

in the desired change, then it will be well to esteem that general medication is indicated. First we set about correcting any functional disturbances that may be present, and follow such correction with tonics. Muriated tincture of iron is an admirable medicine, where the system seems to require building up; quinine, in the majority of cases, is to be given in addition, with happy effect.

R.—Tincturæ ferri chloridi, ℥iij;
Quinæ sulphatis, gr. x. M.

S. To be taken in from three- to ten-drop doses, according to age, three times a day.

Where treatment as just suggested, fails, alterative medicaments of the various classes are used,—alum-water, tincture of iodine, weak dilutions of creasote, acid nitrate of mercury, chloride of zinc, solutions of lead, etc. Constitutional vices are to receive a proper share of attention. It is to be assumed that in children affected with chronic angina the cause is always found to exist in such direction. Scrofula is by far the most common of these vices. A scrofulous child is liable to almost any description of physical degeneration. Now, scrofulous degeneration is rather a difficult thing to describe, the conditions being so diversified and varied. A child descended from consumptive parents is degenerate,—it is not amiss to say, is scrofulous. A scrofulous child has not necessarily always a special distinctive type as in general signification is hereafter described. Such a one, for example, may have white, delicate skin, tumid abdomen, non-compact pouting lip, and a languid, listless gait. It may have every belonging of the most marked lymphatic temperament; or, on the other hand, a scrofulous patient may look as if possessed of all the characteristics of a vigorous constitution. One does not know what better to do, in cases of this kind, than make a general observation of antecedent and present conditions and treat accordingly. Syphilis, it has been inferred by some writers, lies closely, or it may be in the distance, as the root of such conditions; but if this should be the case, a treatment anti-syphilitic is not necessarily implied. That peculiar vice may have lost itself in a general degenerative condition, just as an injury, which has of itself gotten well, may yet be the cause of broken health and physical adversity,—just, indeed, as phthisis may succeed syphilis, long since inferred to have been cured. In all such cases we can only hope, in the correction of ill conditions recognized as existing, to find the good required. We may philosophize and reason, but if nothing functionally wrong be perceived, we must have recourse to a somewhat empirical treatment, building, as we say, the patient up. In other words, there are no specific means of cure; therefore we resort to such general tonics as experience has demonstrated to be useful. Cod-liver oil, cream, mixture of spermaceti and milk, preparations of iron, infusions or tinctures of the bitter barks, as the Peruvian, serpentaria, gentian, etc., are medicines to be employed in these cases.

2. **Irritative Fever.**—Fever from the irritation of teething is a direction of infantile trouble very frequently demanding the attention of the physician.

It may not be amiss, for the benefit of the student, to recall that by irritative fever is meant fever the result of something that produces overexcitement. This, it is true, would also be a definition of inflammatory fever, the two conditions being, as we understand, really one and the same, except in degree. Now, the irritative fever of dentition is, as a rule, a rapid fever,—that is, it appears and disappears quickly; the lancing of a gum causing it very frequently to vanish almost instantly; not always, however, for it can readily be understood that such a disturbance of functional conditions could be excited as to make a return to an equilibrium less probable than the production of some organic lesion.

All febrile conditions in children of a sthenic type are attended with much restlessness; but the fever of dentition is markedly so accompanied. Muscular excitability is a prominent association; sleep is broken; thirst is very great; appetite is impaired and irregular, the child taking the breast rather for the relief obtained from the moisture of the milk than from desire for food; the pulse is not infrequently driven to an incredible rapidity; the face is flushed and burning; the eyes are congested and protruded. Convulsions, and not infrequently death, mark the climax.

The disturbance effected in the system is found in proportion to the local irritation, and to the age, constitution, and general condition of the patient. The marked mobility existing in the nervous structure of infants renders the brain peculiarly susceptible; it is therefore a most common association to find the febrile infant flighty, perhaps entirely out of its head; while if febrile disturbance, consequent upon dentition, supervene when other diseases are in progress, such diseases will be commonly much intensified.

