had been carefully examined by others, but no caries was found, nor could I detect it anywhere at first. Knowing, however, that the teeth are rendered sensitive by acids directly applied to them, I inquired whether she was in the habit of taking any; and being told that, having had lemon-juice prescribed for her general health with advantage, she had continued ever since to put a slice of lemon in her mouth at night, keeping it in contact with the palate and backs of the upper front teeth till about to fall asleep, I was led to examine these teeth behind more carefully, and found underneath the slightly congested gum, where caries is extremely rare, an elongated carious cavity in the neck of every front tooth, unseen till I pressed up the palatal gum. The highly sensitive condition of the teeth showed that the enamel had everywhere been permeated by the acid, and the dentine—the second defence of the nerve-pulp in its centre—acted on.

Captain G. consulted me on July 30th about his teeth, several having broken up within the last two years, when all were apparently sound. The cavities were characteristic of the action of acid applied directly to the teeth, the dentine much softened before the enamel gives way. I found that, when at sea, he took an ounce of lime-juice in water every day, without rinsing his mouth after it, or any other precaution; and, on telling him that the acid had destroyed his teeth, he replied: "Then that is why all sailors have bad teeth."

On my monthly visit to an orphan school, the first Saturday in May of the present year, several of the children were brought to me on account of toothache since my former visit, whose teeth were found, on examination, apparently sound. As the pain had not been severe, or frequent, or lasted long, I suspected that some acid had readily passed through defective enamel to the dentine and nerve-pulp; and, on inquiry, I found that rhubarb had formed part of the school diet for two or three weeks, and that the children brought to me were very fond of it.

Toothache is supposed to be more frequent in winter than in summer; but such is not my opinion, cold in winter producing, I think, fewer cases than the acid of summer fruits.

On May 25th, this year, Mr. P. consulted me about his upper front teeth, which, having been very fine, had become dull and flattened, the enamel looking as if a file had been used on it. The teeth, he said, were covered over with a thick whitish substance every morning; and, although he had brushed them as usual, I found patches of most adhesive mucus on them near the gums of an acid reaction, and, on its removal, the enamel it adhered to was as described. He had long suffered from dyspepsia.

I have since seen a similar case of corroded enamel by acid mucus; and, if its accumulation in many diseased states, as fever, be considered, it must be set down as a not infrequent cause of caries, being secreted between as well as on the teeth.

Acidity, gastric and salivary, common in pregnancy, is destructive to the teeth. Histories of the loss of one or two in every pregnancy are familiar to us all; but many more are lost from this cause than are ascribed to it, as the acidity then prevailing may permeate the enamel generally and sow the seeds of future destruction: the teeth breaking up, often several about the same time, so long afterwards, that their loss is not attributed to pregnancy.

The destructive effects of mineral acid mixtures on the teeth are of daily observation. They become deteriorated in colour, and, in most cases, sensitive to changes of temperature, not only when cold or warm drinks are taken, but when cold air is breathed—so sensitive in some, that I have had to advise a respirator to be put on before going from a warm into a cold atmosphere. They are also rendered sensitive to articles of food that are either sweet or somewhat sour. Sooner or later, caries shows itself, the dentine being generally extensively softened by the loss of its salts before the enamel breaks in. From mineral acids, as from the acidity of pregnancy, it may be so long before the teeth break up, that prescribers have not the opportunities dental practitioners have of observing the injurious effects of acid medicines on the teeth.

On July 24th, two patients called my attention to their teeth, which, formerly very transparent looking, were now dull and comparatively dark. One had taken mineral acids largely for two years; and, besides the discoloration of the front teeth, the molars had almost disappeared. The other, whose teeth had become deteriorated in colour since I examined them six months before, had been taking nearly ever since not more than ten drops of sulphurous acid in water three times a-day; apparently the molars were still sound.

On July 25th, Mr. W. consulted me about the loss of his upper molar teeth. The enamel had broken in, and the dentine was so completely softened that, but for the nerve-pulp, it might readily have been picked out, leaving only the enamel standing. I inferred that only some acid directly applied could have produced so much softening, and

learned that two years ago he had taken for a lengthened period very strong acid medicine from a homoeopath now deceased.

