The lock-jaw of infants (trismus nascentium) or nine day fits, crying spasms, etc ; its history, cause, prevention and cure / by J. F. Hartigan.

LOCK-JAW OF INFANTS.

HARTIGAN.

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(TRISMUS NASCENTIUM.)

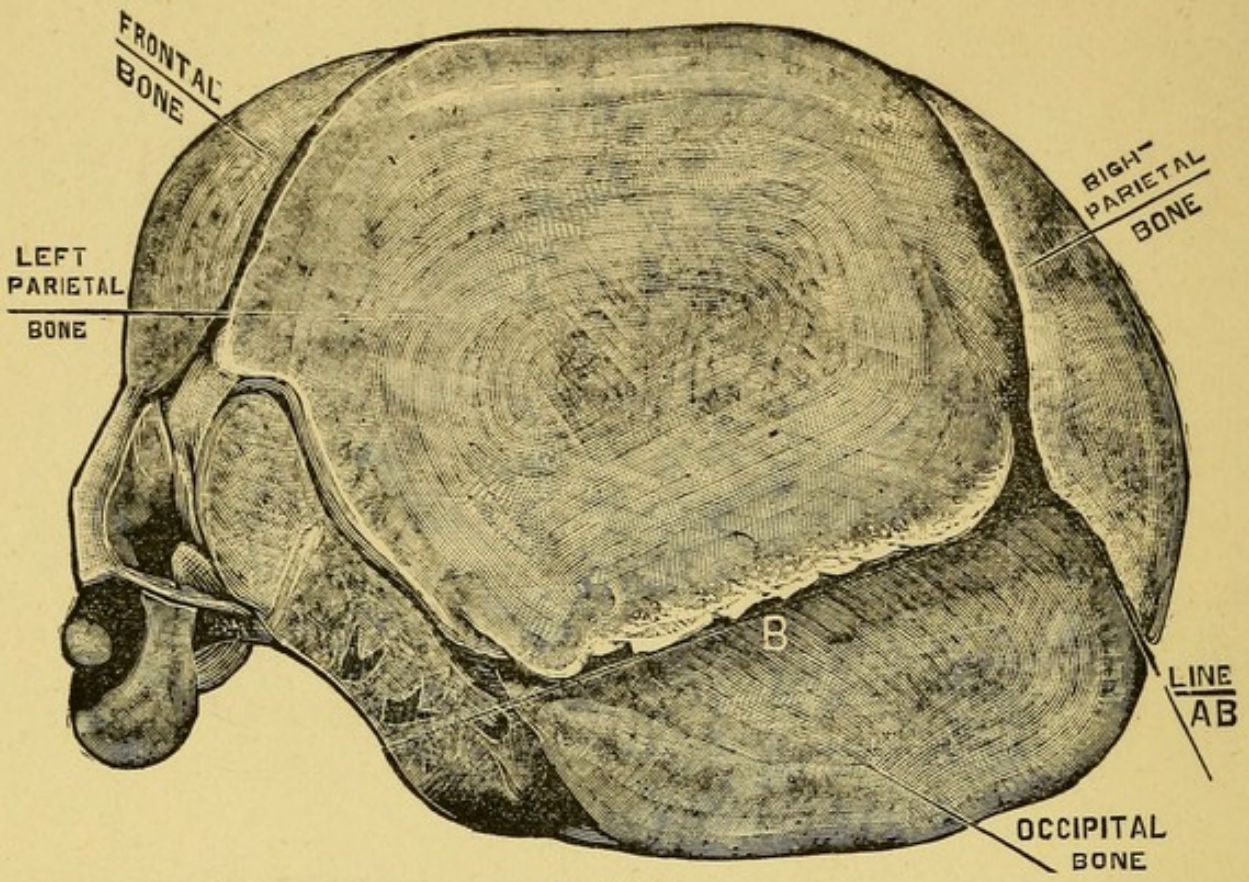

PLATE 1.

View of infant's skull in trismus nascentium, showing by B and the line A B, the parietal bones overlapping the occipital.

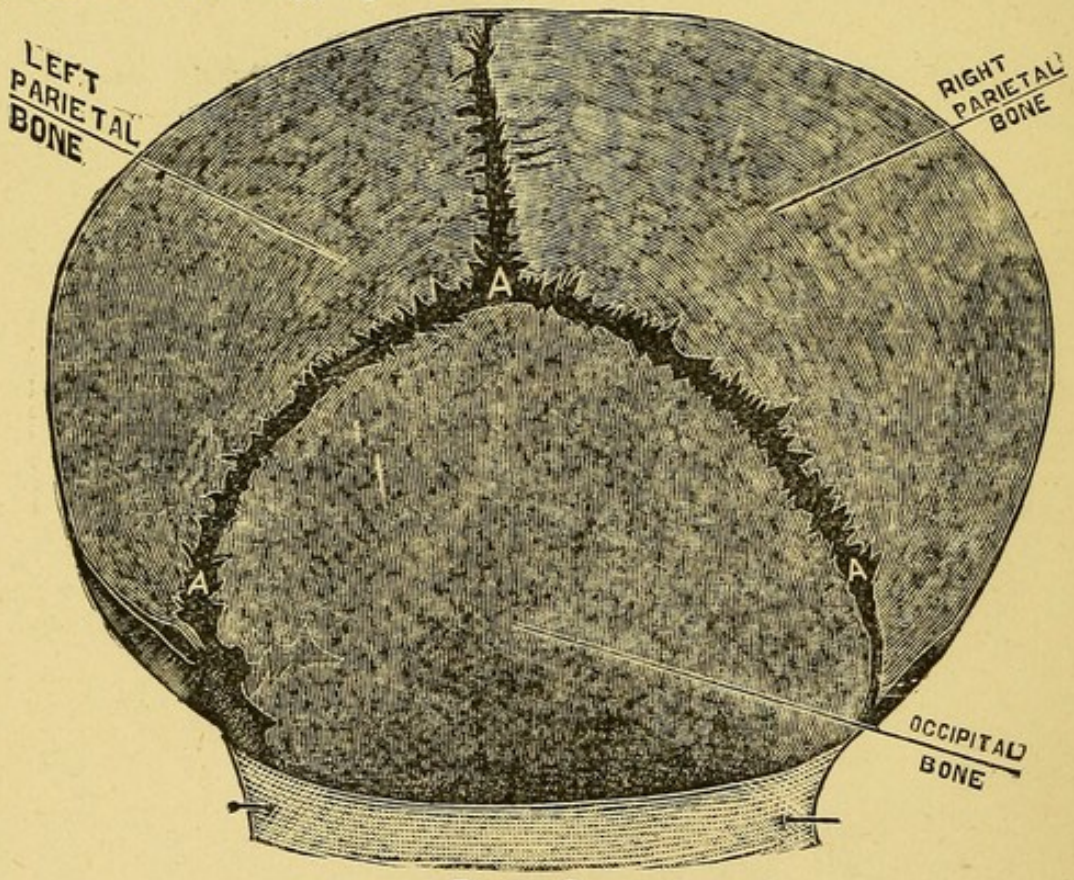

PLATE 2.

View of back of infant's skull, showing more fully the lambdoidal commissure, AAA, or line of depression in trismus nascentium, and the facility with which pressure can be exerted on the brain. Later the bones become firm and united.

THE LOCK-JAW OF INFANTS.

(TRISMUS NASCENTIUM),

OR

NINE DAY FITS, CRYING SPASMS, ETC.

ITS HISTORY, CAUSE, PREVENTION AND CURE.

BY

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TO THE MEMORY OF

DR. J. MARION SIMS,

THE FOUNDER OF AMERICAN GYNÆCOLOGY

and the

DISCOVERER OF THE TRUE PATHOLOGY OF TRISMUS NASCENTIUM.

His views as to the cause and cure of the Lock-Jaw of infants, after having been generally ignored for more than a third of a century, have been translated by the author into practice, and their complete vindication here recorded.

I beg leave to commend this brief work to the enlightened judgment and impartial consideration of the profession, while at the same time I trust that it will find access to mothers and nurses every where, that they may give their necessary aid in *preventing* the most deadly scourge of infant life.

J. F. HARTIGAN, M.D.

WASHINGTON, D. C., July 7, 1884.

THE LOCK-JAW OF INFANTS.

(TRISMUS NASCENTIUM.)

During the winter of 1877 a discussion arose in the Board of Health of Washington, D. C., caused by the continued reports of a large number of cases of Trismus Nascentium by the Medical Sanitary Inspector, Dr. W. D. Stewart; some of the members expressing decided incredulity in the diagnosis. A committee was appointed to investigate the subject, and soon abundant opportunity of verification was offered, for in six weeks sixteen cases were observed, two being seen before death. The symptoms presented were so characteristic and uniform as to leave but little doubt of their nature. Three post-mortem examinations, performed by Dr. W. H. Triplett, afforded further verification in their anatomical lesions. Thus it may be admitted that there was very good evidence of the correctness of Dr. Stewart's diagno-

sis. The Committee, however, did not agree, either as to the identity of the disease or its etiology. Dr. T. S. Verdi, who saw every case, sustained Dr. Stewart, and ascribed the predisposing causes to social condition, poverty, filth, impure air, unwholesome food, etc.; and maintained that the disease was not peculiar to any locality, latitude or country; while Dr. D. W. Bliss, the other medical member, who saw only two cases, denied its existence to the extent represented, and declared, among the many supposed causes, irritating dressings to the navel, pins penetrating the skin, rough handling, falls, blows, exposure to cold, etc.

About the time mentioned, several of these cases came under my observation, with the curiously uniform post-mortem appearances of congestion and extravasation of the brain or spine (more commonly the latter), or both; there was no other lesion observed internally, except occasionally engorgement of the lungs. These facts gradually impressed me with the importance of determining, if possible, the cause or nature of a disease so fatal within the first month of infantile existence. The Act of Congress, a few months later, abolishing the Board of Health, and substituting therefor a Health Officer, afforded me the

invaluable assistance of Dr. D. C. Patterson, Coroner of the District, without whose counsel and co-operation in the investigation of these cases the results herein set forth could not have been obtained.

Deaths being continually reported with the train of symptoms of this disease, I made many post-mortems without keeping a record—the results showing only a marked and painful sameness throughout. It certainly seemed to require violence, or some mechanical cause, to produce such grave lesions in infants generally well-developed, and otherwise healthy. As post mortems multiplied, perplexity increased, and stimulated desire to ascertain the cause. Text-books were consulted, but most writers treated the subject unsatisfactorily, ascribing every conceivable condition for its development.

The extravasation mentioned, observed in posterior part of brain and spine, and the relative situation of the bones externally, now attracted attention. It was found that there was usually a depression of the occipital, or that one side was overlapped by the parietal, bone. Here, then, was rational ground for the process of deduction or induction. Did these appearances demonstrate cause and effect? viz., mechanical pressure

of the occipital or parietal bones on the brain, through the intervening dura mater, finally expending its force on the pons, medulla oblongata, and the nerves issuing therefrom—a theory, which, on more diligent inquiry, I soon found had been advanced over thirty years before by Dr. J. Marion Sims, then of Alabama. But it is curious how the profession has ignored it, or failed to give the matter proper consideration; it is not even referred to in the standard works of the day. Many physicians not only dissented from Dr. Sims's views, but actually ridiculed them. Just as John Hunter, that famous surgeon, and others pooh-poohed Jenner's notion of vaccination.

The following is an extract of a letter I received from Dr. Sims, dated at Nice, Jan. 9, 1882: "Your letter did not surprise me in the least. I am as firmly convinced of the correctness of what I gave to the world thirty-four years ago as I was then."

It is therefore clear that time has not changed the views of the distinguished gynæcologist, which I believe will stand pre-eminent in the history of his great achievements, and the truth of which it will be my endeavor now to establish with some additional facts.

There is no latitude or country free from the

ravages of this disease. It stands first in the long catalogue of fatal maladies; its advent is sudden and unexpected; promising young life is destroyed in a few hours, turning the joy of parents into sorrow, and blasting their well-grounded hopes. So well known is this fatality among midwives, especially the colored grannies, that it is common to hear them say, "No use to send for the doctor; babies with nine-day fits die sure."

Hippocrates described three varieties. Aristotle taught that a species of convulsions, not unlike tetanus, occurs frequently before the seventh day after parturition. Celsus called the disease nervous rigor; Aretæus, maxillary spasm. In the works of Galen it is first named trismus. Moschion and Levret, who figured in the first century, entertained an opinion in regard to its exciting cause—that the stagnant blood in the umbilical cord might produce dangerous disease; in which M. Bajou concurred.

All nosological writers have called this species of trismus, tetanus; which Cullen describes as a spastic rigidity of the inferior maxilla, attacking infants between the second and seventh day from birth. It occurs, he says, among children of both sexes; is not common in every

country, but is confined more especially to cold regions.

Clarke, Chisholm, and Hilary, teach that in the West Indies, it prevails in the worst form. It is called there, and in South America, seven days' disease. Hofer testifies it is present in the mountains of Switzerland. Mons. Fourcroy, who wrote a treatise on the subject in 1744, says, that twenty-four per cent. born in St. Domingo die of the disease.

"Mr. Morrison, who practiced for several years at Demerara, has never known one authenticated case of recovery. And Mr. O'Brien mentions that out of about 200 cases which he witnessed, *not one recovered.*" (Curling).

It is referred to in Dr. Cleghorn's *Treatise on the Diseases of Minorca* (from the writings of a Spanish physician): The doctor observed that it is needless to add the remedies prescribed by the Spanish author, as in twenty years' practice he had scarce known six to recover. According to John Hancock, M.D., in Essequebo, Demerara, and neighboring islands, the disease kills half of the whole number of infants born, and the fatality is at least 99 in 100.

Dr. Hüpeden says, "In certain colonies of Guyanas half the children born die of trismus

On the Westmanneyer Islands, south coast of Iceland, according to McKenzie, the small number of inhabitants are only kept up by emigration, the disease is so prevalent, carrying off all the new-born."

In a letter from Dr. S. B. Labatt to Dr. Collins, Dr. L. says, "During 10½ years that I was resident in the Lying-in hospital, Dublin, I witnessed nearly two hundred cases, and after giving a fair trial to all remedies of repute, in no case when the disease was fully formed, did I meet with a recovery." Dr. E. Kennedy, during his mastership of the hospital, gives similar testimony. Dr. Collins says of his treatment, "In every instance I have been disappointed."

Andral, in his *Cours de Path. Interne*, affirms that the affection is found among the Jewish infants in Russia.

Mr. Maxwell says, in the *Jamaica Physical Journal*, "From observations that I have made for a series of years, I found that the depopulating influence of trismus nascentium was not less than 25 per cent. It scarcely has a parallel within the bills of mortality."

"It occurs among the children of the poor in Russia, Germany, Scotland, and Iceland. In England and France the disease is rare, and I see

no mention of its prevailing to any extent either in Italy, Spain, or Turkey, the hottest climates of Europe." (Dr. P. C. Gaillard).

Asst. Surg. S. Rogers, wrote in 1841, "It is a disease of very common occurrence in India, and as far as can be ascertained, it is uniformly fatal."

Dr. Maunsell, after distinguishing it into two forms, sums up his observations by saying, "Both are equally fatal."

At Elving, Prussia, it was observed that fatal cases were occurring with great frequency. A midwife being questioned, she made the alarming statement that many had died before there was time to send for a doctor. She admitted that in 380 confinements, she had met with 99 cases. In the middle of Germany it occurs oftener than any part of Europe, especially in districts where there is no parochial church, thus obliging the mothers to make long journeys to have their infants baptized. It is also common in some of the Northern parts, where, I am informed, the infant is swaddled, arms tied by the side, and fastened to a board, being left to lie in this position often for hours at a time on the back. This practice is common among some Indian tribes, the mothers thinking it a mark of comeliness to have the head

perfectly flattened behind. According to Dr. David Day (*Med. Statistics, U. S. Army*, 1839–54) the death rate of the Winnebagoes is greater than exists elsewhere in childhood, and he attributes it to the pernicious effect of this strapping upon the brain.

