There is, however, another method by which this lesion may be possibly caused where fracture is not a necessary accompaniment, namely, rupture or tearing of the sinus without fracture or suture-separation, produced by certain decided changes in the form of the cranium resulting from heavy blows inflicted by some broad, flat instrument (Bergmann). I have no record of an example so produced, but the injury demands notice as standing in the category of possible factors.

From this character of injury experience shows that the transverse sinuses tear more frequently than the longitudinal, which is explicable not only on the ground of their anatomical location and connections, rendering them much more fixed and unyielding than the latter, but also in the fact that the cause resides, perhaps, in the direction of the rupturing forces, which commonly operate from above and behind. Thereby the cranium is compressed from above downwards, but expanded laterally,—an expansion which must cause great stretching of the transverse sinuses, and, as seen, a giving way, occasionally, of their walls.

On the other hand, rupture of the torcular Herophili is, of all the sinuses situated directly beneath the cranial walls, the most rarely met with. It should be noted, also, that in the analysis of the seven traumatic cases, six are characterized by the absence of external or integumentary wound, and in only one is the fracture open or compound. Hence this preponderance of subcutaneous or simple over compound fractures in association with this injury, must be mentioned as a point of special interest. It is necessary to remark, however, that investigation has shown that laceration of the sinus from cranial fracture with depressed bone-splinters, without simultaneous scalp wound, is comparatively rare. Nevertheless, in one of Stromeyer's cases it is important to refer to the fact that it was a child who had his right parietal bone depressed, from a blow the result of a fall, without cutaneous wound, furnishing another instance of injury of the sinus from a simple fracture.

(*To be concluded.*)

THE THERAPEUTIC ACTION OF THE OIL OF TURPENTINE IN THE MORE PAINFUL AFFECTIONS OF THE DIGESTIVE ORGANS OF INFANTS AND YOUNG CHILDREN.

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In the therapeutic management of the more painful and grave affections of the alimentary canal of infants, and in those of a harmless character attended with suffering, I have for some years past been testing the virtues of the oil of turpentine as a curative agent. The use of the turpentine in this class of affections has given me much satisfaction.

The diseases of the digestive organs of infants, we are all aware, are among the most intractable and fatal which come under our observation and treatment.

If by any agency these painful and destructive diseases, which cause so much suffering to these helpless little creatures, and anxiety to relations, can be relieved or mitigated, I believe the profession is entitled to a knowledge of it. While I appreciate the fact that the therapeutic properties and application of this well-known remedy to the treatment of certain adult affections are clearly comprehended by the profession, I am equally aware that its value as a remedial agent in a large class of diseases of the mucous surface of the alimentary canal of early life, is probably not understood. Who in our profession does not witness annual visitations, during every hot season, of those inflammatory affections, often epidemically, a large proportion of which prove fatal regardless of the use of opiates, astringents, alkalies, mercury, and bismuth? In my own experience the oil of turpentine often fills a place here which no other remedy does. The therapeutic action of the turpentine on the diseased mucous membrane of the intestinal canal is of a multiform character. It is eminently soothing to the irritated and inflamed membrane, and seems to promptly arrest that rapid exfoliation of epithelium which, during the inflammatory process, is progressing at an unusual rate of rapidity. If it be really true that this agent is capable of correcting this sloughing process in intestinal inflammation, it is an important point gained in the therapeusis of this class of diseases. I think that experience will fully sustain the opinion that the agent is really reparative in its action.