The diagnosis of dental irritative fever is not always easy, this simply because the fever is irritative, and not invariably inflammatory,—that is to say, the local disturbance is confined to the *vis vitæ*, and does not involve, to a perceptible extent, the local vascular system. We look into the mouth, but see no swelling of the gums, no evidences of inflammation; yet the trouble is there, and it may be that it is only by incision that the fever is to be controlled. Diagnosis must therefore necessarily not infrequently be of a differential character. To aid us in this, we not only consider the absence of other causes of irritation, but we have marked assistance in a knowledge of the varying periods of tooth eruption, and of the causes advancing or retarding such evolution.

Where dental evolution is inferred to be the cause of a febrile manifestation, and incisions do not seem to be demanded, we are to resort to ordinary general treatment. Lemonade, prepared with crushed ice, is a most grateful and refrigerating febrifuge; the neutral mixture, freshly made, by simply adding the carbonate or bicarbonate of potassa to lemon-juice, is another excellent medicine. This addition may be made to a full saturation. A refrigerating mixture, as follows, may be prescribed, and administered *pro re nata* in teaspoonful doses:

R.—Liquoris potassii citratis, ℥iij;
Potassii bromidi, ℥j;
Aque, ℥j.

Much relief is commonly given by sponging the skin when it is very hot, using water and alcohol, or water and cologne, or water and vinegar. Bathing the wrists in alcohol is another source of great comfort. Bromide of potassium is an admirable preparation to administer in febrile conditions. To children it may be given, dissolved in ice-cold water, in doses of two grains or more to the tablespoonful. Tartar emetic, added to these doses in the proportion of the fortieth of a grain to each, assists the quieting influence. Where the pulse is much excited, and an infant is of sthenic condition, tincture of veratrum viride may also be added, one drop to each dose; in the use of this last agent, however, the effect as its action on the circulation is concerned is to be watched with care. Emetics are highly valued by some. Cathartics may also be used to good purpose; sulphate or carbonate of magnesia being employed, as preferred.

When, in defiance of treatment, a fever of irritation continues, efforts are to be directed to effects that may be produced outside of the ordinary functional disturbances. The extension of inflammation by continuity, where, for example, severe and unyielding inflammation, resulting from dentition, exists, may produce pharyngitis, parotitis, bronchitis, pneumonitis, gastritis, or it may excite to take on morbid action the brain, the heart, the liver, or, indeed, any organ of the body. When such sequelæ occur, we are to treat the parts involved, as in any common inflammation, just, indeed, as we have been treating the unyielding fever, except that we feel the necessity to make such treatment more vigorous; it may be that under such circumstances we will find the local or general abstraction of blood an absolute necessity.

In these cases it is not to be forgotten, however, by the practitioner, that, conjoined with the original cause of inflammation, some other might exist; thus, a malarial influence may have been lying in abeyance, and needed but the depression, the result of the dental trouble, to allow of its asserting itself; or it may be that some half-corrected tendency to congestion is, by the excitation, entirely undone. Such associations are to be considered if treatment is to be successful. This excitation of morbid action is well demonstrated in the association, with dentition, of diarrhœa and the cutaneous eruptions; while the treatment, wherever the secondary irritation shall exhibit itself, is recognized to have a common character.

3. **Diarrhœa.**—The alimentary mucous membrane being continuous from the mouth to the anus, it will be at once recognized that a localized inflammation could render the whole tract irritable. It is thus that diarrhœa, or, indeed, more commonly all the symptoms of cholera infantum, associate with difficult tooth eruption, and it is thus that to cure a diarrhœa or an attack of cholera infantum we have so frequently only to cut down upon certain con-

finer teeth or a tooth. I am led, however, to infer that it is quite too common a practice, during the time of dentition, to ascribe to this process not only every diarrhœa, but the numberless other functional irregularities which happen to occur at the period. Diarrhœa, or this combined with vomiting, has many causes apart from the influences of tooth eruption.

The stomach of an infant may be likened to an enlarged portion of a common tube; not only this, but it is a vertical, or almost vertical, tube; hence a child overfed needs only to be inverted to have the milk run from the orifice of the tube.