In the *Annales Méd. de la Flandre Occidentale*, 1857, Contenot observes, "Since Bajou wrote on the subject, two-thirds of the infant slaves in the Colony of Cayenne, died in the first days of their existence. M. Boireau also refers to it being frequent and fatal in the French Antilles. Those attacked at Cayenne before the ninth day, are abandoned or left to die."

Dr. Nailer, of Mississippi, declares that two-thirds of the deaths among negro children are from this disease, and so uniformly is it fatal that a physician is never sent for.

Dr. J. H. Pooley says the disease runs its course, in spite of treatment, to a fatal issue. There are places in every zone where it is so prevalent as to sensibly check the increase of population.

"No children, either white or negro, can be raised on some of our Southern plantations." (Dr. J. A. Murphy).

Dr. Wooten writes: "I believe that it destroys

more negroes than any other disease in Alabama. I have never seen a case that did not prove fatal; and have tried every plan of treatment which books, or the most anxious study on my part could suggest, but all wholly in vain."

Dr. W. L. Sutton says, "The fatality is striking in the West Indies, and in our Southern States, where some families are awfully scourged, whilst their neighbors almost or entirely escape."

This fact is directly at variance with the supposed epidemic nature of the disease.

S. L. Grier, M.D., of Mississippi, "On the Negro and his Diseases," expressed himself as follows: "The first form of disease which assails the negro race among us, is trismus. No statistical record, I suppose, has ever been attempted, but from my individual experience, I am almost willing to affirm, that it decimates the African race upon our plantations within the first week of independent existence. I have known more than one instance in which, of the births for one year, one-half became the victims of this disease, and that, too, despite the utmost watchfulness and care."

Dr. G. T. Maxwell, of Delaware, says: "In the whole catalogue of ills which flesh is heir to, there are few, if any, diseases which present so appalling a mortality record. The testimony of many

extensive practitioners is that they have never known a case to recover. In my experience of twenty years' practice in Georgia and Florida, with a single exception, not one recovered."

In his treatise on this disease, Dr. I. M. Watson, of Nashville, says: "This great outlet of infantile life, has not received that notice and investigation from our best writers, which its great importance so justly merits. All that has been published about it, is well calculated to embarrass."

In reply to Dr. Cullen, who says: "It is a disease that has been almost constantly fatal, commonly in the course of a few days; the women are so much persuaded of its inevitable fatality, that they seldom or ever call for the assistance of our art," Dr. Watson remarks, "But this is not the secret; physicians had seen the disease, but did not understand it; they had treated it, but had not cured it; had sought out its cause and pathology, but had not found them."

Drs. T. C. Black, Rush, Fourcroy, Valentine, Dacille, Campet, Lindsay, J. S. Bailey, West, Goelis, and a host of others, say it is always fatal.

Dr. J. Bierbaun remarks, "In no other condition have we the same train of symptoms. During the prodroma there is more chance of cure

than when the disease is fully developed. In the last case, death is the rule."

G. Gagnard believes that it is most common in warm countries, and children of negroes seem more predisposed to it. In Africa, on the contrary, the white children are oftener attacked during the rainy season. He agrees with Matuszynski, and others, who hold that paralysis and death occur only when congestion is replaced by effusion. His conclusions are that tetanus in the new-born is different from that in the adult; it is oftener spontaneous, and ought to be regarded as a neurosis until an anatomical lesion is found which can be regarded as its cause. The most frequent cause he thinks, is cold, and sudden changes of temperature.

"Whatever be the supposed causes, there is one point upon which authors agree, that almost certain and distressing death awaits the new-born victim." (Dr. W. B. Fletcher.)

Dr. H. C. Bryson thinks that climate or season exerts but little influence in its production. Billard declared that he had no new facts which could throw light on its cause. So little has been understood about it, that the most opposite opinions have been expressed. Romberg, Ollivier, and Prof. Doherty consider that it results from

inflammation and ulceration of the umbilical vessels. Dr. E. Hughes suggests vaginal disease among the causes. Dr. A. Vogel saw the disease under all conditions of the weather, and did not believe meterological considerations had any thing to do with it. He made two post-mortems without any navel lesion. Joseph Frank gives chilling of the body in any manner as a cause; while Duges mentions this as the sole agent in its production. Bajou, who has had a large experience at Cayenne, attributes it to cold and sea air. Dr. Evans to costiveness. Underwood seriously remarks, "The cause has at length been clearly ascertained, and happily its prevention, by Dr. James Clark, who, perceiving that those houses were free from the disease in which there were no fires, very soon demonstrated it to be owing to smoke from the burning wood; the negro houses having no chimneys to carry it off."

Dr. Harrison observed, (*N. O. Med. and Surg. Jour.*, May 1846.) "Again, we find it scarcely existing on the main land of Iceland, but in the the island of Heimacy adjacent, such has been its fatality, that not a child has been raised there. These are highly valuable historic facts, which forbid the idea of its having any thing to do with umbilical injury."

Contenot calls the anatomical lesions an apoplexy of the spinal centre, and he believes the disease to be incurable from the instant this condition is realized. After discussing the various reputed causes, he is inclined to the cold theory.

Dr. Meriwether, believes the disease is caused by absorption of pus by the umbilical vessels. West says that the most frequent post mortem appearance consists of effusion of blood into the cellular tissue surrounding the theca of the cord. Dr. Thoré, in his "Observations on Tetanus in the New-born," (*Archiv. Gen. de Med.* vol. viii, 1845,) gives an account of an autopsy as follows: "A bed of bloody fluid and coagula lined entire extent of spinal canal outside dura mater; no trace in spinal arachnoid. Nothing abnormal in brain or membranes; congestion posteriorly of lungs."

"Dr. Goëlis, of Vienna, frequently found an appearance of increased vascularity in the substance of, and in the membranes enveloping the upper part of the spinal marrow. The same has been observed by Dr. Thompson, of Philadelphia." (Curling.) M. Billard, (*Stewart's Ed.* p. 490.) after remarking that he had only witnessed two instances of the disease, both fatal, observes he

"found on dissection *nothing more than an effusion of a quantity of coagulated blood in the spine.*"

Bouchet, Contenot, Matuszynski, G. Gagnard, and Barillier say, that the congestion and hæmorrhage found in dissections are an effect, not the cause of the disease, but they don't give the philosophy. Copland agrees with Prof. Colles, and says: "In connection with the division of the umbilical cord, impure air, etc., may concur in developing the malady in those constitutionally predisposed to it." Beduar saw no constant lesion of the navel in his cases. In a post-mortem examination in the practice of Dr. Baldwin, he "found the umbilicus enlarged; hardened, and a portion of the surface to which the cord was attached dry and red; the cuticle denuded in two small places, about half an inch from umbilicus. Membranes and substance of the brain natural. A thick and very firm coagulum found covering the posterior and lateral surfaces of the medulla spinalis, extending the whole length of the spinal column. Other organs normal." Dr. Hester, of New Orleans, says: "The disease seems to be produced by the action of an unhealthy atmosphere upon extremely delicate and nervous systems." Sir Chas. Bell remarks: "In the West Indies, it

is produced from exposure to the night air, and most probably from exhalations from the ground. Most writers believe that the cord has something to do with its origin, but they don't know what." "Numerous modes of treatment have been adopted, but in practice all prove unsuccessful. So rarely has a case been reported cured, that many regard such instances as *errors in diagnosis*" (Baldwin). Evanson and Maunsell say: "With respect to the treatment of trismus nascentium, when it has once set in, every thing is empiricism, and little is to be expected from any plan."

Dr. Meriwether, of Alabama, believes that it generally appears sporadically, rarely attacking white children, which is to be accounted for by the superior cleanliness of the white race. As opposed to such view, the editor of the *N. O. Med. and Surg. Jour.* (Vol. II., 1846–7), remarks that the affection is by no means confined to colored children in that city, but is occasionally met with in the most respectable white families. This statement is confirmed by the Annual Report for 1882, which shows a mortality of one hundred and seventy-two (not including one hundred and six cases reported as infantile convulsions), of which number ninety are white. Similar reports come from other Southern cities.

Dr. Joseph Clarke (*Trans. Royal Irish Academy*, 1789) says, that up to the end of 1782, of the births in the Lying-in Hospital, Dublin, about every sixth child died within the first two weeks, nineteen out of twenty being from nine-day fits. He ascribed the causes chiefly to foul air and uncleanliness. In adopting his mode of ventilation, he also reduced the number of beds in the wards, with the most satisfactory results. He gives a table of one hundred and fourteen cases, occurring in two years, showing the day on which each infant died, as follows:

12th	11th	10th	9th	8th	7th	6th	5th	4th	3d	2d	1st	Total
1	0	3	3	5	24	37	18	6	5	10	2	114

Dr. M. Bartram, of South Carolina (*Trans. Coll. Phys., Phila.*, 1793) was the first to ascribe the disease to the umbilicus, a theory, as has been seen, vaguely referred to by Moschion and Levret, seventeen hundred years before. He said it was uniformly fatal among the infant negroes; neglect to bandage the abdomen, allowed the umbilicus to become distended and puffed out, this evil being augmented by the friction of coarse cloths and the worst of dressings. "For the most part, it makes its attack with the dropping of the cord, though rarely it occurs several

days after it is entirely healed. This is not surprising when it is compared with several instances upon record of tetanus in adults, taking place long after the wound is cicatrized. When the disease appears two or three weeks after birth, it is much slower in its progress to death."

In the *Dublin Hosp. Reports*, Vol. i., 1818, A. Colles, M.D., gives the results of twenty-five dissections, based upon a full belief in the umbilical theory, as follows: "The skin forming the edges of umbilical fossa was in some a little raised. On expanding with forceps, the floor of this cavity was in the centre, raised knob shape. A probe readily passed through it, entering the umbilical vein, the peritoneum covering which was highly vascular, sometimes up to the fissure of the liver. The peritoneum covering the arteries was still more inflamed, and extended often up to the bladder. The vein, on being cut open, contained only a few small coagula; its inner surface was pale and free from inflammation, although the coats were much thickened. The arteries contained a thick, yellow, fluid-like lymph, and their coats were thick and hard also. The peritoneal surface of umbilicus showed a soft, yellow substance in the centre, resembling coagulable lymph, which formed the prominence

mentioned in the external view, the arteries generally opening into it."

S. B. Labatt, M.D., Master of the Lying-in Hospital, Dublin (*Edin. Med. and Surg. Jour.*, Vol. XV., 1819), in reply to Dr. Colles, gives an account of nine dissections, showing that "the appearances mentioned by Dr. C. are not always present in infants who have died of trismus, but are sometimes found in infants who have died of other diseases."

John Hancock, M.D., says (*Edin. Med. and Surg. Jour.*, vol. xxxv., 1831) the chief and essential cause of trismus is an irritative impression made on the nervous system by the compression of the cord in tying it.

Dr. C. Woodworth, of Mississippi (*Boston Med. and Surg. Jour.*, vol. v., N. S., 1832), reports a fatal case, which he thought was produced by irritation in the intestinal canal.

Dr. Von Busch, in an article entitled, "Inflammation of the umbilical arteries as the cause of trismus in the new-born" (*Neue Zeits. für Geb.*, vol. v., 1837), says that, according to his experience, it always occurs after the cord has dropped off, and not later than the tenth day after birth. In no case had he found suppuration or inflammation externally, and in his new observations of

arterial inflammations, the same was seated far distant from the navel. He claims that the reason this was not discovered before, was probably because in making the section of the abdomen with a cross-cut whose center was at the navel, the umbilical arteries were cut off, and hidden behind the bladder. He made three careful autopsies, and among other important observations, found considerable inflammation of both arteries; in one case, the cord was fifteen inches long—in another, twenty-two inches. Diffuse peritonitis was found in all, apparently originating at the posterior wall of bladder. The arteries showed bulbous swellings the thickness of a goose-quill and half an inch long. A dense deposit of fibrin, in a sheath-like form, was found between the outer and middle coats, and in the lumen black looking thrombi. A sound could be introduced from the navel through the arteries up to the swelling. Below, they were open to their continuation in the hypogastric. Nothing abnormal about the umbilical vein, but a sound was introduced its whole length also; bowels and mesentery congested, and blood extravasation under peritoneal coat of liver. Stomach showed traces of inflammation. Nothing abnormal in chest, cranium or spinal marrow. The abdomen was swollen and

hard in the two cases seen before death, pressure on it causing pain and contraction of the lower extremities. From his observations he believes the disease, in most cases, due to this inflammation of the umbilical arteries, possibly produced by the entrance of air.

J. Matuszynski (*Gaz. Med. Paris*, vol. v., 1837) saw the disease twenty-five times—thirteen male, twelve female; all appeared healthy, and were nourished by mothers. Most were seen in the winter months. He gives the result of twenty autopsies, made with the greatest care, by Dr. Finckh, as follows: "The bodies were covered with linen wet with vinegar, and laid on the belly, so as to prevent infiltration of blood in dependent parts. Most were made thirty-six hours after death—some four to six hours. Around umbilicus was generally perceived areola of bluish-green color; the bodies preserved expression of suffering characteristic during life, and rigidity of muscles. In sixteen cases of spine examination, there was abundant effusion of black blood all along canal, in space between dura mater and canal; sometimes it was limited to cervical or dorsal regions—sometimes extravasation of serum, irregular in location. Dura mater and arachnoid generally healthy; pia mater almost constantly

injected, sometimes thickened. The cord was reddened twice; once was softened; once appeared indurated. All the rest of cases normal. Exudation of blood in cranium, preferably in subarachnoid tissue or ventricles. In one case lymph was found; sometimes serum in ventricles. Brain in two cases firmer than usual; in others softened. Nothing worthy of note in abdomen or chest. Umbilical vein and arteries were scrupulously examined, and presented no sensible alteration. * * * * * * *

"The convulsions coincide with period of congestion; paralysis followed by death when exudation takes place. Seibold found spinal cord inflamed; canal filled with black coagula in one case. Hinterberger relates ten similar cases; Billard two cases. D'Outrèpont saw this condition six times. James Thompson, of Jamaica, made a great number of autopsies of negro infants, and always found spinal cord and membranes inflamed."

Following the plan of Finckh, Dr. Weber, of Kiel, also placed infants on their faces to prevent any deceptive appearance from gravitation, and without exception found injection of the capillaries of the cord and extravasation.

"Experiences with trismus nasc., by Dr. C. E.

Levy, of Copenhagen" (*Neue Zeits. für Geb.*, vol. vii., 1839). In the lying-in establishment, during the year 1838, he found in six autopsies, inflammation of the umbilical arteries. He agrees with Von Busch that this is the cause of the disease. In five of the cases there was also hyperæmia of the brain. In three, extravasation outside spinal dura mater. In one unusual injection of arachnoid spinalis. He adds that extravasation of spine was a post mortem accident, and attaches less importance to hyperæmia as a cause of the disease.

Dr. Schneemann says (*Hann. Ann. für die ges. Heilk*, vol. v., 1840): "That want of oxidation of the blood has much to do with producing it, is believed; and this is favored by too rapid tying of the pulsating cord, or by placing the child under the bed-clothes, and half suffocating it with the foul odors between the sheets of a puerperal woman."

Article of Prof. P. G. Cederschjöld, translated by G. Von dem Busch (*Neue Zeits. für Geb.*, vol. x., 1841). "On an epidemic of tris. neon., observed in the lying-in-house at Stockholm in 1834."

During this so-called epidemic, 42 children were seized within five months, 34 of whom died. In

order to discover its origin certain meteorological observations were secured. After describing these, Prof. C. remarks: "It appears very probable that the unusually long-continued bad weather mentioned caused not only the many cases of the disease, but created an epidemic which continued long after these atmospheric causes had ceased to exist. It is strange that the disease, as far as I know, did not show itself during this time in the dwellings of the city, or any where else, except in the lying-in house."*

* * * "Post mortems showed congestion of vessels, sinuses, and membranes of brain; the distension greatest at the base with extravasation. Spinal cord showed a like condition. * * *

"Of all in whom the disease was fully developed, not one was saved. Those reported as cured only showed the prodromes, and as these are not at all positive, it is possible that many of these children would not have had the disease at all."