The action of turpentine on the tongue is doubtless largely typical of that on the mucous surface of the digestive organs. On the *dry*, *cracked*, *red*, *contracted* and imperfectly nourished tongue of fevers the direct effect of the agent is to increase and regulate the circulation of the organ, to reëstablish the secretions and restore nervous function, so that in place of the former condition the organ becomes moist and pliable, assuming its natural complexion and softness. We have reason to believe that in that numerous class of diseases of the digestive tube of an inflammatory character, accompanied with fever, the the condition of the tongue actually in part represents the state of the mucous membrane of the gastro-intestinal canal, and the action of the turpentine on the one indicates to a certain extent its remedial influence on the other. The oil of turpentine in common with the other essential properties and products of wood tar, is manifestly antifermentative, antiputrefactive, deodorant, and antiseptic. In this respect, apart from its peculiar powers in healing inflammation of mucous membrane, it becomes an important agent in correcting fermentative and putrefactive action in the contents of the intestinal canal, which plays so conspicuous a part in the causation of disease in infantile life. The action of turpentine on the circulation, and indeed on the process of blood formation, is positively of a restorative character. This peculiar therapeutic property is clearly demonstrated through the remarkable influence of the remedy in restoring the circulation in purpura

simplex and purpura hæmorrhagia, and in correcting the tendency to those affections. In both of these diseases there are certainly blood stasis and blood depreciation. This fact, which has been repeatedly demonstrated in the practice of myself and others, indicates the decided influence of the agent over certain abnormal irregularities of the capillary circulation, and at once directs our attention to its adaptability in relieving engorgements and healing inflammations of the mucous membranes. Its remarkable influence also in arresting hæmorrhage of the stomach and intestines constitutes another evidence of decided action in regulating the circulation of those membranes. Whether this hæmostatic power is due to some astringency or to some peculiar influence on the vital conditions of the blood, as in the case of purpura, is difficult to decide.

The action of the drug in these diseases of the mucous membranes is not confined to its influence over the capillary circulation, but extends to the organic system of nerves and the secretions. In other words, it exerts a positive influence on the vital operations of the epithelial cell itself. When the digestive juices of the salivary gland, the stomach, pancreas and intestines are imperfectly secreted, as they too often are, all food, instead of being digested, being exposed to a temperature of 100°, is at once subjected to the laws of chemistry and, undergoing rapid fermentation and putrefaction, gives rise to various deleterious products of an acrid and gaseous nature, which produce an endless train of morbid actions in the alimentary canal of the infant.

I am fully impressed with the belief that the oil of turpentine acts as a stimulant to the salivary, stomachic, pancreatic and intestinal secretions, and in this way becomes a promoter of the digestive operations. In that condition of the system indicated by a dry, red, glazed, or brown tongue, we may rest assured that the processes of digestion and assimilation are wellnigh suspended for the want of the appropriate secretions. If the turpentine can restore the secretions of the mouth and restore the tongue to its normal state, the digestive process has already received an important impetus. There is probably no stage of human existence more subject to those painful, protracted and deleterious sequences of indigestion from defective secretions of the digestive fluids, than that of infancy.

The dry, inflamed, and aphthous mouth of the infant suffering from chronic mucous disease, when all healthy secretion is in great part suspended, calls imperatively for the use of some agent which has the power to restore these absolutely necessary factors of digestion. The almost invariable improvement which follows the use of the turpentine in the digestion of infants suffering from intestinal and gastric affections, leads to the rational conclusion that it exerts a general influence in promoting the flow of the various juices concerned in the act of digestion. Under the use of this agent the process of digestion is certainly facilitated, becoming more easy, comfortable, and more free of pain, while the abnormal products arising from indigestion are decidedly diminished, if not entirely prevented.

Mention has been made of the antifermentative and antiputre active, as well as the antiseptic properties of turpentine. The presence of these properties is clearly indicated in its decided agency in preventing and arresting the evolution of offensive intestinal gases and tympanites. Probably in our study and treatment of the intestinal diseases of infants we have not heretofore attached sufficient importance to those septic influences arising from the acts of fermentation and putrefaction in the contents of the canal. In such cases we are too prone to trust alone to the agency of opiates, alkalies, and astringents. Fermentative action and its peculiar products in the contents of the digestive organs of the ill-fed, ill-nourished infant suffering from dyspepsia is the bane of infantile existence. These products consist of the various acrid and irritating animal and vegetable acids as the lactic, butyric, and acetic.

