

the enema had been evacuated by pressing on the lower part of the colon. It did not seem to exert any influence on the disease further than to prevent the occurrence of the convulsive shocks. The same results followed the use of chloroform on the next day.

7th.—The muscles of the face and jaws were now affected, the utterance of words difficult, although they were quite appropriate.

8th.—Breathing was still more oppressed, and rather noisy. Towards the evening a state of coma set in, and he died early in the morning of the 9th day.

The body was examined 24 hours after death. The vessels of the brain and the substance of the brain were loaded with blood, the lateral ventricles contained a small quantity of serum, as did also the pia mater at the base of the brain.

The vessels of the spinal canal were loaded with blood, the cellular tissue between the dura mater and the walls of the spine was of a deep red. A large quantity of serum escaped from the canal, it was slightly turbid. In the lower part of the dorsal region the arachnoid membrane was somewhat thickened and opaque; between it and the pia mater gelatinous exudation existed, which extended up as high as the medulla oblongata, but its consistence was much less marked above the 6th dorsal vertebra than below. The pia mater was deeply injected throughout, but this state was more marked below than above the 6th dorsal vertebra.

The cord was more vascular than usual, but no other change could be observed, although it was carefully examined. The vertebræ were quite healthy.

(To be continued.)

ARTICLE IV.—*On the Peculiarities of Dentition in Man, and its Influence on Infantile Mortality.* By J. SMITH, M.D., Dentist, Edinburgh.

THIS is a subject in which, notwithstanding the researches of previous enquirers, much room still remains for investigation, and regarding which, both as to its nature and consequences, the most vague and contradictory ideas are entertained—some of them, like most other errors once established in medicine, being apparently as difficult to remove, as they are certain to exert an injurious tendency in their practical application.

Dentition, in the most common acceptation of the word, appears to be too frequently confined to that period at which the temporary teeth make their appearance above the gum; and in this restricted sense of the term, we have constant reference made to a number of affections occurring during infancy, and attributed to the morbid influence of, exclusively, the eruptive stage of this process, under the various names of teething, cutting the teeth, etc. etc., all having regard to the penetration of the tissue enclosing the tooth—as if this were effected, not according to a vital process, but by mechanical force—while the other stages, exhibiting less obvious phenomena, are never taken into account at all. It is of importance, in the consideration of this subject, to bear in mind that the process of dentition, being in all its stages a natural one, regulated by relatively the same physiological laws as other healthy actions, ought to proceed without constitutional disturbance; that it does so in all animals, so far as

we know, with the exception of man; and that, in his case, when disturbance does take place, it is to be regarded as arising from some peculiar abnormal condition of the parts concerned in, and not all as an inherent effect of the process itself.

The structures concerned in dentition are originally adapted for its occurrence, and it is inconsistent with what we know to be the case in analogous instances of development, that any of the steps essentially necessary in the process, such as the penetration of the gum, should occasion a great amount of distress. But an important source of error, and one calculated to lead to much misapprehension on this subject, exists in the fact, that from the greater susceptibility at this age to impressions of any kind, sometimes to those of a very slight nature, considerable constitutional disturbance, altogether apart from this cause, is of very common occurrence; and, although certainly not in every case due to this process, yet the eruptive stage of dentition offering something like a plausible explanation of suffering, an unfavourable impression generally prevails regarding it, and affections are imputed to its agency, which might, in many cases, be traced to an entirely different origin. However, attention being arrested by what appears to be so evident a cause of uneasiness, all treatment is at once turned in that direction, and the true cause of the disorder probably overlooked.

The opinions entertained of dentition being the source of such serious results as are generally ascribed to it, appear in a great measure owing to this unfavourable prejudice existing in the minds of medical men; and while the works of the more early authors on this subject, contain statements involving such misconception and inaccuracy, as to render their confutation unnecessary, we find, at the present day, that the same inclination towards exaggerated ideas of the pernicious tendency of this process, prevails to a very considerable degree.