Cases of opaque-looking discoloured enamel, with sensitiveness of the teeth, are frequent from a strong acid having been used to hasten the removal of tartar through ignorance or want of principle in the operator.

As the ordinary expedient of a glass-tube is seldom used so effectively as to prevent the acid reaching the teeth, other means must be used to prevent its ruinous effects on them; and, being confident from long experience that the neutralisation of the acid by a weak alkaline solution is invariably effective, I hope the time may soon come when every prescription containing an acid will be accompanied by an injunction to rinse the mouth immediately after every dose with a solution of the kind.

The form I have always recommended is a teaspoonful of bicarbonate of soda and a tablespoonful of eau de Cologne in a quart (a wine-bottleful) of water, a little hot water being added, if required, to warm the small quantity poured out for use. This is agreeable, easily remembered, and readily renewed. In hospital and dispensary practice, and by the poorer classes, a small piece of camphor may replace the eau de Cologne, and will serve quite as well to make the solution agreeable. This or some similar solution should be used to rinse the mouth, at least every night at bedtime, but better after every meal, whenever there is a suspicion of acid acting, or having acted, on the teeth, and may be relied on to preserve those that have not been permeated; and I think that dentinal softening of recent origin and small extent may be arrested by its continued use. It should be used several times a-day from the commencement of every pregnancy. The mouth should be rinsed with it not only after every dose of mineral acid medicine, but also as soon as possible after acid fruits and whatever tastes acid in the slightest degree.

In cases of serious illness, when the teeth are likely to be invaded by acidity from various sources, it may be possible to use it as a preventive when the tooth-brush cannot be used; and in addition to it when it can. And, as it is more than a preventive of caries, often sufficing to keep threatening cavities quiet till they can be treated by operative means, it will be found so far serviceable during pregnancy and illness.

The toothache of childhood, arising chiefly from acid-forming farinaceous and saccharine food, is very amenable to an alkaline solution as a mouth-wash frequently repeated, and such should be used regularly after meals whenever the temporary teeth show signs of decay, it being most important that they be preserved till the period of replacement.

The general prevalence of dental caries is chiefly owing to food remaining on and between the teeth after meals—from breakfast-time till the following morning, when, according to custom, the teeth are brushed; brushed, but probably not cleaned, as the brush is more often used to polish the surface merely than to assist in removing what has accumulated between them. Experiments have been referred to that prove the solvent action of weak acids on the teeth; and I think it will be conceded without proof that, were portions of our ordinary food, mixed and moistened as in mastication, kept during a night at the high temperature of the mouth, the compound would be sour. It follows that dental caries must continue to prevail as now, while it is the custom to allow the food to remain in contact with the teeth all night.

The following observations show the dependence of caries on food remaining in contact with the teeth. When the teeth are wide apart, food is not retained, and they generally remain free from caries. The lower front teeth are seldom attacked by caries when, as is generally the case, the spaces between are closed to the entrance of food by tartar. The backs of all the teeth, upper and lower, being kept free from food by the tongue, are seldom affected by caries. Lodgment of food takes place between the bicuspid, between the molars, in the depressions on the masticating surface of these teeth, and on the buccal walls of the molars, and these are the chief seats of caries. While mastication is performed by the molars and bicuspid, the upper front teeth remain free from food and from caries; but, when they themselves are made to do the work of lost or diseased molars and the food gets between them, caries is certain to follow before long.

Further proof cannot be required that, if no food remained in contact with the teeth after eating, they would be free from caries, unless acted on by acidity from one or other of the sources previously enumerated.

The only indications, therefore, for the prevention of dental caries are the neutralisation of acid applied to the teeth and the removal of food before it has become acid. The neutralisation of acid by the alkaline solution recommended has been sufficiently dwelt on. The food should be removed after every meal, and all who have not the opportunity of doing so should not fail to remove it thoroughly every night at bedtime by rinsing, as the brush cannot be trusted to remove the food from between the teeth.