Again, the mucous membrane of the intestines of an infant is tender and susceptible; excess of food, or food not easy of digestion, irritates this membrane, and, by the relationship of tissue, excites to action the middle coat of the tube, yielding discharge or diarrhœa. Crapulous diarrhœa may thus be somewhat continuous, for the reason that, unassisted, the contractions fail to relieve the canal of the source of offence, and thus their continued efforts keep up the continued discharges. Worms irritating the canal are the frequent cause of diarrhœa. In hot weather we generally have an increase in diarrhœa cases; and not only is the irritation thus induced not limited to the intestinal tract proper, but the liver as markedly sympathizes; hence the frequency in these months of cholera infantum, the excess of bile being thrown both ways. Enteritis, from follicular ulceration in typhoid conditions, may induce and keep up a diarrhœa in a child as it does in an adult. Tabes mesenterica is a cause of diarrhœa in the scrofulous infant. Syphilis may ulcerate and irritate the intestinal tract, just as we so frequently see such irritation in the mouth. These allusions are sufficient to remind us that diarrhœa is not a disease, but only a symptom, and that, whether occurring in the dentitional or any other period, it may have, as its provocative, a great variety of sources, or lesions. When a diarrhœa depends on a dental origin it is perhaps always a condition of vascular perversion, and is entirely direct in its nature; the erupting tooth or teeth inflame the mucous membrane of the mouth, and, by the continuity of tissue, the irritability extends itself over the intestinal portion of the structure. It is well to remember that in diarrhœa of this character there is much or little mucin, according to the state of the inflammation, and much casting off of epithelial scales; but there is, of course, nothing diagnostic in such phenomena, because of their not being peculiar to a particular form, or character, of inflammation. We are to look at the mouth and at the throat; if there be a local condition of irritation and inflammation, and if the vascular derangement extend as far as we can follow it, we have reasonable grounds for inferring that in the teeth resides the origin of the trouble, particularly if, having examined the system at large, we fail to discover other lesions. The author does not desire to be understood as asserting that it is only in this way we have dental diarrhœa, for he well knows there is another way, and that is through the second of the legs of Bichat's tripod. He very well knows that there is an influenced inner-

vation, and that, if the bowels of an infant be weaker than its lungs or its brain, such deranged innervation will there expand itself. He has seen the diarrhoea of such deranged innervation relieved almost instantly by an incision into a tooth-cyst, and yet there was no redness, no swelling, nor any other evidence of local excitability. These cases are, however, rare, and have their analogues in reflex spinal irritations. The diagnosis must necessarily be somewhat differential in character; yet, where a case is at all obscure and the circumstances urgent, it is commendable practice to make incisions over the positions of teeth whose periods of eruption correspond most nearly with the time of operation.

It is well, however, and indeed necessary, to remember that a mucous membrane may be inflamed, in varying localities, without having intermediate sanguineous disturbance. Thus a stomatitis and an enteritis might be present at the same moment; the one depending on local dental disturbance, the other upon a cause or causes of entirely dissimilar nature. Now, in a case of this kind, having associative diarrhoea, it will plainly enough be seen that any treatment directed to the stomatitis would not (except as a similarity in practice might pertain to both troubles) affect the enteritis. To recognize these cases, antecedent conditions are to be inquired into. Colds or atmospheric vicissitudes will, most frequently perhaps, be found explanatory of the disturbances. The cutaneous circulation, as a result of some injudicious exposure, has been depressed, perhaps, and thus the enteritis has been forced upon a part having the least ability to resist an inrolling wave. In some infants, restless and nervous in their natures, a predisposition to enteric irritation seems inborn; the slightest disturbance reacting in this way; it may not be that diarrhoea is the result, but the trouble exhibits itself in some evident way.

The milk of a nurse is occasionally the source of a diarrhoea. Infusoria and crystalline substances are found frequently, on examination, in such milk. Here a cure is to be obtained only by change of diet,—good cow's milk, diluted or pure, according to the age of the infant, being the best substitute. Other causes of diarrhoea, to be considered in connection with a supposed but doubtful dental source, are debility, hepatic derangements, interfering with the venous circulation, an increased peristaltic action through mental emotions, as anger or fright, a rheumatic or scrofulous diathesis, malarial influence, etc.

Diarrhoea from dental irritation, if inflammatory by continuity of relationship in the membrane, generally demands the lancet alone for its cure; the operator is to free the advancing tooth or teeth. If, however, on the removal of such cause, the effect does not subside, the invoked and persistent irritability is to be treated on such principles as commend themselves. Sweet oil and paregoric, administered internally, are oftentimes found to act very happily. To each teaspoonful of the oil add from five to twenty drops of the opiate, according to the age of the little patient. Heating applications to the abdomen are very useful; for example, a sinapism made as follows:

Flour, ℥ss;
Mustard, ℥j;
Ginger, ℥ij;
Black pepper, ℥ss.