The gases evolved from fermentation and putrefaction are the carbonic acid, carburetted and sulphuretted hydrogen, and the ammoniacal. The hourly contact of these deleterious and poisonous agents with the imperfectly developed epithelial coats of the infantile digestive organs must prove destructive of its organization and cause erosion, with its extensive morbid consequences.

Following these general remarks on the use of the oil of turpentine in the intestinal affections of infancy, it is proper to state in detail the special diseases to which it is applicable.

Gastralgia.—All infants are liable to transient attacks of painful colic, arising from temporary distension from accumulation of gas in the stomach, or from the presence of acids. But artificially fed infants more particularly are occasionally subject to a violent, protracted and intensely painful form of gastralgia in which appetite and digestion are suspended, accompanied with rapid reduction of flesh and strength, sufficiently to endanger life. Vomiting may or may not be present. There may be slight diarrhœa or constipation. The affection is invariably attended with wasting of the tissues and suspension of development, anxious and contracted facies, but no fever except in advanced stages, when gastritis or duodenitis may be developed. Pain is the great and absorbing feature of the disease, which is a never-ending source of suffering to the little patient, and a source of perplexity to friends.

The disease may appear at a very early age. It does not appear to be associated with any organic lesion. It does not partake of the intermittent character of ordinary colic. But the pain is almost constant and unceasing, without relief from opiates. The abdominal walls are usually retracted. The shrill penetrating cry of these little sufferers may often be heard, to the dismay and distress of all, pervading the entire house, day and night, except when under the influence of opium. On one occasion a feeble, emaciated little infant was brought to my office suffering with this affection, for treatment. Such were the shrill and distressing screams of the little creature, the wasted and piteous expression, that all transient callers were compelled to leave the room. The mother was robust and apparently in a vigorous

state of health, and afforded an abundant supply of nourishment.

I think in this case the child was suffering from an aggravated form of acidulous dyspepsia, with simple irritation of the gastric and duodenal mucous membranes. In two or three months this wretched little sufferer, under the turpentine treatment, combined with a few simple anodyne and alkaline remedies, was converted into a rosy, fat, merry, healthy infant. I have found the following formula a useful remedy in this class of cases:

℞ Mucilag. acac. ..... fʒiss
Sodæ bicarb. ..... xgrs
Chloroformi ..... xgtt
Ol. terebinth. ..... ʒss M

Sig.—A teaspoonful every two or three hours to an infant of six months.

Intestinal Catarrh of Infancy.—Catarrhal inflammation of the lower ileum, cæcum, and colon, is well known to be one of the most frequent and fatal diseases of infants during our hot seasons. The inveterate dyspepsia of the artificially fed infant, subsisting on cow's milk, arrow root, and other farinaceous food during dentition, united with the depressing influence of heat, constitute the most fruitful source of intestinal catarrh. The enormous amount of lactic, butyric and acetic acids generated in the stomach and intestines of those dyspeptic infants subsisting on these particular articles of diet, act as corrosives and destructive agents on the delicate epithelium. Thus a constant process is going on in those cases of exfoliation of epithelium and erosion of the submucous coats of the large intestine. The succeeding steps are engorgement, inflammation, ulceration, and softening.

Only about one-fourth of the entire number of artificially fed infants digest cow's milk perfectly. The remainder either digest it indifferently, or not at all. They, the latter, must pass through the lactic acid stage, with its attendant dyspepsia, pain, discomfort, more or less protracted intestinal catarrh, with its peculiar type of low fever, which resembles in many respects, in a striking manner, typhoid fever. The mouth and tongue are dry, red, and aphthous. The skin is dry, parched, and shrivelled. The pulse is quick and the temperature high at night. The abdomen is usually distended and tender on pressure. The intestinal discharges are muco-sanguinous and often frequent. The emaciation is always great. This, which is in ordinary termed the chronic diarrhœa of infancy, with its attendant pain, low fever, and emaciation, is a scene so often witnessed that we are prone to take a superficial view of these cases without penetrating further into the true pathological principles involved. I believe that genuine typhoid is not a more perfect example of septic fever than the form under consideration. Not only the intestinal contents, while in a state of fermentation and putrefaction, afford septic material for absorption, but the débris of broken down and sloughing tissue from softening and ulceration, furnish also materials for infecting the blood, and the production of true septicæmia. Hence in these cases we have to deal with a disease far more complicated than a simple diarrhœa. We have here an example of a local lesion and septic fever united.