As an illustration of what we here state in reference to this question, we find in the "Gazette des Hôpitaux," for March 3, 1855, the following remarks: "One sixth of all infants born perish annually at the period of dentition. Already, in 1781, the Royal Society of Medicine, struck by this alarming proportion, offered a prize for the best essay on the following subject, 'What are the best means to be employed for the prevention of the accidents of dentition, common to infants at the breast, and for their successful treatment when they occur?' The question, hitherto ill-studied, has not as yet been solved, for, as the mortality tables substantiate, *the proportion of infants lost by dentition, is exactly the same at the present day as it was in 1781.*"

Not to mention the fact of the rate of infantile mortality having diminished in every way since 1781, it need only be remarked with regard to the assertion that "one-sixth of infants born perish annually at the period of dentition," that, according to the latest statistics, the total number of deaths from all causes whatever,

occurring between the third and twenty-fourth months, allowing this period to embrace that of more active dentition, does not amount, annually, to one-seventh of the number born. Thus, in the last volume of the Registrar-General's Reports, the deaths in England for 1849, between the ages of 3 and 24 months inclusive, amounted to 40,847, while the number born was 295,158, making the number of deaths less than one-seventh. Dentition, taking place as it does, generally speaking, about the same time in all children, we should find, were its concomitant disorders of so fatal a character, that the infantile mortality at the period of its occurrence, if not relatively increased, would, at all events, not be materially diminished. Instead of that, however, we find, with this cause of disease superadded to those previously existing, that about this very time the mortality commences, and continues afterwards, to be to a considerable extent smaller than before. From the 4th to the 14th month, allowing for extreme cases, has been stated as the period during which the teeth commence to make their appearance. According to Fox, the average date of their eruption is the 6th, 7th, or 8th month of infant life; Hunter, the 7th, 8th, or 9th; Blake, the 6th, 7th, or 8th; and Bell the 5th, 6th, 7th, or 8th. Allowing, then, the eruption of the temporary teeth to commence during the 6th, 7th, or 8th months, we shall find, by calculating according to the data afforded by different tables of mortality for the first periods of infant life, given in "M. Quetelet's Treatise on Man," that the following ratios are obtained:—

Of 100,000 born, there remain alive at the end of the

1st month,	90,396,	or	9604	die during	1st month.
2d	87,936,	„	2460	„	2d
3d	86,175,	„	1761	„	3d
4th	84,720,	„	1455	„	4th
5th	83,571,	„	1149	„	5th
6th	82,526,	„	1045	„	6th
12th	77,528,	„	4998	„	before 12th

Thus, of 83,571 alive at the 5th month, 1045, or nearly $\frac{1}{80}$, die during the sixth month; while of 82,526 alive at the sixth month, there die before one year 4998, or only $\frac{5}{80}$ in the next *six* months.

The following ratio is given, according to the data afforded by another table of M. Quetelet:—

0 to 1 month	20,542	deaths.
1 ... 2	5,233	...
2 ... 3	3,748	...
3 ... 4	3,090	...
4 ... 5	2,467	...
5 ... 6	2,213	...
6 ... 8	3,525	...

The deaths here, during the 7th and 8th months, being 1155 less than during the 5th and 6th.

In the Registrar General's Returns for England, we find abstracts

occasionally given of the comparative mortality at different ages in different years. Taking that for the years 1839-44 inclusive, p. 214 of vol. for 1847-48, as an average example, the annexed table will be found to give the ratio as exhibited there:—

Deaths.			
Years.	Months.		
	3d to 6th.	6th to 9th.	9th to 12th.
1839	8165	6800	6172
1840	8328	7081	6320
1841	8008	6341	5573
1842	8279	6814	6141
1843	8259	6786	6123
1844	8400	6831	5927

The steady decrease in mortality exhibited by this table confirms what has been already advanced.

In the last published volume, namely for 1849, we likewise find the following table, as exhibiting the rate of mortality at different ages:—

	Total Births.	Total Deaths.	Months.			Total under one year.	One year.
			0	3	6		
England,	295,158	221,801	26,551	9,835	15,031	51,417	15,081
London,	37,168	34,167	2,936	1,365	2,366	6,667	2,981

Here we find 9,835 dying between the third and end of the sixth month, and only 15,031 between the sixth and end of the twelfth, or 4,639 less than if it continued at the same ratio as from the third to the end of the sixth, as the mortality would at that rate amount to 19,670 instead of 15,031.