Mix these together with a little vinegar, and retain against the skin until the part is well reddened. It is not at all necessary to blister the surface.

Another, and perhaps a more comfortable, mode of treatment, is to give small doses of Dover's powder, or, what is to be preferred, the liquor potassii citratis, in conjunction with minute doses of tartar emetic.

R.—Spiritus ætheris nitrosi, ℥ss;
Liquoris potassii citratis, ℥ij;
Antimonii et potassii tartratis, gr. ʒ. M.
Give in ten- to fifteen-drop doses each two hours.

This combination serves to direct the irritability to the surface, and, by a relief thus afforded the affected part, not infrequently yields a cure.

If the inflammation have anything of a sluggish or passive character, the spirit of Mindererus will act happily. Half-teaspoonful doses each two or three hours may be given.

Diarrhoea from dental irritation, not inflammatory in character, is to be treated in consideration of its nervous relation; and just here is the condition in which the bromide of potassium acts most satisfactorily. This salt may be given in five-grain doses, dissolved in water; or, if the practitioner do not like to commence, in the infant, with such a dose, he may try if less will answer his purpose, and increase pro re nata. Less than five grains, however, is not found to do much good, unless, indeed, the child be very young. Spirit of Mindererus, sweet spirit of nitre, and the camphorated tincture of opium also act satisfactorily in these cases. These may be given in such proportions as seem indicated. An ordinary prescription would be about as follows:

R.—Spiritus Mindereri, ℥ij;
Spiritus ætheris nitrosi, ℥ss;
Tincturæ opii camphoratae, ℥ij. M.
S. About twenty-five drops each two hours.

The following combination is a valuable one, when other sources of irritation, not perhaps thoroughly appreciated, exist in conjunction with the dental trouble:

R.—Hydrargyri chloridi mitis, gr. ij;
Pulveris opii,
Pulveris ipecacuanhæ, āā gr. j;
Magnesiæ carbonatis, gr. xij.

Divide into eight powders, and administer one after each operation, if profuse; otherwise, each two, three, or four hours, according to judgment.

4. **Spasms.**—To appreciate the cause and condition of spasms and convulsions in early childhood, whether influenced or not by the excitements of den-

tition, one has but to consider the restless mobility of the cerebro-spinal system at such age. If, at an early period of life, the gray matter of the spinal cord be examined, we are struck with its development when compared with the similar substance in the cerebral portion of the encephalic mass. To express ourselves differently, the ganglion of excito-motor or reflex action we find to be much in excess in its development, and not only so, but sensitive and susceptible, as its offices are concerned, to the last degree,—a result most likely of the necessity for the motion of growth and development existing in the members of a child; such a system may be compared to a tensely-strung instrument, responding to the slightest touch.

The difference between a regular and irregular motion is the difference between an ability or disability of the cerebellar gray matter to perform its functions of co-ordination; the difference between a co-ordinated and an irregular motion is the difference of spasm; and if we carry this to the disability of the cerebral mass to influence, it is the difference of convulsion.

Spasm, then, may be defined as irritation, direct or indirect, of the spinal cord or of its terminal outshoots, or nerves. This foundation-principle appreciated, a further consideration of the subject is not at all difficult. Very true it is, that there may be causes of disturbance not to be discovered; but the results, and the meaning of these, are not thereby rendered obscure: it is only the cure that is to be delayed or denied.