The excess of lactic acid is also responsible for the presence in these cases of that inveterate form of intertrigo, which aids in impairing the general health. The acid here acts as a destructive agent on the delicate cuticle, leaving the cutis exposed and inflamed. In other words, the cuticle is destroyed by contact with the corrosive acids in identically the same manner that the epithelial coat of the intestine is from the same causes.

Infantile life is the acid stage of human existence, as old age constitutes the alkaline period. In infancy we are called upon to contend with the effects of acid development and action, while in old age the enemy that besets its course is of an alkaline character, in the form of ammonia. To repair the damages resulting from catarrhal inflammation of the intestines, restore lost epithelium, reëstablish suspended secretion, heal erosion of mucous membrane, the turpentine performs a good part.

Dysentery of Infancy.—In the primary stages of acute dysentery, when the symptoms are violent and accompanied with much fever, tenesmus and pain, the acute features may be much modified by the use of minute doses of mercury (mild chloride), ipecac, and bicarbonate of soda, followed by the tartrate of soda and potash in sufficient quantity to clear the intestinal tract effectually. This procedure relieves the intense engorgement of the mucous membrane of the large intestines promptly before disorganization begins, and diminishes inflammatory action, and improves the state of the secretions. The powers of digestion and the febrile conditions are also benefited by the proceeding. The following formula may then be resorted to with infinite benefit:

℞ Mucilag. acac. ..... fʒi
Ol. terebinth. ..... fʒss
Ol. resini. ..... fʒss
Aq. menth. pip. ..... fʒiij M

Sig.—A teaspoonful to a child of six months every 3 hours.

In connection with this treatment, anodyne enemata, composed of tinct. opium and mucilage, should be resorted to, to allay pain and procure sleep. In the advanced stages of this affection, when the fever assumes a depressed type, the general system begins to suffer seriously from emaciation and constant fever, when the tongue becomes red and dry, indicating great general prostration and a tendency to disorganization of the mucous membrane involved in the inflammation, in my experience the turpentine is among the best agents for arresting this state of affairs, and turning the tide in the direction of health and of reëstablishing a reparative process.

In some cases in the stages of disorganization I have combined the oil of turpentine with the oil of yellow sandal-wood with positive benefit. It may be found also advantageous to combine the turpentine with other agents of an anodyne, alkaline, astringent or antiseptic character.

The local anæsthetic or anodyne influence of the oil of turpentine on the gastro-intestinal mucous membrane is very considerable, which adds greatly

to its value as a remedial agent in the treatment of this class of affections.

Enteritis of Infancy.—While simple, uncomplicated enteritis is not a frequent disease of infancy, yet it occurs occasionally, and is always of serious import at this tender age. Enteritis is manifested by the presence of slight fever, moderate diarrhœa, prostration, and paroxysms of violent spasmodic, nauseating and depressing pains in the abdomen, occurring particularly one or two hours after taking nourishment. During these attacks the pulse becomes frequent and feeble, the surface and extremities cold and often livid. Relief only comes after the passage of the contents of the intestines through the diseased duodenum, jejunum and ileum. The severe paroxysms of pain do not occur usually until the contents of the stomach have escaped from the organ into the small intestines.

