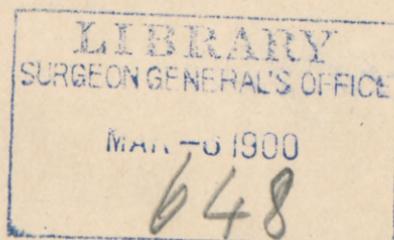


JACOBI (A.)

TYPHOID FEVER IN
THE YOUNG

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TYPHOID FEVER IN THE YOUNG.*

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THE literature of the typhoid fever of infancy and childhood is very copious; that of the last twenty years is not exactly worthless; indeed, a number of magazine articles are quite valuable. But they do not compare with the very first publications on the subject which appeared at a time when typhoid fever had not long been recognized as an independent morbid entity. Amongst those which should be read today, in order to gather almost everything connected with the subject, with the exception of the Diazo and Widal tests, are Taupin, in the *Jour. des Conn. med. et Chirurg.* of 1839, who explains the apparent infrequency of typhoid fever in the young by the mildness of most cases; F. Rilliet, *De la fièvre typhoïde chez les enfants*, Paris, 1840; the article on the subject in Rilliet and Barthez's great Handbook in 1853; Louis and Andral in 1841; a paper of A. Baginsky in Virchow's Arch. Vol. 49; of Hensch in the *Charité Ann.* Vol. II, 1877; the thesis of Georges Montmoulin, 1885 (*Observations sur la fièvre typhoïde de l'enfance*), and the article of C. Gerhardt in the second volume of his great "Handbuch," in 1877. The most meritorious of all the contributions to the knowledge of our subject, however, is the little book of Edmund Friedrich, *Der Abdominal Typhus der Kinder*, Dresden, 1856. My advice to all modern and future writers on any topic connected

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with the question of typhoid in children is to first consult the 102 pages of that monograph, which is apt to teach the often forgotten lesson that medicine is not of today nor of yesterday; that there have been great and good men worth knowing, before we were born, and that the history of our science and art is sadly neglected amongst us.

Infection and Contagion.—The opportunities for infection or for contagion are the same for the young and for the old. The bacillus has been found active though it had been dry for months; in the soil and in clothing after one or two months. Into water and into the soil it is introduced with typhoid discharges which carry contagion though they have been in contact with putrid material. This experience explains isolated cases and those attributable to the influence of sewers and privies, and the transmission through the atmosphere. Flies have been charged with carrying the poison. Infected water that is used for drinking or for washing the bottles and cases in which milk is kept, is responsible for hundreds of epidemics. Contagion from patient to patient in a hospital or in a tenement, by bedding, by the hands of the attendant, by the use of the same unwashed thermometer for the typhoid and non-typhoid are surely either possibilities or facts. The fetus and newly born may obtain their typhoids through the blood of the mothers; contagion through the milk of the mother is not improbable, though in most of such instances the suspicion may be directed to other sources of the malady. Small infants have a great advantage in this that their typhoids are not frequently attended with characteristic stools, and that for this reason a hospital case is not so dangerous to its neighbors; that they are not roaming about the floors where older children pick up infection, and that the water they drink or eat is almost always boiled. The latter fact alone explains the relative absence of typhoid fever from the first year of life.

SYMPTOMATOLOGY.

Temperature.—The severity of the illness need not correspond with the body temperature. A girl of 9 years, whose case is reported by Gerloczy, in *D. Med. Woch.*, No. 15, 1892, had unconsciousness, diarrhea, very frequent pulse, universal hyperesthesia, roseola, abscesses, and bronchial catarrh, and got well after thirty-nine days. During all this time there was no

increase of her body temperature. It appears that very severe cases of typhoid fever, when exhibiting bad cerebral symptoms are liable to have low temperatures on account of the thorough sepsis prevailing. If so, the prognosis is very bad.

Belei Medvei (Intern. Klin. Rundschau, 1891, No. 35 and 36) observed a girl of 12 years that was taken sick with severe headache, restlessness, chill, pain in neck, unconsciousness, miosis, unequal pupils, rapid respiration, and a temperature for four days from 36.8° to 37.5° C. Then the temperature rose and the typhoid symptoms of spleen and cecum, and diarrhea made their appearance.