In the *N. O. Med. and Surg. Jour.*, Vol. ii.,

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* Dr. Busch here makes the following note: "This circumstance appears to me to speak against the assumption of the author that weather changes produced the disease, and it may be assumed that local causes existing in the institution had probably more to do with its appearance."

1845–6, Dr. Wooten remarks: "I have usually observed the first symptoms to make their appearance about the time the umbilical cord comes away, and from this I at first supposed that it was the effect of awkwardness in dressing the navel by the ignorant midwives, but careful investigation led to nothing conclusive on this point."

In the same number of foregoing named journal, the editor invites communications on the subject, because of the alarming mortality at that period, numbering 150 annually in New Orleans.

Such has been the history of this disease, and the various causes given by those who perhaps devoted most attention to it. The suggestion just preceding may have met the eye of Dr. Sims at the time. At all events, in the same year his first paper appeared in the *Amer. Jour. of the Med. Sciences*, giving his interesting views. In the subsequent one in 1848, after further experience and investigation, he made clearer those views, modifying some of his first propositions. Before discussing them in connection with my own facts and cases, I will briefly review what has since been written on the subject, and will also refer to the claimed analogy to tetanus in the adult.

Dr. Baldwin, of Alabama (*Amer. Jour. Med. Sciences*, Vol. xii., 1846) sustains its identity with tetanus in the adult, believing it to be *generally* if not always traumatic, and locating its exciting cause in the umbilicus. He recites other agencies in producing the disease among negro children, such as want of attention and proper preparation on the part of the mother, illy constructed houses and surroundings, mode of dressing umbilicus, filth, with a predisposing constitution of the atmosphere.

Of Dr. Sims's first article the author remarks: "This most ingenious hypothesis, however creditable to Dr. S. for its originality and the beauty of its conception, is supported by but few facts, which will not sustain with equal or more force very opposite conclusions. One striking and well authenticated feature in the history of the disease occurs to my mind as being so completely irreconcilable with this view of its pathology, that I cannot forbear reference to it. It is that *the postmortem appearances are not uniform.*" With regard to the pathology of the disease, and tetanus in the adult, he thinks "the reflex function of the 'excitomotory' nerves," as demonstrated by Marshall Hall, is a clear solution of the phenomena observed.

Drs. D. P. Calhoun, S. A. Ferrin, H. C. Bryson, R. H. Chinn, N. Ostrander, F. W. Clement, S. Chamberlaine, G. Dowell and C. L. Gwyn, report cases successfully treated on Dr. Sims's plan.

Dr. I. M. Watson refers in a sarcastic vein to Dr. Sims's observations and explanation, notwithstanding his remark in the same article, "That alternate displacement and replacement of the occiput should suspend and reproduce some particular forms of paralysis, or *nervous affections*, I am prepared to admit." He holds with much positiveness that the umbilicus is, with few exceptions, the exciting cause of the disease.

Dr. W. L. Sutton says (*Nashville Med. Jour.*, Vol. iv., 1853): "A point made by both Baldwin and Watson is the similarity of time in the period of incubation. I think they have been a little hasty in their assumption; the best criterion is the test of truth. Curling has given a table of 124 cases of tetanus in the adult, with the time from the reception of the injury to the appearance of the disease; and a table of 185 children dying of trismus, and the number of days they lived. Collins also has given 34 cases of trismus, with the day on which each was

attacked; also the duration of the disease in 30. Of the 124 deaths, the disease appeared in 90 after the *seventh* day; whilst of the 185 children, 131 died on and before the *seventh* day. Again, of the 124 by Curling, 70 were attacked after the *ninth* day. Of the 185 children, 165 died on or before the *ninth* day. But of the 30 cases given by Collins, in which the duration of the disease is stated, the average was 31.7 hours.

Subtract this from the time lived by Curling's infants and we have about 155 attacked on or before the *seventh* day, or 84 per cent.. whilst of 124 adults 54 or 43.5 per cent. were attacked on or before the *seventh* day. But even this falls short of the proper view, for if we take Dr. B's standard and adopt the separation of the cord as the time at which the injury is received, then, assuming four days from birth as the time of separation, all of Collins's cases will fall *short* of *seven* days, and 175 of the 185 of Curling's. Again in Collins's cases and in Curling's, the disease occurred on an average two days after the average time for the separation of the navel; whilst in the 124 adults by Curling, the average time at which the disease supervened was 11.67 days."

In confirmation of Dr. Sims's statement that children are born trismal, among others he men-

tion's West, who says that the disease may come on within twelve hours from birth.

"It is worthy of remark," he concludes, "that Prof. Harrison, of New Orleans, detected the displacement of the occipital bone and attempted its restoration fifteen months before the publication of Dr. Sims's first paper."

On page 203 of the same volume, Dr. Sutton details a case that came under his notice since writing the foregoing. His conclusions are that the child "was born trismal," and that the disease was brought on by pressure from the occipital bone. He had employed Dr. Harrison's plan to elevate the bone, but without success, as it would slip and occupy its former place, and nothing but temporary relief was granted.

J. Harrison F.R.C.S. (*Brit. Med. Jour.* i., 1860) agrees with Dr. Colles, but does not say that trismus is the only disease that may arise from a festering navel, as is shown in the following case: "The child had a grievous look, sunken, clearly from grave mischief; the umbilicus was festering, abdomen distended and hard. At the post mortem the umbilicus was red and prominent; there was universal peritonitis, and the liver was wholly covered by false membrane. In this case there were no symptoms of trismus."

Dr. Hervieux (*Gaz. des Hop.* 1862) reports two cases : In the first, autopsy showed engorgement of cerebral pia mater and arachnoid ; congestion of substance of the brain, cord and cerebellum, black coagulated blood in choroid plexus, brain softened ; spinal arachnoid contained bloody fluid, cord softened throughout.

2nd Case. Besides the condition found in the first, there was exudation in occipital fossa, and spinal arachnoid. No disease of umbilicus or other organs. Meningeal apoplexy of spinal cord is, he says, the nearly constant lesion, and the most probable cause is cold.

M. LeBarillier, (*Jour. de Med. DeBordeaux* May, 1863) recognizes eclampsia as different from trismus, and neither like tetanus of the adult. He details an autopsy as follows : "No trace of inflammation of umbilical cord ; rigidity slight ; face bluish, and ecchymosed patches over chest and abdomen. The condition of brain and cord accorded with appearances described by Thoré and Hervieux."

A post mortem by Dr. G. Dowell (*Amer. Jour. Med. Sci.*, vol. XLV., 1863) showed, "Umbilicus healed, but there was dark blood in the umbilical vein, and a yellowness around the navel ; liver congested, and gall bladder filled." He thinks

the primary cause is in the umbilicus, brought on by congestion of the liver from coagulation of blood in the umbilical vein. He ascribes among the many causes, a hereditary tendency; so much imbued were many planters with this notion, that often they told the midwife if they saved such children, they might have them.

Dr. J. Lewis Smith ascribes uncleanliness and impure air among the chief factors, in the development of the disease. Ten cases observed by him were all in shanties where habits of cleanliness were impossible, and he never saw or heard of a case in the better class of domiciles.

"According to Romberg, Scholler made 18 autopsies, and in fifteen found inflammation of the umbilical arteries. Finckh examined the umbilical vessels in 11 cases, without discovering any pathological change."

"In the *Edin. Med. and Surg. Jour.* for Jan., 1822, Dr. James Thomson, who spent considerable time in the tropics, says, that he examined nearly forty infants and found the navel in all states."

"In the *Dublin Jour. of Med. and Chem. Sci.*, Jan., 1836, Dr. John Breen, criticising the umbilical theory, remarks, that he never discovered any peculiar morbid appearance which would justify an explanation of the pathology of the dis-

ease. In my own experience there was no evidence of disease in the umbilicus."

From such statistics, Smith says that while umbilical disease is a frequent cause of tetanus nasc., yet cases occur in which we must look for some other. He thinks there are serious objections to Dr. Sims's mode of explanation, "for if it was correct, it would ordinarily occur sooner; compression of the medulla would certainly be followed by immediate and marked symptoms, instead of an immunity for four or five days; besides, other physicians have not derived the same benefit from placing an infant on the side. * * The correct explanation is probably as follows: If the new-born infant becomes emaciated, the volume of the brain is diminished, like that of the trunk or limbs, and the sinking of the occipital bone simply corresponds with the amount of waste in the cerebral substance. Now, in fatal tetanus nascentium, emaciation is very rapid. Viewed in this light, the occipital depression, so far as it has any effect, must be regarded as conservative. It prevents serous effusion, which, in a similar state of waste, occurs in older children, whose cranial bones are consolidated."

In a paper "On the Spread of Trismus Nascentium through a Contagium" (*Zeitsch. für Epi-*

dem. und Offentliche Gesundheitspflege, 1868–71), Dr. Hüpeden says: "Within six months of 1865, 100 cases had occurred in Elving, twenty-one of whom were in the practice of one midwife; the condition of navel was supposed a cause, but the mode of dressing and care did not confirm it. In Lüneberg fourteen cases occurred in 1867 with one midwife (dirty sponges or bandages could not be proven as having been used). Instances being reported of many cases occurring among certain midwives, and none among others, gave rise to suspicion. Investigation resulted in one woman being 'pensioned,' after which no more cases occurred. 'Anæsthesia' of the hands of another woman, and hot baths, were thought to be causes, but were disproved." The doctor closes his article as follows: "May the etiology of trismus be what it will, experience, such as that in Elving, proves that midwives can exercise a positively murderous activity for months and years without being stopped by the authorities."

G. A. Ketchum, M.D. (*Trans. Med. Ass'n Ala.*, 1871), does not think Dr. Sims's theory possesses much merit, as he had not seen relief afforded by the posture method. Hot weather, foul air, and too much bed-clothing, are given among the predisposing causes, or the navel has

been fretting by the dressing or tight bandaging. He asks upon what grounds or what good office does this girdle of torture on the screaming and struggling infant fulfill, and condemns the practice of allowing the original dressing on the navel. Two cases are related; one died, and the other recovered under the use of chloral.

Dr. J. Bierbaun says (*Deutsche Klin.*, vol. xxv., 1873): "The constitution has no effect, as the strong and weakly are alike seized. Neither has season an influence in its production. According to James Clark, in America, the smoke of green wood in the chimneyless huts of the negroes very frequently is the cause, but I doubt this. Here in Westphalia, on the contrary, in the chimneyless huts, where the smoke is so thick that one scarcely can see or hear, where they burn green and dry wood, turf and sawdust, the disease is rarely seen; or at all events, is not seen oftener than in the clean dwellings of the well-to-do. A very high value has been placed on the activity of the skin as an etiological factor. It was observed in many cases where colds have been taken, and in many colds have nothing to do with it—nor atmospheric, nor telluric influences.

In a paper by A. Stadfeldt, M. D., entitled "Contributions to the Study of Trismus in the New-born, with statistics of ninety-three cases observed in twenty years, 1853 to 1872, in the Lying-in Hospital, Copenhagen" (*Archives de Tocologie*, 1874), he says that his experience is opposed to the umbilical theory. There were fifty-one male, forty-two female, fifty multipara, forty-three primipara; all were fatal. Sex nor duration of labor present no disposition in producing the disease. In eighty-eight cases, one death occurred on 4th day; three on the 5th; thirteen on the 6th; twenty-nine on the 7th; twenty-five on the 8th; nine on the 9th; seven on the 10th; one on the 12th. As opposed to the assertion that it prevails in puerperal epidemics, he says that in 1854 there was a good deal of trismus and little puerperal fever, while the reverse was the case in 1864. Most cases occurred in the summer months.

In the *Amer. Jour. of Med. Sci.*, vol. lxix., 1875, Dr. P. A. Wilhite, of South Carolina, records fourteen cases in his experience, based upon a full belief in Dr. Sims's plan of treatment. Of this number, three cases of the acute form were cured by position alone, and two died without treatment before he saw them. The other nine

presented the chronic or trismoid affection, five of whom recovered from position alone, and four succumbing without the discovery of the means of rescuing them. In all, the pressure was produced by depression of the occiput, differing in degree from the slightest to the greatest possible.

In the *N. Y. Med. Record* for Dec. 2, 1882, Dr. J. G. Thomas, of Savannah, writes that the disease is not confined by any means to the colored race. Adhesion of the prepuce, he claims, produces a certain percentage of cases in male children, and cold draughts of air prove an active factor in causing the disease in both sexes.

The following references may be of interest, as showing the contradictory results of treatment by various remedies:

Annales de la Mèd. Physiol., vol. xvii., 1830. *Edin. Med. and Surg. Jour.*, vol. xxxiii., 1830. *Med. Zeitung*, 1842. *Amer. Jour. Med. Sci.*, vol. vii., 1830–1. *Archiv. Gen. de Med.*, vol. vii., 1845. *N. O. Med. and Surg. Jour.*, 1845–6, 1846–7, 1852–3, 1853–4, 1874–5. *Casper's Wochenschrift*, 1846. *Charleston Med. and Surg. Jour.*, vol. iii., 1848, vol. viii., 1854, vol. xii., 1857. *St. Louis Med. Archives*, vol. ii., 1868. *Western Lancet*, vol. xiii., 1852. *Southern Jour. of Med. and Phys. Sci.*, vol. iii., 1855. *Nashville Med.*

Jour., vol. xv., 1858, vol. xix., 1860. *Chicago Med. Examiner*, vol. i., 1860. *Gaz. des Hop.*, 1862, 1863. *Indiana Jour. of Med.*, vol. i., 1870–1. *N. Y. Med. Jour.*, vol. x., 1870. *New So. Wales Med. Gaz.*, vol. ii., 1871. *Chicago Med. Jour.*, vol. xxviii., 1871. *N. Y. Med. Record*, 1872, 1875. *Rich. and Louisville Med. Jour.*, vol. xvi., 1873. *Phila. Med. Times*, vol. iii., 1873, vol. v., 1875. *L'Imparziale*, vol. xiv., 1874, Florence, Italy. *Med. Reports*, Shanghai, 1876. *Amer. Med. Bi-Weekly*, vol. vi., 1877. *Ohio Med. Recorder*, 1877. *St. George's Hosp. Reports*, 1879. *Atlanta Med. and Surg. Jour.*, 1879–80. *St. Louis Med. and Surg. Jour.*, 1881. *Brit. Med. Jour.*, i., 1881., i., 1883. *London Med. Times and Gazette*, i., 1882. *Canada Med. and Surg. Jour.*, 1881–2. *Allg. Wien Med. Ztg.*, vol. xxviii., 1883. *Bull Med du Nord.*, Lille, vol. xxi., 1882. *Trans. Miss Med. Assn.*, Jackson, vol. xvi., 1883. *Boston Med. and Surg. Jour.*, vol. cix., 1883. *Arch. of Kinderh.*, Stuttg., vol. xxxv., 1883–4. *Phila. Med. and Surg. Reporter*, i., 1884.

In this connection Copland remarks: "Nature in many of those cases asserts her own prerogative, and carries it above the many and incongruous agents too often irrationally, empirically,

and injuriously resorted to. If we consider the diverse, or even opposite nature of the measures which have been prescribed for this malady, their apparent success in some instances and their failure in others, and their employment in different states of the disease, with little regard to the navels or their operations in relation to pathological conditions, we necessarily must infer that recovery has sometimes taken place notwithstanding their use, and not by their aid."