The means I wish to see in general use are three.

1. Rinsing the mouth thoroughly with water after the last meal of the day to remove all food.

2. Rinsing immediately afterwards with an alkaline solution to neutralise any acid or its effects.

3. Moderate brushing in the morning to remove any mucus secreted during the night.

I do not hesitate to affirm that, were these simple means in general use, toothache would be as rare as it is now common.

The chief obstacle to overcome is the prevalent belief that morning cleaning is all that is required for the preservation of the teeth, a belief I find best attacked by drawing attention to the uncleanness of going to bed having a part of every kind of food that has been eaten during the day about the teeth, how disagreeable it must become, and how inconsistent it is with care of the teeth to leave them in such a state all night.

In conclusion, the illustrative cases I have introduced having occurred in practice within the past few weeks, I am sanguine that I shall not be thought to have occupied the time of the members unnecessarily.

REPORTS

OF

MEDICAL AND SURGICAL PRACTICE IN THE HOSPITALS AND ASYLUMS OF GREAT BRITAIN.

ST. THOMAS'S HOSPITAL.

TRAUMATIC ANEURISM OF THE PALM: FAILURE OF TREATMENT
BY COMPRESSION: LIGATURE OF THE BRACHIAL ARTERY
WITH CARBOLISED CATGUT: CURE.

(Under the care of Mr. SYDNEY JONES.)

FOR the following report we are indebted to Mr. CHARLES E. SHEPPARD.

Joseph Newman, aged 15, farm-labourer, was admitted on May 7th, 1877. Fourteen days previously, a pint and a half black bottle broke in his hand, inflicting a wound in the left palm about three-quarters of an inch long. There was much hæmorrhage at the time; the blood was bright, and spurted about a foot and a half. A medical man first saw him two days afterwards, and made a small incision into a soft fluctuating swelling on the inner side of the middle of the palm and below the level of the annular ligament.

Five days after the accident, there was considerable bleeding, which had several times recurred. Some inflammatory swelling in the palm had occurred principally two days before admission.

When admitted, there was a traumatic aneurism corresponding in its projection in the palm to the size of a filbert; it seemed to correspond with the superficial arch, pulsed freely, but was easily controlled by pressure on the radial and ulnar arteries. There was some inflammatory effusion, with tenderness, amongst the neighbouring structures. A small wound, occupied by clot, still existed at the site of the original injury, and gave exit to an opaque serous blood-tinged fluid. Graduated compresses of lint were placed over the radial and ulnar arteries; the fingers were bandaged separately, and the whole secured on a straight back-splint. Over the bandage cork pads were placed on the radial and ulnar arteries, being secured by an improvised tourniquet. The arteries were thus entirely secured. Oiled lint was applied to the palmar wound.

It was found difficult to keep these pads accurately adjusted. The skin, too, became tender and the hand swollen. The boy was unable to bear flexion at the elbow-joint, or pressure on the brachial artery.

On the 13th, six days after admission, a pad with sulphate of zinc lotion was applied to the wound. It had been found necessary to change the situation of the pads frequently, on account of pain, several morphia injections having been used. To-day, there was swelling, with redness in the axilla; and, on May 14th, an axillary abscess was opened. The parts where the pressure had been applied were very tender; the hand and fingers were swollen, and the latter were oedematous.

On May 15th, Mr. Sydney Jones decided to tie the brachial artery. This he accordingly accomplished, under the influence of ether, at the junction of the middle and lower thirds. The artery was small; but pressure completely controlled pulsation in the aneurism and in the radial and ulnar vessels. Carbolic catgut was used, the ends being

cut close, and the edges of the wound were brought together by wire sutures and covered with oiled lint. The limb was secured on a splint and covered with cotton-wool. The brachial wound did not heal by first intention. It was found desirable in a few days, on account of its unhealthy appearance, to apply lint with chloride of soda lotion.