While these statistics indicate so plainly the decrease of mortality during the eruption of the temporary teeth, there even appears to be a somewhat analogous circumstance connected with the evolution of the permanent set; for about the sixth year we find the degree of mortality became again suddenly reduced, and remaining extremely small until the age of puberty.—(Quetelet.) Whether or not the decrease in the rate of mortality depends upon, or is connected with, the conditions existing at the eruptive stage of dentition, may be difficult to determine, but the tables above quoted clearly demon-

strate, that as the period for the evolution of the teeth advances, the degree of mortality is checked, and appear to afford abundant evidence that the influence of this process is inconsiderable in the production of fatal effects. There seems to be little chance of fallacy in statistics of so general an application to their subject as these are, since the process of dentition is one which of necessity takes place, and does so within a limited period of time, so that were its effects of the unfavourable character generally represented, they could scarcely avoid displaying themselves in a more obvious manner.

While these remarks are advanced as illustrative of the misconception prevailing in reference to the danger resulting from dentition, it is not meant to dispute the fact that important symptoms may exhibit themselves in connection with this process as it occurs in man, but rather to point out that too great anxiety exists with regard to it as a necessary, an unavoidable cause of suffering; an opinion, if not arising from, at least increased by the obscurity and uncertainty involving the whole process, and extending to those principles upon which its treatment requires to be based.

It is in man alone, with the exception of a very few problematical cases, said to have occurred among the lower animals, that dentition is attended by those morbid symptoms manifested previous to and during the appearance of the temporary teeth; and the probability is, that in man alone do they ever occur, since an explanation of them is to be found in causes which exist in no other animal. In considering the nature of the symptoms attending laborious dentition, we must look principally to the organic condition of those textures implicated in the action going on; recollecting that the teeth during their development and rapid growth, while acting in one sense as foreign and partly inorganic bodies within the gum, are endowed with a very high degree of vascularity and sensation, so that whatever pressure they may exert on contiguous parts, re-acts upon themselves with still severer effect, that again being aggravated in its consequences by the condition of the whole nervous system at this period of life. Whatever complications may arise as secondary consequences of dentition, pain seems to be its most frequent as well as its most simple accompaniment, and it is to the immediate causes of this condition, as mainly productive in its results, of those maladies observed to be more common about this age, that attention has been so often directed. Locally, the inconvenience seldom exceeds mere irritation; that, however, sometimes increasing to a considerable extent; and although almost universally asserted, it seems not to be satisfactorily established, that this arises from the cutting or penetration of the teeth through the superincumbent tissues, but from other circumstances special to man alone.

That the passage of a tooth above the gums, constitutes the principal cause of the disorders attending dentition, is a theory which, however questionable as to its accuracy, is yet borne out by the statements of our highest authorities on the subject. Mr Hunter

remarks at p. 80 of his "Treatise on the Teeth",—"These twenty teeth, in cutting the gum give pain and produce many other symptoms which often prove fatal to children." And again, at p. 113, "While the operation of growth is going on, another operation is produced, which is a decay of that part of the gum and socket which covers the tooth, and which becomes the cause of the very disagreeable and even dangerous symptoms which attend this process. As the teeth advance in size they are in the same proportion pressing against the sockets or gums, from whence inflammation and ulceration are produced." Mr Fox, speaking of the same subject, at p. 73 of his work, says,—“The excitement occasioned by the passage of the tooth through the gums, often gives rise to the most alarming constitutional symptoms, which are always, with difficulty, alleviated and not unfrequently terminate in death.” Mr Tomes, one of the latest authorities on this question, seems inclined to maintain the same opinion, and states at p. 128 of his work on "Dental Physiology and Surgery," that "Pressure, produced by the growing tooth upon the inflamed gum, and indirectly upon the formative pulp, are justly considered as the more immediate cause of these symptoms." Then, alluding to induration of the gum as another cause of them, a number of cases are cited in support of this opinion, where, after incising the gums the morbid symptoms disappeared, while the most serious results are adduced as the consequences of neglecting this operation. All of these authors, and many others advocating the same opinion—that the disorders accompanying dentition are produced by the pressure exercised by the teeth in a direction perpendicular to the socket at the time of their eruption from within the maxillae.