Due warning of the effects of pressure, or approach of the disease, is given by the child being disposed to whine and cry ; it may be subject to heavy deep slumber, or starting in sleep ; is languid, moans, cannot take the breast, although seemingly anxious to do so. A peculiar restlessness or twisting of the upper extremities while awake without evident cause, sudden changes of color, screwing of the mouth, accompanied at intervals with a characteristic shriek, are reckoned sure forerunners. Generally with one or more of these symptoms preceding, the infant is seized as if by an electric shock. These follow every few minutes, when "every muscle is thrown into distorted action, showing the wrinkled forehead, livid countenance, elevated brow, closed eye,

dilated nostril, rigid masseter, fixed jaw, closed mouth, bubbling saliva, retracted head, turgid veins, arched spine, raised chest, troubled breathing, catching diaphragm, heaving abdomen, separated arm, squared elbow, bent wrist, clenched fingers, incurved thumb, extended legs, bent down toes, the whole figure rigid as wood—a pitiful sight." The paroxysm is renewed by a slight noise, the gentlest touch or zephyr. A placid interval of a few minutes succeeds, and then another fit follows. There is no uniformity about the bowels or kidneys. Emaciation rapidly advances. The skin assumes a brownish hue, and hangs in shriveled folds of leathery texture. Peace and pang pursue their sickening interchange, and the child sinks by degrees exhausted.

From such a history it is no wonder so many conflicting theories have been advanced as to the cause of this disease; in fact, any thing that the writer happened to fancy or guess has been offered. The first article of Dr. Sims's appeared in the *Amer. Jour. of the Medical Sciences* for 1846. He truthfully said that "the causes have been points of debate and conjecture—and of its true pathology we have never had any settled opinion. Its treatment has consequently been one of varied empiricism. Wherever there are

poverty, filth and laziness, or wherever the intellectual capacity is cramped, the moral and social feelings blunted, there will it be oftener found. Wealth, a refined mind, an affectionate heart, are comparatively exempt from the ravages of this unmercifully fatal malady. But expose this last class to the same *physical* causes, and they become equal sufferers with the first.''

In illustrating the great rigidity of the frame, in one of the cases he reports, he caught hold of the feet and raised the whole body without flexing the thighs on the pelvis. He then ran his hand under the head for the purpose of elevating the body in the same way, when he immediately detected a *remarkable irregularity* in the feeling of the bones. *It had lain during the whole of its illness exactly in one position all the time, the weight of the head resting wholly on the os occipitis.* The pulse was uncountable, and the breathing from 120 in a minute was reduced to 70, with a corresponding amelioration of the other symptoms. This occurred within ten or twelve minutes after he had taken up the child for examination—and in this way he discovered the relation of *position* to the disease. The child dying the next day, a post mortem examination showed the superficial vessels of brain full

of black blood, and coagulum occupying the whole length of spine.

After describing the anatomical peculiarities of the fœtal head, the spinal venous circulation, and manner of extravasation, he refers to three cases observed by other physicians who were acquainted with his forcible and common sense views. Extravasation had set in in two—but there was sufficient evidence to show an amelioration of the symptoms even in these, and the diagnosis was confirmed by the post mortems. The third, although there was a marked inward displacement of the occiput, made a good recovery by simply placing it on a soft pillow on its side.

In his second article, published in 1848, Dr. Sims says, that new facts and observations had satisfied him that deficient ossification of the cranial bones was not essential to the production of the disease; and it was not intended to be understood as a *pathological* condition, but simply the *physiological* state so necessary to a safe and easy parturition. He modifies his statement as to *dorsal decubitus*, having found that children may have trismus, and at the same time be kept on a feather bed, when they are laid upon what is usually called *the side*. He also admits that a child may die of the disease in its most ag-

gravated form, and yet have no extravasation within the spine.

The position is fully sustained by his observations, "That trismus nascentium is a disease of centric origin, depending upon a mechanical pressure exerted on the medulla oblongata, and its nerves; that this pressure is the result, most generally, of an inward displacement of the occipital bone often very perceptible, but sometimes so slight as to be detected with difficulty; that this displaced condition of the occiput is one of the fixed physiological laws of the parturient state; that when it persists for any length of time after birth, it becomes a pathological condition, capable of producing all the symptoms characterizing trismus nascentium, which are relieved, simply by rectifying this abnormal displacement, and thereby removing the pressure from the base of the brain."

The first case of *trismoid*, or chronic form of the disease, that he saw and describes, was in the practice of his friend Dr. Vickers. Many writers, he says, describe two varieties, acute and chronic, among them Coley, who is quoted as follows: "The chronic variety commences with dysentery, and is attended with a cold, exsanguineous state

of the skin, whence it has been popularly denominated the 'white locked-jaw.' This form of the disease is tedious, and attended, as when dysentery is uncomplicated, with rapid emaciation, which renders ordinary treatment insufficient, and terminates in death."

Of the case mentioned, Dr. S. remarks, "If the occiput was so much displaced, and the child lived *five* months, how is it that they die very suddenly, and that often when the occiput is so slightly displaced as to be scarcely discoverable? Let us examine the facts for an explanation. The child was kept all the time in a cradle, without a nurse. The cradle was too short to allow it to lie flat down, so it was kept in a semi-erect position, with its head supported by a large old pillow of chicken feathers, all matted together—the cradle was too deep and narrow to allow it to turn on its side, even if it had been strong enough to do so—the unvarying 'dorsal decubitus' kept the occiput displaced; the semi-erect position threw the weight of the head on that point of the occiput between the occipital protuberance and the posterior fontanelle; this necessarily tilted the mesocephalon forward against the cuneiform process of the occipital bone, and pressure exerted on the pons always produces chorea or paralysis, or both,

in exact proportion to the amount and degree of pressure. The semi-erect position was altogether favorable to the prolongation of the disease (and of life), because, in a perfectly supine position, the weight of the head would have rested lower down on the occiput, which would have displaced the bone, so as to press more on the medulla oblongata and the eighth pair of nerves, and thus the patient would, in all probability have died, at a very early period of asphyxia."

He then passes on to a class of cases, where it is not so easy to detect the occipital displacement, and where there will be less of the "dorsal decubitus;" but in which the true relative position of the bones may be readily detected, when the way of doing so is understood. "Suppose," he says, "I am called to a child, hearty and plump, with symptoms of trismus, the bones of the head being well ossified. The mother says that she 'always lays her babe on the side.' I run my hand around its head, applying the palm to the occiput, as nine out of ten would investigate it, and feel no displacement. But now let me go to work to find out exactly the relative position of the bones. And here, let me say, that one of two things must *invariably* exist; either the occiput will be under the parietal, or *vice versa*, according to the posi-

tion in which the child has generally been retained. I have examined the heads of several hundred infants, and I have seen but very few during the first week, and none after the second, in which the edges of these bones were parallel, and the commissure on the stretch. This occurs only where the ossification is very deficient, is easily detected, and of course forms an exception to the general rule. And now for the method of finding this out. If it is not ascertained almost by the sight alone, I press the forefinger firmly against the occiput, about half an inch from the lambdoidal suture, and at a point about half way between the posterior fontanelle and the mastoid process. I now pass the finger slowly and cautiously across the suture ; at every step making firm pressure. When the finger arrives at the suture, or commissure, if the occiput is under the parietal bone, it will be found to yield, and the finger coming in contact with the edge of the parietal, will have to be elevated a little so as to pass over on to its free border ; but if the occiput is on the outside of the parietal, then the finger meets with no obstruction : on the contrary, it glides smoothly over, and falls on to the parietal. The proof will be found in a retrograde maneuver."

These teachings—so interesting and philosophic, so in accord with my own experience—justify yet a further extract. The arguments adduced all go to show that the disease is the result of pressure exerted at the base of the brain by *inward* displacement of the occiput, differing in degree from the slightest to the greatest. There is yet another class of cases which he describes, plainly caused by an opposite state of things, namely, by prolonged *lateral* decubitus, with a position of the occiput *exterior* to the parietal bones. "It may reasonably be asked, 'How does pressure in these two opposite modes, produce precisely the same results?' Let any one who feels curious on this point, procure a recent fœtal head, cut away the frontal bone, and scoop out the cerebrum, leaving the falx, tentorium, cerebellum, and medulla oblongata, and its nerves, *in situ*. If the occiput is not very movable, let him cut it loose from the parietal bones along the lambdoidal commissure, leaving a small point of attachment right at the apex. In this condition, the bone can be made to lap over, or slide under the parietals, at will. Now let the occiput be displaced *inwardly;* make firm pressure upon it, at the same time that you look through the opening made by the removal

of the os frontis ; and it will be seen that the displaced occiput pushes forward the whole of the cerebellum, (with the posterior lobes of the cerebrum); that the pons and medulla oblongata are pressed forcibly against the cuneiform process of the occipital bone; and that the fifth, seventh, eighth and ninth pairs of nerves are compressed, pinched, stretched, or thrown into folds near their several points of emergence from the cranium. And here it would be easy enough to analyze the different symptoms of the disease, showing their dependence upon this pathological condition. For instance, the ninth pair of nerves (distributed to the muscles of the tongue), coming out of the fissure between the corpus pyramidale and olivare, being the first and easiest compressed, accounts for the difficulty of sucking being the earliest symptom of the disease. The accelerated circulation, but particularly the hurried breathing, and the laryngismus, may be traced along the eighth pair of nerves and its branches ; while the hard featured, puckered-up expression of countenance, with the spasms of the eyelids, or their open, paralyzed condition, may be seen along the portio dura of the seventh pair.

" The locked or fallen jaw, and the great difficulty of prehending the nipple, are referable to

pressure exerted on the motor branch of the fifth pair. The tonic rigidity of the extremities results from the persistent pressure on the pons, propagated through it to the motor track of the medulla, while clonic spasms come on as a consequence of these, or are excited by sound, by motion, or any thing affecting the excito-motor system. The regurgitating sort of puking, the borborygmy, and the diarrhœa, are to be accounted for by the intimate connection existing between the sympathetic and the nerves implicated at the grand point of pressure.

"Let us now see what is the result of pressure on the parietal bones, when the occiput is *exterior* to them. Give them, then, this relative position. Now look, as before, through the opening made by the removal of the os frontis; then compress the parietal protuberances laterally, so as to cause their lambdoidal edges to approximate each other, thus diminishing the bi-parietal diameter—and what is the consequence? Why, the posterior lobes of the cerebrum are compressed, and pushed down against the tentorium; the occiput is thrown out from its vertical direction, which causes a stretching of the tentorium; the cerebellum is consequently squeezed up between the tentorium above, and the occiput be-

low, and is thus made to slide forward, pushing the medulla oblongata into its bed in the cuneiform process of the os occipitis, and compressing it there just as certainly and as effectually, (though not quite so strongly), as when the pressure was made directly behind on the occiput."

I will now consider those cases which came under my own observation, and which, for convenience I have divided into three classes : viz. 1st. Those that recovered under postural treatment. 2d. Cases in which post mortem examinations were made, many of which were seen before death, but too late to render any service. 3d. Those whose history was obtained after death, the majority also having been seen before fatal results ensued, but where post mortems were not permitted.

The first class embraces six cases, mostly of trismoid. This is to be expected for the reason that the acute form, which runs a more rapid course, is seldom seen by the physician, or when he is called, the patient is generally in the hopeless stage of extravasation, or on account of severity of paroxysms, death has taken place from asphyxia. Hence I have included in the statistical table of two hundred and twenty-nine deaths which follows, all under a month old only. I

made altogether about one hundred and fifty post mortems, but to save repetition, I have selected at random the twenty-five recorded in Class II., and the eighteen in Class III., as a fair average of the general results.

The peculiar degree of pressure, as shown in Dr. Sims's illustration, accounts for what he appropriately denominates trismoid, or the chronic form of the disease.

Class I.—Case I.—On the tenth of December, 1878, while visiting a patient at No. 1121 Fourth Street, I was asked to see a dying child (white male) 8 months old, down stairs ; not that it was thought I could do any good, but just to pacify the distracted mother. On entering the room, Mrs. C. told me her baby had been sick since four weeks old, and at various times was under the treatment of three physicians for "bowel complaint and fever," but nothing had seemed to give relief. The first thing, that she noticed, the child began to fall away, had diarrhœa, occasional vomiting, convulsive twitchings, almost constant whining, crying or fretting. When laid in the crib it would cry piteously, all the symptoms then becoming aggravated, and would roll the eyes and sway the hand aimlessly backward and forward. This distressing condition had grown

steadily worse, the loose bowels being especially marked, as many as twenty-two operations occurring in one day, consisting chiefly of blood and mucus. She said she had been expecting it to die every day; it had repeated weak spells, and would lie apparently breathless, with cold and clammy extremities, never sleeping as other children.

The child was in bed on its back, and on first sight was the least promising case I ever saw. The pale and waxy look sadly portrayed its sufferings, and confirmed the history just given. It was indeed a living skeleton, presenting in addition the appearances of incipient hydrocephalus. Taking the little sufferer in my arms, I carefully passed my hands over the parietal and occipital regions, and had no trouble in detecting an unnatural unevenness at the junction of these bones, the occipital being overlapped perceptibly by the parietals. By gentle manipulation the bones were adjusted with a snap, when (although it may appear fanciful) I was at once rewarded by a bright upward look of the child, as though it had been suddenly relieved from great pain or shock. Even yet I felt doubtful that he could rally, and did not allow my enthusiasm to exceed caution in the prognosis. I endeavored, how-

ever, to explain to the mother that *position* was the last chance of saving life; that she must watch him, now that the bones were in apposition, and keep them so; that she should not place the child on his back, but properly change him from side to side. As for medicine, none was needed. On leaving the house her look of anxiety, now mingled with hope and expectation, assured me that nothing would be left undone.

At my visit next morning the transition was wonderful. The mother, buoyant and happy, held the babe in her arms, just awake from a natural slumber. She said she was so impressed with care in carrying out my instructions, that she had not laid the child down since she saw me, having sat with him the whole day and night; that she was encouraged by the favorable change from the first; he had a long sleep, something so novel—indeed, he had not slept at all for forty-eight hours before—and that, on awaking from this sleep, he cried for nourishment, after which he began to look bright, and notice things, and she now knew he was getting well. Improvement steadily continued, there being no return of a single bad symptom.*

* The mother, who has since removed to Boston, brought the child to see me last summer. He is now five years old, has remained perfectly well, and is a bright, rollicking little fellow.

Case II.—Infant of E. C., colored male, fifth child (one died of the disease when three weeks old), born March 31st, 1879, and was perfectly well up to May 6th, when straining and griping pains of the bowels were noticed, followed by a marked convulsion with slight opisthotonos; this wore off in a few minutes, being succeeded by a calm sleep. The second and third paroxysms occurred the following day, crying, jerking or moaning, filling up the intervals until I saw it May 8th; refused to nurse just before the first spasm. I found it extremely weak and emaciated, not having had food for two days. Examination showed the parietal bones overlapped by the occipital, and quite fixed. Having given directions as to position, I left, and was accompanied on my visit next morning by Dr. Marsteller. There was a marked improvement, and it had nursed feebly during the night. The day following it was still further improved, now seizing the nipple without assistance; the fingers were also flexible, and the secretions normal. I saw my patient the last time on the 12th, and discharged it perfectly cured, without a dose of medicine.

Case III.—Female child of Mrs. K., white, finely developed, three months old. I saw this

patient with Dr. Marsteller, on the 28th of September, 1879; was quite well up to the 23d, when it commenced to fret, and had an "inward spasm." The mother thought these were symptoms of teething, and was not alarmed until it became indifferent to the breast, followed by bloody discharges; whining and fretting were constant, and the only way it slept, or had relief, was by being held erect in her arms. Upon examination, it was difficult to detect any irregularity of the bones, the head was so rounded and well formed. On the left side, however, there was some wedging and tenderness at the junction of the occipital and parietal; pressure here produced such an aggravation of the symptoms, that the mother, thinking we were injuring her babe, snatched it hastily away. She said the nurse was in the habit of laying the child flat on her knees, and bouncing it to make it quiet. On leaving, I simply gave directions as to position, and was rewarded in the morning by the intelligence that it slept well, and nursed a little better. The second day it was entirely relieved, and there was no further bad symptom.