We are prepared, now, to recognize in what way dental evolution is a cause of spasm: it is precisely as it is a cause of diarrhoea, as it is a cause of fever; but the reflected irritation in the latter case expends itself on the muscular rather than on the mucous or vascular system. The cure, or the mode of cure, suggests itself: first, we are to remove the condition of irritation; second, if the parts do not quickly soothe and quiet themselves, we are to help. To meet a first indication we simply lance the gums. It is not thought that in these cases we are to be influenced entirely by local manifestations of congestion: we are to cut freely down upon teeth whose periods of eruption suggest them as being the source of offence. Take a pledget of cotton, and, saturating it with a solution of atropiæ sulphas, one grain to the ounce of water, thrust it, by means of some delicate instrument, into the cut you have made. This is quite equal, at least as such a case is concerned, to the more common subcutaneous injection, and tends to quiet the disturbed nerve filaments. Or the bromide of potassium, as before suggested, may be used; or, drying the gum with a napkin, the smallest possible quantity of the extract of belladonna may be rubbed over the part, or a point of nitrate of silver may be employed. If yet the spasms persist, some general effect on the nervous system at large is to be secured. Tinctures of valerian and gentian in equal parts, given in ten-drop doses, repeated pro re nata, will sometimes act most satisfactorily. If this should not answer, the bromide of potassium, internally, may be employed. Tincture of belladonna is, in the author's experience, one of the best remedies for spasm. The bromide of potassium, cantharides,

and camphor, as recommended by Dr. Chambers in epilepsy, constitute an admirable combination:

R.—Potassii bromidi, gr. iij;
Tincturæ cantharidis, gtt. iij;
Misturæ camphoræ, gtt. x. M.

Sig. Repeat this in a little water, p. r. n.

If, after proper trial of the above,—say a few hours,—the irritability fails to be subdued, the inference will be that our diagnosis has been a mistake, and that dentition has not been wholly, at least, in fault.

At this point we see the necessity of glancing at other causes of irritation which may exist. Many children incline to nervous disturbance from anæmia; this we know to be a quite common cause of such derangement. An anæmic condition might not of itself, in a special case, induce spasm, but assisted by conjunction with a second irritant, the two together could excite to the condition; and one removed, the other might yet very well resist a curative agent. A glance here shows us why the sedative has not effected a cure; let us add iron to our prescription, and a very few more days will give a different result. Perhaps the condition of a child is just the reverse; instead of being anæmic, it is plethoric. Give to this child repeated doses of some suitable saline mixture, and conjoin with bromide of potassium quarter-grain doses of calomel; or, if you do not wish thus to medicate, diet closely for a few days,—give nothing but the breast, and this only in the daytime; or, if the period be that of second dentition, deprive it of all but vegetable food, with water for drink; a cure will most likely follow such treatment. Lack of good, fresh, pure air; unwholesome food; deficient or improper clothing; sleeping with debilitated persons; the milk of the nurse; articles of food not easy of digestion; hepatic derangements; worms in the alimentary canal; influences passed from mother to infant; and numberless similar conditions, are exciting and predisposing causes of spasm and convulsions; all demand, in every case, their share of consideration, if we are to be successful in treatment.

Spasm resulting from the congestion of nerve centres, however induced, is not infrequently tonic in its character; the child may lose all consciousness; it passes into the state that we call convulsion. In these cases results must be obtained immediately; we must relieve the overburdened part. How? By derivation. Try first a hot foot-bath; let it be as hot as the skin will bear. Inclose the steam of the water so that it shall envelop all of the child but its head; compel the taking, if possible, of teaspoonful doses of the spiritus Mindereri. The steam, or the steam and mixture in conjunction, will soon compel profuse perspiration, and thus secure a double derivation. Such treatment will, most likely, relieve the congested part. If it should not answer the intention, then a vein may be opened, or leeches may be applied. The opening of a vein in such cases the author has had no occasion to resort to, but it is good practice, and is recommended by the best writers.

Hot pediluvia, and derivation by perspiration, will be found reliable. If, after consciousness is restored, the pulse continue rapid, with fulness, give one-drop doses of the tincture of veratrum viride, or relax the system generally by doses of tincture of lobelia or the syrup of ipecacuanha. Ten drops of either of these medicines, repeated as indicated, will very well answer the purpose. Keep the child now cool, and guard against every source of discomfort.