With regard to the teeth forcing a passage through the gums, being considered as a cause of so much suffering, it must appear remarkable, first, that this process should occasion so much more distress in man than is met with under the same circumstances in the lower animals; and secondly, that it is about the time of the appearance of those very teeth best calculated by their form, for making a way through the jaws and gums—namely, the incisors and canines—that the greatest amount of distress is experienced. Both instances are remarkable, and both admit of explanation in a similar manner, by the want of sufficient *lateral* space for the accommodation of the teeth within the jaw. When compared with those of the lower animals, much less space exists in the human maxillae for the accommodation of their proper complement of teeth; for, it must be recollected, that man stands alone as an exception to the rest of the animal kingdom, having a similar arrangement of teeth, in having no space vacant in the dental arch, not even for the reception of the canine tooth of the opposing jaw—and when we reflect, that in the nearest approximation among the lower animals to the closely packed teeth of man, there still exists an empty space adjoining the canine teeth, of at least nearly their own breadth, it must be obvious that all lateral pressure on these organs both before and after their eruption,

must be considerably diminished. But not only is there no vacant space in the human jaw, but there would not even be room sufficient for containing the teeth already present, were it not for the protracted duration of the rudimentary saccular condition in the canines, which persists after the ossification of the crown in all the other teeth. It must be recollected that the arrangement of the temporary teeth within the jaw, previous to their evolution, is not as in the permanent set, irregular and adapted to the accommodation existing for their lodgment, but in a regular arch, each tooth occupying its future relative position to the others, and all very nearly on a level at the crowns. In this position we find ossification commencing in all the temporary teeth, with the exception of the canines; as, for some time subsequently to this, the space between the lateral incisor and first molar being inadequate for the reception of the tooth destined to be placed there, ossification does not commence in it till a late period, and even then, in many cases, the space has become barely, if sufficiently large, for its accommodation.

The removal, upon the teeth being cut, of all symptoms of irritation, is, with much less probability, due to the process of perforation of the gums being completed, than simply to the dislodgment, so far, of the unyielding, enamel-coated wedges, constituted by these teeth, from being impacted between those still remaining within the jaw—only the root, or small end of the wedge of the teeth cut, now occupying its former situation. For, the tooth, having once perforated the gum, protrudes beyond it with great rapidity; and this does not arise from enlargement of the tooth itself, by the growth and elongation of its fang, but from its being actually lifted out of its socket by the contraction of the sac at its coronal portion; since the inner surface of the sac is attached to the fang, as far as that point where the enamel commences, and there becomes detached, forming in a manner a loose covering to the crown; so that, when this part of the sac is opened by the tooth, its cut edge having a fixed point by its attachment at its free extremity to the gum, and adhering as it does to the root by its deeper margin, the contraction of the portion of the sac, intermediate between these two points, dislodges the tooth from its socket, leaving a vacant space between the bottom of the alveolar cavity and the extremity of the root. In the case of the canine teeth, deficient amount of lateral space is still more obviously manifest; as here a positive increase in the size of the jaw must of necessity take place before they can possibly be accommodated. And at least, in this instance, when the canines commence to be ossified, while also rising from the alveolus, the probability of lateral pressure seems quite sufficient to account for the more urgent symptoms frequently accompanying the eruption of these teeth, without taking the penetration of the alveoli and gums into consideration at all.

Lateral pressure, from the arrangement of the temporary teeth within the jaw previous to their eruption, seems then a sufficient and reasonable explanation of the peculiar and exceptional symp-

toms attending the first dentition in man, and one which can be better supported by analogy than that attributing the disorders accompanying the appearance of the teeth to the mere piercing of the tissue enclosing them. This step in the process takes place in all animals, and they do not seem to suffer by it; and in the eruption of the permanent teeth in man, such difficulty is seldom if ever heard of. But while there would appear to exist in both these examples the same likelihood of disturbance from cutting the gum as there is during the first dentition, in neither of them have we the state of matters existing previous to and during this process to account for such symptoms, were they even to occur, since it is during the development of the first set of teeth alone that we have them arranged side by side in a regular linear series, and forming an arc so large, as with difficulty to be accommodated within the alveolar space, in contradistinction—1st, to the permanent set, where we find them scattered up and down, wherever there is room in the maxillæ for their accommodation, and which have as many years allowed for their eruption as there are months to the first set; and 2d, in contradistinction to what is found in the lower animals, where there is more than sufficient lateral space in the maxillæ for the number of teeth with which they are destined to be furnished.