Case IV.—Infant of L. S., colored female, born October 11th, 1879. On the 26th, the mother called at the coroner's office for a certificate of

death in the case of its twin brother. She stated that both had been sick almost from birth, and she was compelled to work and leave them in the care of strangers. In her absence they were fed on the bottle, having only the opportunity to nurse night and morning, when they would attempt to take the breast in the intervals of the spasms; these ensued about ten days from birth, both children being affected alike, the boy having just died.

Before leaving the office she asked for a certificate also for the girl, remarking that it would be dead before her return; but in reply to this request, she was told she had better wait until it died.

Happening to meet the coroner soon afterward, he informed me of the circumstances, and accompanied by Dr. Clarke Patterson, I visited the house, an overcrowded tenement in a healthy locality. The room, which was occupied by three adults, was full of smoke and the fumes of cooking. It was about seven feet high and ten feet square, with two windows, slightly raised, and the door so situated as to favor the twirling of the cold wind through the apartment; a bed filled half the space—one chair, an old bureau, and the stove which blocked the entrance, constituted the contents.

On looking around, we beheld the dead child under the window, ready for burial. It was yet warm, and the wrinkled, emaciated countenance, flexed thumbs and marked occipital depression, indicated the work done. On the only chair sat a colored woman, with the subject of this case in her lap, the occiput being pressed directly inward. The child was so exhausted it could not afford a respectable paroxysm. There it lay—dried up, wrinkled, and frowning with suffering—the very picture of a septuagenarian; it jerked and grunted, and, weak as it was, threw itself into painful contortions. These symptoms, the woman said, had continued all the week; she did not know how it was alive, and, when she could do so, had fed it with a spoon. Although I did not think the child would live, I gave the usual directions as to posture, and offered a pecuniary inducement if she could arrange to care for it better. In a little while it took the bottle, seemed easier, and fell asleep.

As a certificate of death was not called for, the next day, I visited my patient, and found it better. The day after there was a further improvement; the fingers and thumbs were now flaccid, and it nursed freely from the bottle held in my hand. The weather being cold, I cautioned them

again about exposure to the open window. I saw it well wrapped, and had reason to believe the child had practically recovered, and was steadily gaining strength. Recovery was complete on the fourth day. I therefore did not call again until the sixth, when, to my great vexation, symptoms of pneumonia presented, and it died that evening.

Autopsy in thirty hours.—Brain and cord *perfectly normal.* Lungs intensely congested.

Examination of the brother showed dotted extravasation and congestion of spine and brain. Thoracic and abdominal organs healthy.

Case V.—Female child of Mrs. A., white, five months old; was well up to the time her mother started with her from Montana. The long ride exposed it to an attack of pneumonia, for which I was first called. After the physical signs and other evidence of this disease had subsided for a reasonable time, I was at a loss to account for the fretful condition continuing. For several nights there was no rest for the mother or other relatives, the child constantly whining or crying, and it was only able to nurse sufficiently for a bare existence. My attention being directed to the head, I discovered an irregularity of the left occipito-parietal region, manipulation not seeming to effect any re-

sult. I directed the position of the child's head to be observed in the usual way, laying great stress on its importance. A good recovery slowly followed.

It will be apparent that the symptoms of trismoid were at first obscured by the pneumonia, and that both conditions were due to the long ride—the mother holding the babe in her arms—which, with the motion of the train, added to the pressure on the head.

CASE VI.—Mrs. L. O., white, primipara, was delivered February 5, 1882, by Dr. H. E. Leach, of twin boys; labor lasted forty-two hours. They did well up to the twelfth day, on the morning of which the mother was awakened by this child crying; after nursing, it quietly went to sleep again. About seven o'clock, she was alarmed at its refusal to nurse, followed by a characteristic trismus paroxysm. About noon, when the doctor arrived, he found these had continued almost without intermission. He notified me, and placed it immediately in a proper position on right side, having detected an unevenness on the left, when the spasms at once ceased, and did not recur until about four o'clock. This was induced by myself in presence of the doctor, but soon passed off on removing pressure of the finger on occiput. The child fully recovered.

The hygienic surroundings were all that could be desired, and there was never a clearer illustration of cause and effect.

CLASS II.—CASE VII.—On the 12th of March, 1879, I was asked by Dr. Leach to see the seven-day male child of V. C., colored. Had nursed hearty up to the evening of the tenth, when it commenced to shrug the shoulders, cry, jerk, and draw itself up, spasms soon following. We found it lying in a constrained position, partially on the back, occiput pressing against the edge of a hard bolster. Upon examination, marked depression of the occiput was discovered. The cord had dropped off the previous day, leaving a raw surface, through which unhealthy pus exuded.

In addition to postural treatment, calomel and chloral were ordered every two hours, with application of turpentine and sweet oil to the abdomen and spine. In the evening, the child was thought to be improving. Next morning, however, developed no change, except the greater exhaustion of the patient; paroxysms had continued at about the same intervals during the night. Death took place seventy-two hours from attack.

A very careful post mortem showed no extension of the disease of umbilicus, the arteries and vein presenting a smooth, healthy appearance;

nothing was discernible in the peritoneum or liver. The lungs were highly engorged. A few small clots were found in the posterior portion of cerebrum and cerebellum; but the entire spinal canal, external to the dura mater, was lined with dark, coagulated blood.

(I learned from the grandmother of this child that she had fifteen children, nine of whom died before two weeks old from "crying spasms.")

CASE VIII.—Female child of M. W., colored, primipara, born March 14, died March 27, 1879, sick three days; usual history, "was stiff all over;" laid mostly in a stupor during intervals of paroxysms; but there was visible evidence of suffering. I satisfied myself from questioning that the child's occiput rested chiefly on the mother's arm. A physician was summoned the first day, who failed to recognize the disease. Autopsy showed marked occipital depression. Umbilicus healthy. Lungs and brain highly engorged. Spinal canal lined with coagula. Other organs normal.

CASE IX.—Female child of H. W., colored, died April 1, 1879, aged four months. Was sick one month, occasionally having had spasms, and was very much emaciated. Post mortem showed marked occipital depression, the left edge being

more overlapped than the right. Large clots were found over the left hemisphere; brain and spinal cord much engorged. Lungs studded over surface and substance with miliary tubercle.

CASE X.—Infant of S. T., colored, male, born May 16, 1879. Had first convulsion half an hour from birth, followed by four more, and died seventeen hours after delivery. Autopsy in forty-two hours. Occipital depression and "looseness" of cranial bones from deficient ossification. Lungs, brain and cord congested.

CASE XI.—Female child of L. W., colored, born Sept. 12, 1879; seized sixth day, and died in sixty hours.

Autopsy twenty-four hours after death. Navel healthy. Occiput markedly depressed. Brain and pia mater congested—several hæmorrhagic spots were seen in the meshes of the latter. Cord lined with coagula.

CASE XII.—Infant of C. G., well developed colored female, born Sept. 15, 1879. Was well up to the morning of the 19th, when, on being put to the breast, refused to nurse. Upon being laid down it commenced to whine, and toward evening had "crying spasms," which were repeated at short intervals during the night. Dr. Leach saw the patient next day, and I accom-

panied him later, when we found it comatose, thumbs flexed, surface livid, frothing at the mouth, etc. ; convulsions had continued from time of seizure. It died in our presence fifteen minutes after our arrival, having been sick twenty-six hours.

Autopsy twenty-eight hours after death. Navel had fallen off the day it was seized, leaving the usual raw surface; otherwise healthy. The right side of occipital bone was overlapped by the parietal, while the opposite was the case on the left. Pia mater of brain and cord deeply injected, mostly in posterior portion of former, with dotted extravasation ; large clots in longitudinal and lateral sinuses. A bloody gelatinous fluid lined the spinal canal.

Case XIII.—Infant of L. B., colored, male, eight months utero-gestation, delivered by forceps Sept. 16, 1879. Was well up to morning of 21st, when it was taken with what the mother called a choking spell. I saw the patient next day with Dr. Leach. The course of symptoms exactly corresponded with the case above. Death took place in the evening, twenty-eight hours from attack. Autopsy thirty hours afterward. Navel nearly healed. In this case the left side of occipital was overlapped by parietal—the

reverse on the right. Same condition of brain and cord as foregoing.

CASE XIV.—Infant of A. H., colored, male, born Sept. 23, 1879. Mother died the same day of puerperal convulsions, after sixty hours' labor. The child was taken in charge by a relative, and continued well up to morning of 3d of October, when it had short respirations, and commenced to draw itself up and clench the fists. At 11 o'clock refused the bottle, convulsions soon ensuing, continuing until death sixty-four hours from attack. I saw this child with Dr. Leach on the second day; and although it was too late to expect recovery, I am convinced that the change of position prolonged life. Autopsy showed congestion of lungs, brain and cord.

CASE XV.—Infant of S. K., colored, well developed male, fourth child (one died of this disease two years before), born Oct. 6, 1879. Was well up the 13th, when it refused the breast. Navel fell off the fourth day, leaving a healthy surface; fretting, crying and jerking, first symptoms noticed. Paroxysms would last about ten minutes, and recur every five minutes, the patient becoming weaker at each successive one. Died in a spasm; sick thirty hours. Nursed hearty once during the disease.

Autopsy showed marked congestion of pia mater, and clots in posterior fossa, and cerebellum. Cord lined with coagula. Other organs healthy.

Case XVI.—Female infant of M. D., colored, born Nov. 22, died Nov. 28, 1879. Was seized on the fifth day, sick twenty-four hours. Autopsy sixty hours after death. Soreness of umbilicus, which was confined to surface. Spinal canal lined with coagula, and a few clots on posterior lobes of cerebrum and cerebellum. Other organs healthy.

Case XVII.—Infant of M. G., colored female, seven days old, died Jan. 14, 1880, twenty-four hours from seizure. Usual history. Autopsy in sixteen hours. Hypostatic congestion of posterior portion of lungs. Pia mater of brain intensely injected, with a few hæmorrhagic spots. Spinal canal lined with coagula.

Case XVIII.—Infant of P. W., colored female, died January 26, five days old, sick twenty-eight hours. First symptom, refusal to nurse. Extensive clots in brain and spinal canal.

Case XIX.—Infant of J. S. T., colored female, six days old, died January 28, 1880, thirty-three hours from seizure. Symptoms and post mortem appearances same as preceding.

Case XX.—Female infant of M. J., colored,

seven days old, ninth child of healthy parents; only one living; from the symptoms narrated, four died of this disease within two weeks from birth. This child nursed well up to sixth day, and died in sixteen hours. A curious feature was the absence of the usual paroxysms of convulsions, the principal characteristic of the disease present being the locked jaw, accompanied by indistinct moans and whining.

Autopsy thirty hours after death showed the occipital bone overlapped on the right side by the parietal, the reverse on the left. The frontal bore precisely the same relation—all impinged and pressed down the cranial contents. The membranes and substance of the brain and sinuses were intensely engorged; the cord also, but no extravasation. Umbilicus healthy. Other organs normal.

Case XXI.—Infant of S. H., colored female; born Jan. 25, died Feb. 2, 1880; sick twenty-four hours. Usual history of symptoms. Post mortem. Clots above and below cerebellum and in spinal canal.

Case XXII.—Infant of A. J.; male, colored; nine days old; sick twenty-four hours. Autopsy in thirty hours. Lungs and brain congested. Extravasation in spinal canal.

CASE XXIII.—Infant of C. P.; male, colored; age five days; died Feb. 4, 1880, twenty-four hours from seizure. Usual symptoms. Autopsy thirty hours afterward. Injection of pia mater, and dotted extravasation of brain. Spinal cord lined with coagula. Other organs normal.

CASE XXIV.—Infant of J. G., colored; first child; healthy male; born Dec. 13, died Dec. 20, 1881. First symptom noticed, refusal of breast the fifth day, when mother found the jaws locked, and in forcing with a spoon nourishment was returned. Soon the child commenced to quiver, double up its fists, foam and fret and grunt and cry and whine, and roll the eyes, which train of symptoms continued with usual aggravation, stridulous breathing, and opisthotonos. There was tonic rigidity throughout, and during the clonic spasms the sufferer, a mulatto, would turn a dark purple. The only intermission of these symptoms occurred the night before death, when it had three hours' sleep, occiput pressing on mother's arm (its general position since birth, as she informed me); awaking in a clonic spasm, and being repeated, until gradually becoming weaker, it passed imperceptibly away, thirty-six hours from seizure.

Autopsy, assisted by Dr. A. A. Hoehling,

U. S. N., forty-four hours afterward, showed marked occipital depression. Navel perfectly healthy. The pia mater of brain, posterior meningeal and cerebral vessels and sinuses turgid with black blood; the spinal veins were also injected with slight dotted extravasation. Lungs intensely congested, probably due to severity of paroxysms, which produced asphyxia and death.

CASE XXV.—Male infant of A. B., colored, primipara; born March 21st, died March 27, 1882. Was well up to fourth day, when seized with usual symptoms; died in thirty-six hours. Autopsy showed congestion of brain, cord and lungs. Umbilical arteries and vein healthy throughout.

CASE XXVI.—Infant of D. C.; colored male; born May 16, died May 27, 1882. Seized with the disease May 23. First symptom refusal of breast. A physician was called the day following, who prescribed salve for "a moisture or ulceration of the umbilicus," but he did not see the patient again; there was no mitigation of symptoms.

Autopsy twenty-four hours after death, in presence of Dr. Hoehling. Navel normal. Thumbs still flexed and inward arching of feet. Apex of occipital bone dislocated and depressed a quarter of an inch, but right parietal overlapped more

than the left; occipito frontalis muscle and scalp very livid. Bowels somewhat stained by bile. Lungs congested; more in lower lobes, and nearly collapsed. Umbilical arteries and vein perfectly normal. Posterior surface of cerebrum and cerebellum loaded with coagulated blood; surface of brain intensely congested. Spine also lined with coagula. (The mother of this child lost her first, a female, of same disease thirteen months before; was nine days old; sick one day.)

Case XXVII.—Another case, colored male, four months old, that I examined about this time, was very much emaciated, and with nothing else abnormal except congestion of the brain and cord. (The latter was removed for examination by Dr. Griffith, U. S. N.) It ran the usual course, and there was apparent depression of occiput. On questioning the mother as to whether the child generally lay in her arms while asleep, she said, "I had seven children and didn't use them to that, because it made them so cross; they cry all the time and want you to hold them."

Case XXVIII.—Infant of E. R.; colored female; fourth child (two others died of the disease); taken sick on the seventh day and lived ten hours; paroxysms almost continuous and extremely violent.

Post mortem in thirty-two hours. Umbilical arteries and vein normal. Lungs congested—the left collapsed; right auricle of heart distended. Pia mater of brain slightly congested; spine lined with reddish gelatinous matter within theca; removed for microscopical examination by Dr. Griffith. Cause of death asphyxia, from severity of spasms.

Case XXIX.—Infant of A. B.; colored female; one of twins born Feb. 1, 1883. When eight days old the mother was driven out of her room at the point of a pistol, and in running up stairs with both infants, she thought she knocked the head of this one against the wall. On the following day it was seized with the disease, and died on the 14th. During its five days' illness the child could not take the breast and regurgitated every thing given with the spoon. Necropsy in thirty hours. Umbilicus and organs of chest and abdomen healthy. Pia mater of brain congested, posteriorly reaching up to the vertex. Cord lined with coagula; removed for examination by Dr. Griffith.

Case XXX.—Female infant colored, second child, born Feb. 11, 1883—labor lasted twenty hours. Was well up to about noon of 16th, when it awoke crying, and soon refused to nurse, spasms

following six hours later. These continued in quick succession until death at 7 o'clock next morning.

Autopsy in five hours. Navel healthy. Lungs highly congested. Pia mater of brain congested, also the cord, with slight extravasation, which was taken to Dr. Griffith for microscopical examination.