Enteritis is invariably accompanied with loss of appetite and impaired digestion. Nausea and vomiting in a more or less degree are usually present. Consequently the tendency to emaciation and reduction of strength are marked. In the treatment of this affection I have found the following formula more useful than any other:

℞	Mucilag. acac.	f℥i
	Aq. menth. pip.	℥ss
	Ol. terebinth	gttxii
	Tinct. belladon.	gttx
	Aq. calcis.	f℥iss
	Tinct. opii. deod.	gttx M

Sig.—A teaspoonful for an infant one year old every three or four hours.

As an adjuvant to the turpentine treatment in the painful affections of the intestines and stomach of infants, the belladonna has given me much satisfaction, and more particularly when the discharges are frequent.

Unclassified Painful Functional Affections of the Stomach and Intestines of Infants.—Infants which subsist on cow's milk and vegetable food principally, are liable to frequent attacks of pain and discomfort from irritations of the alimentary canal arising from imperfect, slow and tedious digestion, which may interfere seriously with the health and growth of the subject. These attacks may be purely of a functional character, or partake of a mild catarrhal nature, with slight fever. The intestinal discharges in these cases usually present an unhealthy appearance and are often extremely offensive, indicating a state of fermentation and putrefaction. The stimulant and carminative virtues of the turpentine, united with its antiseptic and anodyne properties, render the remedy peculiarly appropriate to this class of cases, particularly when combined with lime water and minute doses of carbolic acid.

In the class of cases treated of in this paper the oil of turpentine, as a remedial agent, is not presented as a *sine qua non*, but as a valuable agent to fill a place, and as an effective means of coöperating with other treatment for the relief of the many aggravated, painful and difficult affections of the gastro-intestinal canal of infants.

TRANSPLANTATION OF CONJUNCTIVA FROM THE RABBIT.[1]

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It is not my intention to go into the history of transplantation of conjunctiva from rabbit to man, but simply to report a successful case, and the method followed. Allow me to premise, however, by saying that in the winter of 1873–4 I saw De Wecker, of Paris, make the operation wherein he placed the conjunctiva, after removal from the rabbit, on a microscope slide over a tumbler of hot water to keep it moist and warm before transplanting.

In 1881, at the International Medical Congress in London, which I had the honor to attend as a delegate from this Association, Dr. Dufour, of Lausanne, reported several cases, in two of which he adopted the method followed by De Wecker. The same year—1881—it was my good fortune to assist Dr. Wolfe, of Glasgow, in a successful case, in which, instead of using hot water, he placed the conjunctiva to be transplanted on the back of his hand, transporting it in that way to the patient's eye. This method was so simple in comparison that it is the one I have since adopted in two cases, only one of which was a success.

Mr. S. F., æt. 26, was burned in the right eye with molten iron in September, 1885. He consulted me several weeks after the injury, at which time the upper and lower lids were attached to the inner half of the eyeball, the cornea being covered at its inner two-thirds. There was still a great deal of inflammatory reaction, and I advised postponement of operative procedure.

On January 25, 1886, about five months after the injury, I transplanted conjunctiva after the method of Wolfe, as described by him in the *Annales d' Oculistique* for September–October, 1881, in his report of the case in which I assisted. My operation was made in the presence of the class of the Detroit College of Medicine.

It is not an easy task to remove so thin a membrane as the conjunctiva and transplant it. The moment it is dissected it rolls upon itself and it is nearly impossible to recognize the epithelial surface again. Sutures even do not prevent this tendency to roll up. For the purpose of recognizing the epithelial surface, three or four sutures are placed in the conjunctiva before it is dissected from the rabbit, the suture being long and the needles left *in situ* for use in grafting. Dr. Wolfe suggested and practices placing the conjunctiva on the back of the left hand, where it adheres and dries after being spread out. A little warm water suffices to moisten the conjunctiva and make its removal from the hand easy, when the eye is made ready for its reception.

The difficulty in holding the lid everted is overcome by passing three sutures through the border of the lid, with the ends of which the lid is controlled and kept in the required position. By this means

[1] Read in the Section on Ophthalmology, Otology and Laryngology, at the Thirty-Seventh Annual Meeting of the American Medical Association.