Although the treatment of such cases might not be very different, whether based upon the principles we have advanced, or upon those we have objected to, still its mode of action would be viewed in a very different light in either case; for, in the familiar instance of cutting the gums of children at this period, allowing our theory to be correct, even if that operation did assist in opening a passage for a tooth through the gum, it would not necessarily afford the expected relief unless the tooth immediately made its way through the opening thus provided for it. When the gum, from induration or other causes, evidently opposes the egress of a tooth after it has completely passed the alveolus, an incision, dividing the bridle constituting such an obstacle, will be followed by the immediate appearance of the tooth, and the relief of those symptoms which may have at that particular period manifested themselves. Such cases occasionally present themselves, and are amenable to such a method of treatment; but, as is frequently done, an incision made in the gums, with the view of facilitating the cutting of a tooth which has not yet risen from the alveolus, cannot be expected to fulfil its purpose.

Cases are recorded where the gums have been again and again cut with this view, and the operation, although perhaps beneficial in other respects, yet unsuccessful for weeks in the anticipated result of the tooth's appearance. In reference to this matter, Mr Hunter states, at p. 121 of his treatise, "As far as my experience has taught me, to cut the gum down to the teeth, appears the only method of cure. It acts, either by taking off the tension upon the gum arising

from the growth of the tooth, or by preventing the ulceration which must otherwise take place.

“It often happens, particularly when the operation is performed early in the disease, that the gum will re-unite over the tooth; in this case the same symptoms will be produced, and they must be relieved by the same method.

“I have performed the operation above ten times upon the same teeth where the disease had recurred so often, and every time with the absolute removal of the symptoms.” Here then, it is evident, that the scarification did not act by assisting the tooth in its efforts to make a way through the gum—nor by relieving the gum from the pressure of the tooth—as in either way the tooth would have been so far advanced before it could produce such symptoms, as to appear through the gums immediately upon their being cut; but the true rationale of the advantage derived from this practice, lay in the scarification acting as a local depletive, or as a means of counter irritation, and as such it would still be indicated for the alleviation of these symptoms, until they were removed by the exit of some of the teeth, or an increase in the size of the jaw. On such principles it would be equally efficacious in relieving the vessels, to make an incision, not upon the alveolar ridge, but somewhat laterally; and in doing so, there would be less risk of injuring the sacs of the advancing teeth—an occurrence which, although considered by some as of little importance, cannot but exercise an injurious influence. And only in those cases where either the local appearances positively indicate incisions in that particular situation, or where the tooth is elevating and stretching the mucous membrane, would it at all be preferable to cut down upon the crown of the enclosed tooth. At all events, whatever benefits might result from any method of treatment, they cannot be justifiably attributed to the fact of its having rendered the penetration of the gums or alveoli more easy for the tooth to effect, but merely as affording relief, in the meantime, to irritation temporarily present, and in expectation of an extra amount of space being shortly gained within the jaw by the evolution of some of the teeth in their natural order, and the accompanying increase of the maxillæ in size.

ARTICLE V.—*Case of Fatal Injury to the Orbit with a Walking-stick.* By PATRICK JAMIESON, Surgeon, Peterhead.

I WAS called, in great haste, on the morning of Tuesday, February 13, 1855, at half-past ten o'clock, to see James Grant, a tinsmith, who had met with a severe accident. I found him sitting in a chair, his head reclining on the shoulder of a bystander. He was very pale, faint, and exhausted; had been retching; right eyelids much swollen, tense, protruding, and discoloured, but without any abrasion of cuticle, or other external mark of injury, with the exception of a