CASE XXXI.—On the 15th of April, 1883, I made autopsy of another boy, of mother Case XXVI. He was seized on the sixth day and died within twenty-four hours. The apex of occipital bone was bent inward from the protuberance (like the other) forming a very decided ridge, more on the right side. Experiment showed it to be one of those cases where an operation could not avail, on account of the probable difficulty in retaining the inwardly arched bone *in situ*. Indeed there was an evident line of demarcation, or want of union between the point of ossification here, and the protuberant portion. Another interesting feature of the case was a small abscess of both umbilical arteries opposite the fundus of bladder ; a probe easily passed from it through the navel, which had apparently healed, but there was no congestion or inflammation of peritoneum surrounding. Left lung was intensely engorged. The normal bright

pink appearance of the upper lobe of right lung, was in marked contrast with the dark congested state of the middle and lower ones. The surface of brain was much engorged, with slight extravasation in the posterior lobe and cerebellar fossæ. Spinal cord lined in its anterior, and chiefly lower portion, with reddish gelatinous matter which has been seen but not noted in many of the other cases ; removed for examination by Dr. Griffith.

CLASS III.—CASE XXXII.—This, an almost parallel case to that of the child of Mrs. C. (Case I., Class I.) I saw through the kindness of the Coroner, Dr. Patterson. Being called to give a certificate of death, his attention was directed to a sick child, male, about four months old, lying in a crib. The doctor made an examination of the head, and endeavored by manipulation to adjust the occipital which he found overlapping the parietal bones, but failed to do so. Arriving at the house the mother informed me that her baby was sick since birth, never having had a well day ; that it constantly fretted, whined or cried, and would toss about and feebly beat its head, refuse nourishment, etc. It had not grown at all, and was not much more than a skeleton.

This history was but a tame expression of the

child's sufferings; its truth was too plainly told on the shriveled painful countenance, and although four months old, it had not attained the average weight of an infant at full term. My examination of the head confirmed the character of displacement reported by Dr. P. I found the right parietal bone more deeply overlapped than the left, firmly locked and impossible to release by ordinary manipulation. The child was so low, I explained to the mother the necessity of immediate interference even by an operation. (The one I proposed to perform is that of Harrison's, described by Dr. Sims, which will be discussed further on.) For herself she had no objection, but her husband not being present to give his consent, I deferred it till the next day if the child was then living. It died, however, during the night. No post mortem was permitted.

CASE XXXIII.—Infant of C. T., colored male, died Jan. 10, 1879, twelve hours after birth. Was seized with convulsions immediately after delivery, continuing until death. Marked inward displacement of occiput.

CASE XXXIV.—Male child of Mrs. P., white, well developed, born Jan. 4; died Jan. 11, 1879. Parents well-to-do Germans, residing in a dry, healthy part of suburbs; third child they lost by this

awful malady, the first living one day, the second four days.

Mrs. P. informed me she had no attending physician ; that the baby thrived well until the fifth night, when it refused the breast and soon afterward had a crying fit. She showed me how she sat up with it in bed, the occiput resting on her thigh. (About three years ago a fourth child was born. On meeting the mother a few months since, she thanked me for my suggestions and explanation of the disease, as she believed this last child was preserved on account of such knowledge.)

Case XXXV.—Female child of B. T., colored (mother of seven children), born Jan. 13, 1879 ; taken sick fourth day, died in sixteen hours—refusal to nurse first symptom.

I could not obtain an accurate history. There were "inward spasms," however, and great rigidity, "head burned up with fever." For an hour or more pressure on the occiput was probably accidentally relieved, as the child nursed once heartily, symptoms recurring after laying it down.

Case XXXVI.—Infant of M. A. M., colored, perfectly developed healthy female, born Jan. 8, died Jan. 16, 1879, after thirty-three hours' illness. Was well up to night of 15th, when the first thing no-

ticed she refused to nurse. Upon being laid down it shrieked, whined, and had crying fits and jerking spasms. During fits the head was thrown back, mouth frothing, countenance frowning, fists doubled up or locked in front of breast. The nurse explained that when sitting up in the arms there would be a temporary subsidence of symptoms, but when she placed it in her lap they became aggravated. This led me to ask the exact position of the child when in her lap, which she illustrated with another child, showing me clearly that the whole weight of the head had rested on the occiput across her knee. During the course of the child's sickness it would repeatedly try to take the breast. Jaws were stiff, eyes alternately open and shut, and no sleep from the time of attack. Navel looked healthy. Inward displacement of occiput.

While in the room investigating the case, one of the women present remarked that when she laid her child on the back, "it looked like it was dead, and would seem strangled until I rushed and changed it on the side." Another said she lost hers by crying fits on the ninth day, after thirty-six hours' sickness; one of the first symptoms she observed being, that the child would wake in fright and jump, after being laid on the back some time.

CASE XXXVII.—Another case of trismoid was the adopted child of J. T., white male, five months old, where I was called Jan. 20, 1879, through the courtesy of Dr. Patterson. This case also presented the appearances of hydrocephalus, the picture of suffering being depicted in countenance even after death. History exactly similar to the others. Parietal bones overlapping occipital.

CASE XXXVIII.—Infant of J. H., female, white, born Jan. 26, died Feb. 1, 1879. This child was puny from birth, and was not able to take the breast, although it repeatedly made efforts to do so. When laid on its back, or held by the mother, the head resting on her arm, it would whine and "have fits of little jumping." On the 30th it refused nourishment entirely, next day became rapidly worse and soon died. I took pains in this case again to see the exact manner in which the child was held, the result showing as a rule the occiput rested on the lap or arm.

CASE XXXIX.—Infant of L. T., colored female, (seventh child—three still-born—and from the history given, one of the others died of trismoid three months old), born Feb. 1, died Feb. 12, 1879, sick twenty-four hours. Born with convulsions, which continued till next day, then nursed heartily until they recurred on the 11th. The

mother, on noticing the fixed jaws, from that moment gave the child up.

CASE XL.—Female infant of S. M., colored, born Feb. 14, 1879, although fully developed was never well; the first night had quiverings, groaned and fretted. It continued in this condition until the 20th, not having nursed at all, when convulsions ensued, following in rapid succession until death at 10 P.M., Feb. 22d. "The child during the attacks would froth at the mouth, become stiff and turn blue."

CASE XLI.—I was called on the 22d of February, 1879, to see the female infant of I. W., colored, seven days old. I found it in a characteristic spasm, lying on its back in the lap of an old midwife. I took up the child, examined the occiput, and found it overlapping the parietal on left side, while the reverse was the case on the right. By this time the convulsions ceased, and the face and neck (which were a dark purple color) gradually resumed a natural tinge. After persevering manipulation, I relieved the displacement to a marked extent, and for more than half an hour it continued comparatively calm. The mother told me this was her third child, the labor lasting only three hours. Her first had had spasms when it was two weeks old, but recovered,

and had them again in a month, when it died. She pointed me to her second, a bright healthy-looking child about two years old, who also had spasms when an infant. The baby in question was strong and vigorous, and nursed heartily up to 7 o'clock the evening before I was called, when suddenly it commenced to fret and stretch itself; it "got weak in the jaws" about 9 o'clock and refused to nurse. She gave colic mixture for the "rumbling of wind in the stomach," but it continued fretting and jerking and getting worse all night. The first severe spasm occurred about 6 o'clock, since which time up to my arrival (eight hours after), they continued every half hour, lasting over five minutes.

Upon directing my attention more closely to the patient, I found it was in a comatose condition; the eyes and hands were shut, the thumbs firmly grasped between the two first fingers, the pupils contracted, requiring force to examine them. There was nothing unnatural about the bowels or urine. Before leaving, I gave directions as to proper position. In the evening the child continued unconscious, although there was no aggravation of the other symptoms, until just after my arrival when another severe paroxysm occurred, from which it seemed impossible to re-

cover. Gradually a deep lividity spread over the face and whole body, and it lay painful to behold, bent in the position of opisthotonos; this quietly passed off, being quickly succeeded by little jerkings. The respiration was now hurried and irregular, and pulse imperceptible. Jaws continued fixed, and tongue tightly held between the gums. In this condition it lingered till the following day. I had the theory from the first that extravasation had taken place early upon the brain and spinal cord, which accounted for the comatose condition and opisthotonos; and change of position, nor any thing else, could have saved life. Post mortem not permitted.

CASE XLII.—Female child of E. H., colored, seven days old, third lost by this disease; attacked the fifth day. Usual symptoms; died in thirty-six hours.

CASE XLIII.—Infant of M. L., colored, born February 26, 1879, twenty-three days old. First had spasms when a week old, which passed off without treatment. It nursed and continued well up to the evening before death, when "it commenced to draw itself up, and look as if something hurt it inside; no passage from the bowels, but straining and rumbling of wind; jaws were weak—had snuffles and grunted—rolled the eyes, and doubled

up the fists in spasms." Occipital depression well marked. No soreness of navel.

CASE XLIV.—Male child of L. S., four months old, light mulatto, was attacked on the 23d of March, 1879. Indifference to breast, low whining, jerking, etc., first symptoms noticed. These continued aggravated from day to day until the 31st, when Dr. Leach was summoned. I accompanied him in the morning and found the child's head almost at right angles with the trunk, presenting the most marked case of opisthotonos I ever saw. It was in the mother's lap, occiput resting as usual on the arm. Examination showed occipital depression, the left side being more overlapped. I placed it on the right side lengthwise on a pillow, and continued to watch it a few minutes, when the old granny said that was the first rest it had since taken, adding that when lying in her arms or lap, it was all the time whimpering, kicking, and seemed uneasy. Although the child was four months old, pressure on the occiput with the finger, produced at will an aggravation of symptoms. It was so exhausted when we arrived that death followed in a few hours.

CASE XLV.—Female child of M. G., colored, born April 9, 1879. Was well up to the evening of

14th, when the first thing noticed was hoarseness, then refusal of breast, spasms occurring twelve hours later. The disease ran an acute course, with usual symptoms intensified, death following twenty hours from seizure. The lambdoidal and sagittal commissures were fully a quarter of an inch wide.

CASE XLVI.—Male child of L. C., colored, seven months old ; never seemed to be well. I saw the case on the 12th of April, and found marked displacement of occipital bone. It was very much emaciated, and lay in an occipito-parietal position, grunting and jerking, eyes fixed, and the thumbs flexed on the palm. The whole body was rigidly curved backward. The child was *in articulo mortis*, and died the same evening.

CASE XLVII.—Male child of J. D. white, age five days, born April 24th, in an elevated and healthy portion of the county, died April 29th, 1879—fourth child of healthy parents ; the others living and well from birth. This child commenced to nurse on the 26th, continuing regularly until midnight of the 28th, when its refusal was the first symptom noticed ; the day before, however, it was observed to moan when asleep. The mother laid it generally on her arm, either on the back or side. After the refusal to nurse it

would cry and fret, draw itself up as if it had cramps, clench its fists, and froth at the mouth; it was then discovered that the jaws were fixed, and the child could not swallow, a soothing mixture being returned mixed with froth. The first convulsion occurred eight hours after the refusal to nurse, and they continued about every half hour, lasting sometimes ten minutes—towards the last they came on every five minutes. During these paroxysms the face and neck were particularly livid, and the head rigidly thrown back. Illness lasted twenty-four hours. There was marked occipital depression, and "looseness" of cranial bones from deficient ossification. No inflammation of umbilicus. The mother observed that when laid on its side flat on a pillow, there was a general lull of symptoms. The robust health of the parents, the scrupulous cleanliness, and the remarkably healthy surroundings, were especially noticeable.

Case XLVII.—Infant of S. G. C., colored female, born November 4th, 1879. Was well up to night of the 10th, when after being nursed and laid down, awoke in about an hour, fretting and crying. The mother tried to quiet it by offering the breast, which was refused. There was not much change until early morn when the first spasm oc-

curred. Symptoms ran usual course, death taking place thirty-three hours after attack. I saw the case six hours afterward. Occiput much depressed; indeed, it could not be otherwise, on account of the lack of development of the bones, allowing nearly an inch space at their junction, which gave a loose, baggy feeling to the head.

Case XLIX.—Infant of M. G., colored, male, born December 7, 1879. I was called to see this case on the sixth day from birth. The mother told me it was well and hearty up to the evening of the 12th, when it was taken sick with a pain in the stomach and crying—soon commencing to stretch himself, and draw up his arms. He went to sleep for an hour or two, and on awaking "looked as if he had a stopping in the head—was kind of choked and couldn't get his breath," (stridulous breathing). At times he turned black in the face, and she would try to nurse him, but he couldn't take hold; he continued to snuffle and choke and strangle.

The first spasm occurred about 8 o'clock, being repeated every fifteen or twenty minutes, and lasting one into another. In this condition I found him. The paroxysms were so severe and well-marked, accompanied with lividity and opisthotonos, that extravasation had too evi-

dently taken place. I placed him on the side and attempted to feed with a spoon, but the power of deglutition was gone. Death occurred during the night, thirty hours from attack. The examination before death showed plainly depression of the occiput on the left side, and the natural relation of the bones on the right. Navel had sloughed off the fourth day, leaving a perfectly healthy surface.

The following tables represent the mortality for four years of cases under thirty days, coming under the Coroner's jurisdiction, and give the color, sex and age for each year; also, grand total and month in which deaths occurred,

	White.		Col'd.		Age.																		
Year.	M	F	M	F	Under 1 day.	1 day.	2 days.	3 days.	4 days.	5 days.	6 days.	7 days.	8 days.	9 days.	10 days.	11 days.	12 days.	13 days.	14 days.	15 days.	18 days.	21 days.	25 days.	30 days.	
1879	5	3	23	31	6		2		1	10	7	14	4	6	2	1	1	1	5	1		1			
1880	2	1	30	31		1	2	4	3	13	7	14	6	3	2	1	2		3			1	1	1	
1881	4	2	29	14		2	1	4	1	1	6	8	9	3	1	4		1	3	1		2		2	
1882	2	1	31	20		2		2	1	9	10	13	3	5	1	1			3		1	3			
Total	13	7	113	96	6	5	5	10	6	33	30	49	22	17	6	7	3	2	14	2	1	7	1	3	229

MONTHLY MORTALITY.

Year.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1879	7	8	4	3	4	6	4	2	7	8	5	4
1880	5	9	5	5	2	10	6	3	7	4	6	2
1881	5	4	3	2	1	2	7	3	6	6	8	2
1882	4	5	3	3	8	2	3	2	8	6	4	6
Total.	21	26	15	13	15	20	20	10	28	24	23	14

It will be seen that during the six warm months, viz., April, May, June, July, August and September, one hundred and six deaths occurred, or nearly one-half of the whole number, showing that the disease does not prevail in any one season more than another, as claimed by some authors. It will be further noticed that the term "nine-day fits," is a misnomer, as only seventeen of the two hundred and twenty-nine died on the ninth day, or 7.4 per cent. That sex has nothing to do with the disease, will be observed also from the table, the small increase of males being merely in proportion to general statistical results.

The colored element largely predominates, but this again only bears a general ratio to other diseases, and not from any "peculiar organization," or "hereditary tendency." For, according to the annual statement of deaths of all ages certified by the Coroner for 1879, one of the years mentioned—although the white population was two to one—of the whole number (six hundred and twenty-five,) four hundred and eighty-four or seventy-seven and four-tenths per cent. were colored. Another important factor which swells the mortality among colored infants, is, that many mothers being employed during the day, their

babies are neglected or left to strangers, and very often allowed to remain hours at a time in a crib, generally on the back. It is proper to say that the table includes a large number reported as "Convulsions," whose history was exactly the same. This was done pending these investigations, and following the usage of other physicians. To a great many in general practice, trismus is an obscure disease; an infant is found in a paroxysm of convulsions, and the death certificate so records it.

The following shows age when seized, of two hundred and nine cases,—at birth, 15; one day, 2; two days, 13; three days, 10; four days, 39; five days, 34; six days, 35; seven days, 17; eight days, 9; nine days, 8; ten days, 7; eleven days, 6; twelve days, 3; thirteen days, 3; fourteen days, 1; seventeen days, 2; eighteen, nineteen, twenty, twenty-three and twenty-eight, 1 each. (Of those sick from birth, or born trismal, one lived 30 days, one 7 days, one 5 days, one 3 days, one 36 hours, one 33 hours, three 1 day, one 17 hours, two 12 hours, one 10 hours, one 5 hours, one 1 hour).