An instructive and suggestive case where epilepsy had its irritant in dental irritation is described in the *Medical Record* by Dr. Nathaniel Field. The paper states that a small boy, about five years of age, while apparently in good health, was suddenly attacked with an epileptic fit, from which he soon recovered. The parents were much surprised at the occurrence, and were unable to account for it. About two weeks afterward he had another strong convulsion, lasting several minutes: but it passed off without any constitutional disturbance. No cause for the attack was discovered by the relator or other practitioners. In a day or two the fits returned, and were repeated at short intervals for about ten days, during which time it is asserted that he must have had a thousand. Every resource in the power of Dr. Field was exhausted, and three eminent medical professors examined the child from the crown of his head to the soles of his feet, but no local irritation was discovered. After carefully watching the commencement of the paroxysms, Dr. F. observed that the muscles of the left side of the face invariably began to twitch on the recurrence of a fit. After a convulsion had passed off, and while the child was in a state of unconsciousness, he raised the upper lip, and found the corona of the second canine tooth, instead of having caused by a just relation the absorption of the root of the deciduous tooth, had passed behind it, and had forced it through the alveolus and gum into the lip. The gum was now slit vertically and the old tooth removed. In less than an hour the convulsions began to subside, and before the day was over they had entirely gone, and never again appeared.

Passive congestions are sometimes a cause of infantile spasms; these are not difficult to distinguish from the acute, or active, conditions, the languor and sluggishness markedly contrasting with the turgidity and fulness. Again, they are distinguished from the active state in their results, these being not immediate, but mediate. Passive congestions depend on some obstruction in the circulatory apparatus, and are, perhaps, more frequently associated with the chylopoietic than with any other system. Stagnations may also occur as a result of some interference with the respiratory office, or they may be the result of the action of some directly sedative poison. Wherever and however they exist, they are to be removed, if possible, by meeting and combating the cause, which, of course, is the philosophy of cure.

In cases of pure irritation, as Dr. George Wood happily puts it, besides removing the cause, it is proper to diminish the nervous susceptibility and to control the cerebral irritation by diffusing the excitement over the whole system. To meet the first indication, narcotics may be employed; and none

is more efficacious than opium, which, to diminish its stimulant influence, may be combined in some instances with ipecacuanha. Hyoscyamus, lactucarium, or conium may be substituted, if on any account thought preferable. But before resorting to these remedies, the practitioner must be very sure of his grounds. He must be quite convinced that it is nervous irritation, and not active congestion of the brain, that he has to encounter. The second indication, above alluded to, is to be fulfilled by antispasmodics, administered by the mouth, the rectum, or the skin, and by the use of tonics, of which the metallics are deemed most efficient. Of these the oxide of zinc has perhaps enjoyed most reputation, though the chalybeates should be preferred in anæmic cases. Should the digestion be impaired, and the system at large feeble, the simple bitters or quinia might be preferable to the metallic tonics. These remedies may often be combined in the same prescription. Thus, opium or hyoscyamus, asafetida, and either oxide of zinc, carbonate of iron, sulphate of quinia, or extract of gentian or quassia, may very properly go together. The cold or shower-bath, cautiously used, may also serve to strengthen the nervous system. Fresh air and nutritious diet of easy digestion are important. Any derangement in the hepatic secretions should be carefully observed, and treated with minute doses of calomel, blue pill, or mercury with chalk. When the disease depends on intestinal spasm, great advantage will often accrue from the use of laudanum, with asafetida or spirits of ammonia by the mouth, the injection of musk into the rectum, the application of a mustard cataplasm, or blister over the abdomen; and if, as often happens, the bowels are distended with flatus, from the introduction of a catheter into the colon, and drawing off the air by means of a syringe. Should the disappearance of an eruption have preceded the convulsions, efforts should be made to restore it by friction with croton oil or other active irritant. In urgent cases a blister might be produced, by means of a strong solution of ammonia, on the surface previously affected.

In frequently recurring convulsions, resisting other measures, and threatening life, the practitioner would be justified in resorting to the inhalation of chloroform, which will often quickly quiet the spasms, and, if reapplied with each return, may obviate the danger until the tendency is past. It has the advantage, moreover, over other narcotics, of not congesting the cerebral centres, though the danger of fatal prostration from its use must not be forgotten.*

Even when asphyxia or apparent death may have resulted from the convulsions, hope is not to be abandoned; but efforts made by artificial respiration to restore the functions of the lungs, and consequently that of the heart.

Finally, on this subject, attention is to be directed to the connection between the troubles we are considering and the predispositions of hereditary nature, so often found in association. When these deteriorative conditions exist, it is a necessity for success in treatment that they be considered and combated.

* It is found safer to combine with it a portion of sulphuric ether.

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