May 21st. Pulsation, at first slight, and after a few days stronger, appeared in the radial and ulnar arteries. No pulsation recurred in the palmar aneurism after ligature of the brachial; the hand and fingers rapidly improved, and the wound in the palm healed.

May 28th. The brachial wound appeared healthy, and was filling up.

June 7th. The wound of the palm had healed; no return of pulsation occurred; the axillary abscess had healed; the brachial wound was nearly healed.

June 18th. All the wounds were healed. The patient left the hospital in a few days with the hand perfect and the movements of the tendons complete.

RIGHT POPLITEAL ANEURISM: ARREST OF PULSATION BY APPLICATION OF ESMARCH'S BANDAGE: RECURRENCE OF PULSATION: SECOND APPLICATION: CURE.

(Under the care of Mr. SYDNEY JONES.)

For the following report we are indebted to Mr. L. MAYBURY.

James Maw, aged 31, dairyman, formerly a carpenter, was admitted into St. Thomas's Hospital on June 20th, 1877. He had previously been under the care of Dr. Biddle of Kingston. He stated that he was quite well until two months ago, when he felt some stiffness at the back of his right knee. An examination of the ham disclosed a round soft swelling about the size of a walnut, which retained nearly the same size for about a month. Three weeks before admission, he was laid up with "acute rheumatism"; his illness lasted ten days; both knees and ankles became painful and swollen. At the same time, the tumour in the ham grew larger, and was diagnosed by Dr. Biddle as popliteal aneurism.

On admission, there was a soft elastic swelling in the right ham, about the size of a cricket-ball, with expansive pulsation in all directions, the pulsation being readily controlled by pressure on the femoral, and the size of the swelling materially diminished by that pressure. The aneurism did not seem to contain much clot, and some parts of its walls appeared very thin and pouched. There was no swelling of the leg, and but little inconvenience, and that mechanical, was experienced from the presence of the aneurism.

The right knee measured fifteen inches, the left thirteen inches and a half in circumference.

June 22nd. The patient having been kept quiet since admission, Mr. Sydney Jones determined on the use of Esmarch's bandage. At 9.50 A.M., this was applied, with moderately firm pressure, from the toes upwards to the lower limit of the aneurism; the aneurism was avoided and only lightly covered with cotton-wool. The elastic bandage was carried upwards above the aneurism to within a few inches of Poupert's ligament, where it was secured by a safety pin; the elastic tube not being employed. Some cotton-wool was placed over the toes, and the limb was raised and supported on pillows. After application of the bandage, all pulsation in the aneurism ceased. The patient complained of numbness in his toes and leg. The application of the elastic bandage was completed at 9.55 A.M., and it was kept on until 11 A.M. During this time, he complained of much aching and numbness of the limb; he sweated much; the pulse varied from 68 to 84; the respirations from 24 to 32; the temperature in the axilla remained about normal; at the end of half an hour, a subcutaneous injection of one-third of a grain of morphia was used; towards the end, he suffered much pain and grew very restless. Before the elastic bandage was removed, a tourniquet was applied over the femoral artery in the groin, and, after the removal of the bandage, a second tourniquet was placed lower down, so that alternating pressure was kept up continuously until 1.15 P.M. (three hours and twenty minutes from the first application of the Esmarch bandage). At 1.15 P.M., pressure being relaxed, pulsation was still felt in the aneurism. Pressure to be continued. At 3.30 P.M., pulsation was felt in the tumour by Mr. Sydney Jones. The tumour, however, was much firmer and pulsed less. Digital pressure was directed to be used instead of that with the tourniquet. This was carried on by relays of dressers, each dresser compressing for ten minutes. At 7.45 P.M., the patient was seen by Mr. S. Jones. The sac was firm, and no pulsation detected, *i.e.*, nine hours and fifty minutes after the commencement of the treatment. It was thought advisable to continue digital pressure for a short time longer, the patient suffering but little inconvenience from it. It was kept up until 11 P.M., when Mr. Sydney Jones again saw him. There was no pulsation in the sac; collateral circulation might be felt on the