Of the two hundred and twenty-nine in the table, the duration of disease of two hundred and seven only could be ascertained as follows: one

lived 1 hour ; one, 2 hours ; one, 6 hours ; one, 10 hours ; two, 12 hours ; one, 14 hours ; two, 15 hours ; two, 16 hours ; one, 18 hours ; seventy-four, about one day; one, 28 hours ; one, 30 hours; two, 33 hours ; one, 34 hours ; eight, 36 hours ; sixty-six, about 2 days ; twenty-four, 3 days ; nine, 4 days ; one, 5 days ; one, 6 days ; four, 7 days ; one, 11 days ; one, 14 days ; one, 30 days.

The table below shows the mortality under a month, during the same period, from all other causes combined, such as violence, congenital debility, premature delivery, etc., not including still births.

	White.		Col'd.		
Year.	M	F	M	F	
1879	13	14	39	32	
1880	12	5	29	31	
1881	6	4	32	27	
1882	12	7	39	39	
Total	43	30	139	129	341

This demonstrates only a trifling difference in the percentage of males (fifty-five to fifty-three) compared with the trismus table, and ought to dispose of the latest theory that adherent prepuce is largely the cause of the disease. The increase of whites in this table is due no doubt to the equal likelihood of accidents and violence, as it includes chiefly the poor, or those in the same station that the colored represent.

Now, with regard to the identity claimed between this disease and tetanus in the adult, it will be apparent that the statistics presented do not confirm this view. It is also disproved by the comparisons of Dr. Sutton and others, previously given. Holmes mentions two hundred and seventy-seven cases of traumatic tetanus, of which only one hundred and thirty or forty-seven per cent., were seized within ten days after the injury. I was enabled to learn the time of seizure from birth in two hundred and nine of my cases of trismus, of which number one hundred and eighty-nine or ninety per cent. were under ten days, while of the eighty-eight reported by Stadfeldt only one survived the tenth day. Matuszynski's twenty-five were all seen before the ninth day ; and one hundred and seven of the one hundred and fourteen of Clarke's died before the ninth day.

In a table of 327 fatal cases of tetanus in the adult, also reported by Holmes, seventy-nine succumbed within two days, or twenty-four per cent. I ascertained the average duration of sickness in two hundred and seven of my cases to be fifty hours, of which number one hundred and sixty-five lived two days and under, or about eighty per cent., and eighty-six lived one day and under, or forty-one and six-tenths per cent.

Another point in refutation of this claim of identity, is the fact that in the tetanus of the adult, febrile excitement is not essential, and if present is only secondary. Indeed O'Beirne states that of two hundred cases observed by him, not one was accompanied with fever. In every instance of trismus nascentium where I took the temperature, when the disease was at its height, I found an elevation, one case that I saw with Dr. Shadd of the Freedmen's Hospital, reaching 105.4.

Neither are the post mortem appearances alike. The brain, medulla and cord have been found in various conditions in the adult, but very rarely if ever have coagula been seen, although universally present in the infant. The similarity of these diseases in other respects I admit; but their etiological relation I deny. The principal basis of identity claimed is the trauma necessarily inflicted in the cutting of the cord at birth, irritating dressings, etc., to navel, which is supposed to correspond with the wound in the adult.

An analogy to eclampsia has also been claimed by some writers. In this connection, the following remarks of Dr. J. Lewis Smith accord with my own observations. After describing mode of attack and paroxysms of eclampsia—which differ widely from trismus—he says: "Death does not

ordinarily occur from one attack. There are several at intervals, during which the stupor is gradually becoming more and more profound, till finally there is total loss of consciousness and sensation. This is the most frequent mode of death, namely, from coma. * * * *

"The only disease for which there is danger of mistaking eclampsia is epilepsy." (We all know what a far remove this is from trismus.) "M. Ozanam mentions the following means of distinguishing the two: 'Eclampsia differs from epilepsy in the frequent occurrence of prodromic symptoms; the clonic form of the convulsions; the rare appearance of froth in the mouth, the absence of a hideous aspect of the countenance, the spasmodic and sobbing character of the respiration, and a state of quiet without snoring which succeeds an attack. Eclampsia consists in a rapid, forcible and involuntary muscular contraction, *alternating with relaxation*.'" (In trismus there is generally tonic rigidity throughout.)

Another difference: "Eclampsia occurs at any period of infancy and childhood, and is either idiopathic, symptomatic, or sympathetic. The most common cause, however, of clonic convulsions is the presence of some irritant in the primæ viæ. Dentition, worms, etc., are also causes."

With regard to trismus, he says: "To one who has seen this disease in the new-born, or is familiar with its symptoms, diagnosis is easy. The symptoms which possess diagnostic value are more manifest and reliable than in most other infantile affections."

The symptoms of congestion of the brain, or apoplexy, have likewise been advanced as analogous; but the inability to suck, pointed out by Dr. Sims, must be regarded as pathognomonic of trismus nascentium. An equally unfailing sign that I have observed is opisthotonos, which *invariably* accompanies congestion or extravasation of spine, and is not present in congestion of the brain.

The umbilical cord has been the most generally accepted cause of the disease, because in many instances, probably from the twistings and contortions during paroxysms, a lesion of this sort has been found associated. But it has been also shown that extensive inflammation here has not produced a symptom of trismus nascentium. Every physician observes tenderness or redness of the navel, and knows that this is only the normal state attending the process of sloughing, or the few days following. How common it is for his attention to be called to the "baby's navel not healed yet," or "something is the matter with

baby's navel;" but does he find trismus? Chanier (*L' Union Med.*, 1879), gives the case of a *healthy* infant, born at full term, in whom the cord was green and red, flattened, and as if belonging to a still-born fœtus. In a five-weeks-old infant, that died of asphyxia from being accidentally overlaid, I found coagula and yellow matter lining the outer portion of the commencing obliterated umbilical arteries, while the inner were glistening white and healthy; but this coagula is only the well-known physiological effect of the ligature. The areola around umbilicus was nothing more than the stain of bile and decomposition.

When inflammation of the cord, with or without suppuration, is present, it sometimes extends inward, producing convulsions and death. These cases are liable to be mistaken for trismus, and in a few I examined there was generally peritonitis, but no extravasation along the spine. I have also examined several infants under a month old that died of other diseases, with a like absence of extravasation. Dr. Milduer, of Prague, who has recorded the results of forty-six cases of fatal inflammation of the umbilical vessels in children born in the lying-in hospital of that city, states that convulsions occurred in only five of the number, and that *in no instance had these convul-*

sions the least resemblance to those which characterize trismus.

Dr. Thorè says: "With regard to the umbilicus, the condition described by authors may be produced or developed during the disease. In my experience, there is nothing more common than inflammation of umbilicus, and nothing more rare than trismus."

Dr. E. Goldmann, of Texas, says that he has seen many cases in which no lesion of any kind could be traced to the navel. On the other hand, he had seen a number of children with navels ulcerating for weeks, with considerable tumefaction and redness around, and yet without tetanus intervening.

"The true pathology has not yet been discovered, nor can the soreness of the umbilicus be regarded as the peculiar pathognomonic lesion, for this is so frequently observed without the supervention of trismus, and they cannot therefore be associated as cause and effect." (P. C. Gaillard.)

Dr. Hancock, of Edinburgh, is opposed to cutting the cord, on the ground that it produces the disease; while some observers in the Southern States found the practice of not cutting the cord was limited to a stray midwife, and was invariably attended by fatal results.

Another point which the advocates of the umbilical theory seem to have overlooked, is the fact that no nerves have been traced to the cord. Who has ever observed the slightest evidence of pain or uneasiness in tying it? How then can the "reflex irritation" of Baldwin be explained? Dr. Woodworth, of Mississippi, while not advancing any theory as to the cause of the disease, thought that "physicians who attribute it to tying or dividing the funis improperly, must forget that the funis is not supplied with nerves."

Dr. Sutton, replying to the position taken by Dr. Watson, says: "But I do not suppose Dr. W. means that the wound inflicted on the cord *per se* ever gives rise to trismus. We know of no nutrient vessels in it—no nerves to direct vital operation." Among my own endeavors to ascertain something satisfactory on this point, I addressed a letter to Dr. Francis Delafield, of New York. His reply was: "I have no knowledge concerning the nerves of the umbilical cord."

If any thing more was necessary to refute this umbilical theory, I invite attention to the following extract of a lecture delivered before the Harveian Society of London, by Edmund Owen, F.R.C.S. (*Brit. Med. Jour.*, i., 1880):

* * * "I will now allude to a strange condi-

tion of the umbilicus, of which I have seen a good many examples. Close around the cicatrix is a red and irritated or eczematous patch of skin, whilst from the depths of the umbilical fossa oozes a thin purulent fluid. For the cure of this affection, lotions and all other kinds of dressings avail nothing; for, at the bottom of the depression, and hidden by overhanging folds of skin, there is a small fleshy polypus which has sprung up from the scar of the fallen umbilical cord."

This description would seem to accord with that given with so much minuteness by Colles and Von Busch, and claimed by them to have been the cause of trismus nascentium.

The next prominent theory in the etiology of the disease is cold, or draughts of air. It is well known that the gentlest zephyr will very often seem to renew the paroxysms. I do not believe that it can produce the disease *per se*. On the contrary, a more natural result would be bronchitis, and like inflammatory conditions in such an active capillary system as the infant's.*

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* Cold as a cause of simple congestion of the spine is, however, generally interesting. I do not deny its possibility to produce many of the symptoms of this disease. But as age advances, with the corresponding development of the nervous system, it must manifest its influence in a more varied form. A peculiar

It seems unnecessary to dwell on the numerous other causes ascribed as producing the disease. It has been shown that climate or season exerts no special influence. Dr. Goldman attributed a case to neglect in shutting the windows before a storm, and claimed that the disease prevails on islands in proximity to the sea more than elsewhere. Yet, according to West, we have an example of almost entire immunity in Ireland. Another writer (Gaillard) starts out with the assertion that it is well known to be more common in warm than in cold climates, and before his article is finished the statement appears, "The disease is most frequent in the cold, damp

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case of hysteria in a young girl, accompanied with paralysis of the cervical muscles, reported by Dr. D. W. Prentiss, before the Medical Society of the District of Columbia, last spring, was clearly attributable to a long ride in an open buggy, the nervous symptoms following, or being associated with, an acute synovitis. This suggested to me that hysteria is often an effect of local or circumscribed congestion of spine ; and that in cases arising from this cause, our treatment is often radically wrong. Generally, local congestions, in persons otherwise healthy, are a sequel of cold. We have inflammation of one lung, lobular pneumonia, or any acute inflammatory condition from this cause, always preceded by a stage of congestion. And why should not congestion, local or circumscribed, take place in the spinal cord as well as in any other organ, or part of organ, as an impression or shock of cold, and remain passive, say from absence of the peculiar tissue

and variable months of winter and spring." While Watson, who called Sims's "failure" a splendid one, and ridiculed that gentleman for his exertions in the cause of humanity, although not reporting one case in his own experience, ascribes the predisposing causes to indigestion, heat, etc., and that it attacks so frequently on the ninth day after the cutting of the funis that it has been termed nine-day fits.

A few words with regard to filth, bad ventilation, and hygienic surroundings. Dr. P. C. Gaillard, after quoting crowded localities, bad or insufficient nourishment, etc., says: "But these do not act with more energy in this than in any

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or vascularity that favors or develops inflammation? It seems to me this is the philosophy of hysteria following such a history; and when we have an aggravation of the mental and physical symptoms, could it not be accounted for by extension, or the impression being conveyed upwards to the medulla pons and brain? Such congestion, when long-continued, would produce exhaustion of nerve power by pressure around the crura, or origin of the optic nerve, accounting also for the temporary blindness occasionally seen in connection with these cases.

Assuming, therefore, that hysteria is sometimes an effect of minute or large local congestions of spinal cord, following the impression of cold, I repeat, is not the treatment of this condition often radically wrong? It would at least be curious to employ asafœtida, bromides, etc., instead of antiphlogistic measures for congestion or inflammation elsewhere.

other disease, and in fact seem to exert no peculiar influence whatever; for the disease is not observed to be most common in the localities where these conditions most especially obtain, as for instance in the manufacturing and mining districts of England and Ireland, and in large cities every where. Indeed, I have seen it under every circumstance; in the well-kept, elevated and isolated spot in the country, as well as the crowded, filthy, and lowly situated city hovel."

Dr. J. S. Bailey (*N. Y. Med. Record*, Vol. v., 1870), in reporting three fatal cases, says: "Vitiated atmosphere and want of cleanliness did not produce the disease, for the apartments were cleanly and well ventilated."

To show the relative frequency of the disease in the Lying-in Hospital of Copenhagen, and the affiliated houses scattered in different parts of that city, Dr. Stadfeldt says there were eleven deaths in 10,000 children born in the former, whilst in the latter there were eighty-two in about the same number of births. "The danger of trismus occurring is therefore greater in the affiliated houses, although the hygienic conditions are better."

At a meeting of the Philadelphia Obstetrical

Society (*Amer. Jour. Obstet.*, Vol. viii., 1875), Dr. Ingham alluded to a local epidemic of trismus on a Southern plantation among the slaves, in which the subject had been investigated thoroughly without discovering any cause. Ventilation and cleanliness were good. Dr. H. C. Bryson says (*Ohio Med. Recorder*, i., 1876): "In New York tetanus is more frequent in infancy than in all the other ages combined." . . .

"That dirt is unhealthy is by no means an accepted fact. It is a matter of daily observation that children reared in the most squalid poverty, ignorant of the existence of such a thing as soap, or the purpose for which a comb was intended, are not of necessity, on that account, feeble and unhealthy. Neither do emanations from decomposing vegetable and animal matter contain the necessary entity in its production, when the disease is found depopulating, with the same wasteful hand, the frigid north and torrid south."

Dr. G. T. Maxwell writes: "It is true that most of my cases occurred among the negroes and the poorer class of whites; but it is equally true that cases did happen in the families of the wealthy, cultivated and refined. Thorough ventilation, absolute cleanliness, good nursing, and every thing that thought could suggest and money

procure, were sometimes unavailing to prevent the appearance of this terrible malady."

This brings me to the final consideration of the purport of this work, viz., the establishment of the true cause, and the prevention and cure of trismus nascentium. After the publication of Dr. Sims's articles, cases were reported for and against occipital displacement. Those with whom the practice was successful naturally espoused the theory; while the majority seemed to have derived no benefit from such treatment. This was, no doubt, due to a want of true understanding and continued investigation of the subject. Dr. Sims said himself he had not explained every thing in connection with it—that his observations were but a small beginning. It is my privilege to give the results of four or five years' perseverance in the endeavor to elucidate this matter. The physiological explanation, showing the effects of pressure on the base of the brain, so admirably described by Dr. Sims—which experiment I have myself repeatedly performed with entire satisfaction—leaves nothing more to be said on that point, except to add that the duration and frequency of convulsions depend upon the degree of pressure. For instance, I have observed in the acute form, that when the

convulsions continue a certain length of time, extravasation ensues, and the case becomes hopeless. In cases of deficient ossification, where the bones are loosely attached by their commissures, or where the displacement is easily detected, the symptoms occur sooner, and are more aggravated, the majority dying in a few hours.* Where one side is overlapped, the disease is milder; and when the displacement is hardly perceptible, the symptoms are apt to continue many days. These facts will be apparent from an analysis of the cases of Class II. and III.

To better understand the pathology and rationale of the production of the disease, it will be remembered that the child's head before birth has for its pillow the soft cushion of the liquor amnii. At birth, and for some time subsequently, the cranial bones are not united, are thin and without diplœ. It is reasonable to suppose that the transition to a different usage will cause them to be easily displaced, or the occiput

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* This is the class that would accord with Dr. J. Lewis Smith's expectations that "if Dr. Sims's theory was correct, compression of the medulla would certainly be followed by immediate and marked symptoms." But there are also cases where there is little or no emaciation, and no consequent sinking of the bones to correspond with supposed cerebral waste.

to be depressed, the degree and character of which depending upon position or management. The mother may allow the head to lie on her arm or lap perhaps during nursing, or the nurse may place it in a like position, or the child may be retained in the recumbent posture on a hard mattress, an old quilt, or a bunch of clothes, as Dr. Sims says, wadded up and stuck under the occiput. And here I may be permitted in illustration to offer a characteristic extract from one of Dr. Sims's cases. "The mother said that there had always been great difficulty in getting the child to suck; that sometimes it could not draw the breast at all, and very often would stop before it got half through; and that this had been the case from the time it was a week old. I requested her to suckle it (it was now quiet; had been for some time lying on its side). She took it up from the bed, and applied it to the breast. In doing this the occiput fell precisely against her arm, as it supported the head; there was a difficulty in the child laying hold of the nipple, and she attempted to force it into the mouth by pressing this firmly up against the breast. This plainly increased the difficulty, for the pressure of the child up to the breast, by the arm supporting the head, and acting upon the occiput behind, evi-

dently produced a deeper displacement of this bone, and so every effort on the part of the mother, while she thus held the child, only aggravated the trouble. Seeing that there was no chance for it to suck in this way, I requested the mother to take her arm from under its head, while I would support it in my hands, gently and firmly compressing the parietal protuberances for five or six minutes, but with no pressure on the occiput; and it sucked with the greatest ease; indeed, most ravenously. I then changed the pressure from the parietal to the occipital bone, and instantly the same difficulties occurred, as when the head was resting on the mother's arm."

Another fruitful cause, especially of the chronic form of the disease, is the modern baby-carriage. A child is laid in this deep, narrow, coffin-like contrivance, pillow crosswise. The body as well as the head sinks in the middle. The child has no room to turn, and if it could, it would be in imminent danger of smothering from the raised pillow on either side. Arriving home after its jolting and head-jarring expedition—panting and fretful, perhaps—it only needs a little improper handling (if the bones are not already dislocated) to inaugurate the disease; refusal of

breast follows, then convulsions; a physician arrives, but the case is not recognized; all sorts of remedies are employed; twitchings, convulsions and other symptoms continue; finally, from overloading, the delicate blood-vessels give way, or more generally death is caused by an exhaustive diarrhœa. This is no fancy sketch, but an every-day occurrence. I can recall numerous instances before this subject attracted my attention, that I know now could have been saved by *position*, when the death certificate recorded "tabes mesenterica," "meningitis," or "cholera infantum." Who cannot recall similar cases, where the little one was perpetually dosed, the symptoms persisting, despite every thing that could be done, or where perhaps, they were relieved, and, as the physician supposed, by the potency of his prescription, when probably it resulted from an *accidental proper position?* Dr. Z. T. Sowers, of this city; Dr. Luck, of Roanoke, Va., and others, inform me they have seen many such cases. A brother-in-law residing in the latter place, an intelligent but not a medical man, wrote me a few months ago, "I really think if we had not our attention called to the subject, that this infant would have fallen a victim thereto. For several days it had many of the symptoms you

describe, but the simple means indicated were apparently effective." In a conversation with Dr. John B. Hamilton, Surgeon-General Marine Hospital Service, he told me that when practicing in Kane, Greene Co., Ills., in 1872, a child about two years old, of Elias Greene, living in the neighborhood, was a subject of convulsions, which had continued at frequent intervals since birth, produced, it was thought by deficient ossification, of the cranial bones. Dr. A. B. Allen, who attended the case, placed a tight bandage around the child's head, and *the convulsions in a few months entirely ceased*, the bones having become consolidated. Dr. Hamilton's statement was dependent upon the history as given him by Dr. Allen, but it was common repute that the child was cured by the treatment; Dr. H. himself having attended other members of the family.

Of the many instances that I have lately seen in the incipient stages of the disease—all of which it may be said were controlled—one particularly occurs to my mind, where the mother, after allowing the child's occiput to rest on her arm all night, noticed next morning among other symptoms, what she called swelling of the feet; this was nothing more than commencing rigidity. The child, plump and healthy, sucked indifferently, threw

its head back, all the muscles becoming knotted ; it regurgitated half a teaspoonful of water containing one-twelfth drop tinct. aconite, which the mother insisted produced the spasm that followed. I, therefore, ordered other "medicine," consisting of chalk and sugar, and remained to see that a *proper position* was carried out. There was no further bad symptom.

Dr. T. N. McLaughlin, who gave me valuable assistance in many of my post mortems, now of the Philadelphia Hospital, writes me as follows of a case occurring in that institution.

"My attention was called to Mary M., æt. four days. The mother stated that the child was very restless, refused to nurse, and she was unable to account for the sudden change in its condition. Upon inquiry, I ascertained that the mother was in the habit of resting the back of the child's head upon her arm, and tossing it while lying in this position, in order to quiet it. The child presented the following condition: The expression was one of intense distress. There was marked hyperæmia of the conjunctivæ, delirium, and throwing of the head from side to side. It had a few spasmodic contractions of the muscles, but no convulsions ; the pulse was rapid and feeble. The cause being recognized, I immediately re-

sorted to your mode of postural treatment, by placing the child upon a pillow, and on its side, so as to relieve the pressure from the overriding of the occiput. The relief was almost immediate. The little one who was so restless before, now became quiet. This postural treatment was alone tried in order to test its merit; and I feel confident that the child's life was saved by immediately recognizing the cause, and removing it."

Dr. H. E. Leach, who also became interested in this subject with me, furnishes the three following recent cures:

"CASE I.—Mrs. K., mother of six children—two pairs of twins—taken in labor morning of January 13, 1884, terminating at midnight by the delivery of twins—boy and girl. They continued well up to February 3d, twenty days after birth, when the mother states she was awakened in the night by the moaning and peculiar breathing of the boy, which she described as a short, sharp respiration, and on placing it to the breast, refused to take hold. She said it did not look like the same child, although it nursed and seemed in excellent health about 9 P.M., three or four hours before she was awakened.

"I was called about 11 A.M., February 4th; found the child lying in its mother's arms (usual

position, as she informed me), with its arms drawn up, thumbs and toes flexed, pinched expression of countenance; eyes partly closed, and a constant moaning sound accompanying a short, sharp and forced expiration. I examined the head, and found a well-marked occipital depression all around, although more marked on the right side. The attempt to replace the bones seemed to cause an increase of the spasms, and so much apparent distress, that I ceased from disturbing him. The bowels not having moved since the previous morning, I ordered calomel, warm foot-baths, and, above all, impressed them with the necessity of *position*. Being people of common sense, they readily carried out my instructions, and on the morning of February 5th, I had the gratification of seeing my little patient nursing well, all symptoms of spasms having disappeared. The girl child seemed to enjoy good health, and had no trouble whatever.

"Case II.—Mrs. B., primipara, was delivered of a fine male child January 6, 1884. Continued well up to the sixth day, when the mother noticed the same symptoms as those described in Case I., only the bowels were loose previous to the discovery. Nothing was done except as to position, and a chalk mixture. The child made

a good recovery. In both cases the hygienic surroundings were excellent.

"CASE III.—Mrs. S. gave birth to a male child about the end of February. Cord came off sixth day. Two days afterward refused to nurse, then convulsions ensued. Examination showed well-marked occipital depression. Postural treatment was alone employed. Good recovery."

As before mentioned, in many of those examined I found a reddish gelatinous matter mixed with the coagula enveloping the cord, distributed mostly in the dorsal and lumbar regions. West also refers to its presence around the theca. This may correspond with the viscous mass, or proliferation of connective tissue, which, according to Meigs and Pepper, is the constant anatomical lesion found almost exclusively in the gray substance of the cord. The condition I have described existed in a lesser degree in an infant that died of asphyxia by being accidentally overlaid. I am indebted to the courtesy of Dr. P. S. Wales, Surgeon-General United States Navy, and P. A. Surgeon S. H. Griffith, United States Navy, for the following report of the microscopical examination:

"In reference to the examination of five spinal cords received from Dr. Hartigan, the following report is respectfully submitted:

"Four of the specimens were from infants who had died of trismus nascentium, and one from an infant who died of asphyxia. In the cavity of the arachnoid, more or less surrounding the cord, in all the cases was found a varying quantity of reddish gelatinous lymph. In three of the cases of trismus, abundant coagula were found in the same locality—less defined in the other. In the case of asphyxia, no coagula were found.

"Microscopical examination of the lymph showed it to be organized—containing abundance of capillary blood vessels—with the evidences of congestion observed in microscopical extravasations, as well as turgescence of the larger vessels. This condition was found in the case of asphyxia as well as in the cases of trismus, in all the cases the lymph presenting precisely the same appearances, which are shown in the accompanying photomicrographs.

"No microscopical examination of the cords was made, but they presented the appearances of congestion."

When attention was first called to Dr. Sims's views, the efficacy of a plan so simple, and promising such happy results, was tested by many physicians as stated. Some saw the patients soon after the first convulsion, and were able to rescue

them: while the large majority arrived probably several hours, even days, subsequently—and, of course, as a rule could not afford much relief. This is sufficient to account for the rejection of the theory. I myself, confess to some disappointment until repeated observations made the cause clear. I found some instances, where on account of deficient ossification, or the looseness referred to, the symptoms were precipitated during or shortly after delivery, death following in a few hours. These fortunately constitute a very small percentage, and are probably attended by contusion of the medulla oblongata. They are not altogether hopeless, however, for sometimes death may be averted by early proper management, and tracheotomy, if necessary. When the disease occurs later, and the patient is seen on the eve or soon after the first convulsion; in other words, during the stage of congestion; progress can be arrested, as is amply shown in Dr. McLaughlin's case.

It is not always necessary to the development of the disease, that displacement should be marked or visible. In either case, from continued decubitus, unpleasant symptoms may arise; which subside when the child is taken up—the pressure being thereby relieved—only, however, to recur when the infant is again laid down.

The fact, that the post mortem appearances are not uniform, was advanced by Dr. Baldwin as irreconcilable with Dr. Sims's views of the pathology of the disease. As has been already shown, this is accounted for by the many who die early of asphyxia, from severity of the paroxysms, and consequent congestion of the lungs, before there is time for extravasation. The post mortem appearances therefore, the character of the symptoms, and the duration of the disease, really depend upon the degree of pressure, from the slightest to the greatest possible—modified or intensified by its intermittent or persistent nature.

Another class remains to be mentioned, in which position alone cannot rectify the displacement. This either depends upon too great ossification, and consequent impaction, or the apex of the occiput is dislocated or curved inwards. Here a surgical operation becomes necessary. Cases XXVI. and XXXI. are examples. Such cases would require the most diligent manipulation and attention, to afford a chance of success. Indeed I do not know that any contrivance could be devised to retain the incurved apex *in situ*. Dr. Sims reports a case where he punched the scalp with a shoemaker's awl, and, with the edge of the parietal as a fulcrum, endeavored to prize out the bone, but

he did not succeed. He then followed the plan of Dr. Harrison, and cut down on each side of the lambdoidal suture; and with the flat end of a probe on one side and a director on the other, he pushed out the edges of the occiput. The effect was satisfactory, all the urgent symptoms becoming modified, but they would instantly return by letting the bone fall back. Although permanent good was impracticable, the result showed clearly that the symptoms were dependent upon mechanical pressure. The only case of this kind I saw before death, was through the kindness of Dr. Smith Townshend, Health Officer; the patient was moribund. After cutting through the lambdoidal suture I prized the bone out; a marked mitigation of symptoms immediately followed. There were no means to hold it in position, but the child lived till the next day. At the examination of the head, no effusion was seen to have followed the operation, and it was with difficulty the opening in the commissure could be found. The operation that Dr. Harrison successfully performed, was for depression and impaction of one side. Dr. Hort had a similar case. He cut down upon the right side of lambdoidal suture, and with a grooved director forced the occipital bone back into its place. The child had one convul-

sion and recovered ; it was kept reposing on either side. In such cases I believe there is every assurance of success when performed upon early ; but where the incurved apex cannot be rectified, the child evidently is born but to die, the symptoms being generally manifest soon after birth.*

Drs. Wilhite and Bryson compared the effect of a spicula in the adult to the pressure of the occiput in the infant. Now while the results are the same by relieving such pressure, it will be apparent that the effects on the infant are more profound, for instead of local irritation, we have contusion at the *fons et origo*, or base of the brain. That such effects are not confined to the human race is shown from the following striking comparison by Dr. Bryson. "Those who are hunters have noticed doubtless, in killing a wounded bird by pressure of the thumb upon the base of the brain, the cry of alarm, the spasm and rigid contraction of the muscles ; and if the pressure have not been exerted to a fatal extent, and the thumb be removed, how the rolling of the eyes ceases, the rigidity departs and the bird seems as well as ever."

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*If called to another case like this, I would not hesitate to remove the offending portion of the apex and secure the denuded pericranium to the scalp.

The custom of "bouncing" on the arm or lap, for the supposed purpose of quieting the baby, is another evil. Precaution against the disease ought to be observed from birth, by proper instructions to the mother and attendants, and especial care should be taken that the child has a soft feather pillow to lay its head upon during nursing, while asleep, or when carried in the arms or lap. Such article should constitute one of the indispensables of the baby's toilet. This is probably one of the reasons there are not more victims of trismus among the better class of people, among whom infants are not allowed to lie upon the back in a narrow crib long enough for injurious effects; among whom, too, they have the attention of well-paid nurses, and the benefit of frequent change of position, from the lavish manner in which they are fondled.

The fronto-parietal position of the opposite side, or face looking toward the horizon, is the proper one generally for overlapping of one side or in occipital depression. In all conditions, the disease results from a pressure expended at precisely the same point. The less direct and less powerful, as shown, accounts for the chronic form, or trismoid.

One more interesting point in this subject is the

cause of still-born children, when the cord is not at fault, and when movement has been distinct just before and during a tedious labor. Death does not occur from asphyxia, because respiration has not set in. What, then, will cause it but prolonged pressure on the brain? In two still-borns that I saw recently, the incurved thumbs and toes, and general stiffness, attracting my attention, examination showed intense congestion and dotted extravasation of the spine, and posterior part, and base of brain. M. Thelu (*Jour. de Chir.*, June, 1844) relates a similar case of a child born dead in a state of tetanic rigidity, but there was no autopsy.

Now taking into account the mortality in Washington, New Orleans, and other cities, and their proportion of population, it is no exaggeration to say that the whole number who in the United States annually succumb to this disease, is 25,000: which, when compared with the population of the globe, and the greater prevalence of the malady chiefly from ignorance in the Eastern countries—is appalling to contemplate; for it gives a mortality of more than half a million. Already, however, these investigations are yielding good results. During the year 1883, even with the increase of population, there have been

only thirty-four cases reported by the Coroner, which is a reduction of 37 per cent. from last year: while for the first four months of 1884, only seven cases are reported, or at the rate of twenty-one for the whole year, showing a further reduction of 38 per cent.—*three times less than* 1879, *when the investigation began.* I can only attribute this gratifying exhibit to my efforts to bring the matter to the notice of midwives, through whom it is fast becoming known and understood by mothers.

Thus I place this subject before the profession, earnestly invoking for it the careful consideration its importance demands. To myself it has been an exceedingly interesting study. I have not formed conjectures, and then moulded facts to suit them; but have honestly sought—not without personal sacrifice and sometimes even personal danger—to accumulate trustworthy information. The whole matter is humbly submitted, believing as Dr. Sims has aptly said, "If I am wrong, contemporaneous observers will prove it. If I am right, future generations will feel it."

Since the foregoing work was written, the calamity of Dr. Sims's death has been flashed over the civilized world. It may therefore be not improper

to refer to his undiminished interest in these investigations. In my office during his late visit to Washington, shortly before his death, he manifested the utmost sensitiveness when speaking of the matter, and expressed confidence that his theory would sooner or later be fully established.