This absence of high temperature does not astonish those who see a good deal of sepsis and of sickness complicated with weak heart. Temperature and danger need not correspond. The very feeble are not as a rule subject to high temperatures any more than the very old; and quite often the worst cases of sepsis are those which exhibit low temperatures. That is a fact best known to those who see much diphtheria or much puerperal fever.

Observations of high temperatures previous to the appearance and recognition of the symptoms are not frequent. While an adult would be about his work, the infant or child is seldom considered sick enough to claim attention and attendance. That is why chilliness and chills are readily overlooked; indeed, the latter are not marked as a rule in any illness of the young. The rise of the temperature in the typhoid of the young is mostly gradual; it is high in the second stage with slight remissions and gradually falls toward the end of the disease. This rule, if it can be called so, is, however, subject to many exceptions. The temperature of small infants may be very irregular, is in many cases rather low and uniform, in others high with few and short remissions. Irregularities, moreover, often depend on complications. After all, neither those are always right who consider the typhoid of the nursling and infant as a uniformly severe disease, like Baginsky and Roemheld, nor those who make light of it. The degree of individual infection, and the nature of the epidemic are factors that have to be considered.

Complications which disturb the regularity of the temperature curves, are, for instance, otitis, which is quite frequent. In connection with it we should not forget that the otitis media of the infant need not terminate in perforation of the drum

membrane; for the pharyngeal end of the Eustachian tube is so large a funnel at that early age as to permit the discharge of pus from the middle ear. An occasional complication is scarlatina; in the last two years malaria was a more frequent complication of typhoid than I have ever known it to be. Suppurating arthritis, diphtheria of the throat or of the vulva, both bacillary and streptococcic, are detrimental in the same way. Constipation is also an occasional cause of the rise of temperature; the regular visiting hours of hospitals, even without clandestine feeding, are apt to increase temperatures. Now and then there are two regular daily curves. That is another reason why the rectal temperature should be taken at least four times in twenty-four hours.

Digestive Organs.—The condition of the lips, the tongue and the mouth may depend on previous catarrh, angina, or the presence of adenoids; otherwise on the severity of the typhoid, and exhibits the same surface changes of the epithelium and mucous membranes that are observed in the adult. The lips are frequently dry, the tongue mostly moist, its epithelium accumulated in the centre, the edges red, or the whole tongue red and dry, covered with dry epithelial scabs, torn or ulcerated. Large ulcerations are mainly noticed during unconsciousness, smaller ones may be quite numerous on the hard and soft palate in every severe case. There is no herpes. The throat shows angina, the tonsils are swollen, in exceptional cases covered with a pseudomembrane which once, in a boy of 9 years, continued through the whole length of the esophagus to below the cardia. In bad cases of older children, or in the few that occur in the nursling when the mouth is kept open because of narrowness in the naso-pharynx, of indolence or unconsciousness, thrush is met with as it is in the worst cases of adult typhoid, or in moribund phthisis. Stomacace is less frequent, noma still less so; the latter is observed only toward the end of the illness, or during apparent convalescence. Fortunately, during nearly fifty years, I met with half a dozen cases only, one in a baby of 8 months, one in a girl of 11 years, all fatal. Baginsky, however, reports a case of noma that recovered. It may be added that noma is not quite so frequent after typhoid fever as after some other infectious diseases, prominent amongst which is measles, where I have seen at least a dozen instances. Parotitis may terminate in per-

foration, either outward or through the external ear. An abscess of the submaxillary gland I have seen in few cases only. Otitis media is an occasional complication originating in pharyngeal changes. The appetite is proportionate to the fever, the dry mouth and the degree of unconsciousness; during convalescence the hunger is great and conducive to dangerous mistakes in diet. Vomiting is noticed in bad cases, and is caused by the condition of the digestive mucous membrane, occasionally by meningitis, and sometimes by accompanying or consecutive nephritis.

Diarrhea is a frequent symptom in typhoid fever, either before its apparent outbreak, or in the first week, or at a later period. It appears to be of a catarrhal nature, induced probably by the presence of bacilli and their toxins. In the later periods of the disease it certainly depends on the presence of ulcerations. But to expect diarrhea as a common symptom is a mistake occasioned by the statements of many European books. In the other hemisphere diarrhea appears to be more general than with us. I think we miss it in one-half of our cases.

Even the assumption that where there are ulcerations there must be diarrhea is not founded on uniform facts. In ward 28 of Bellevue, in 1877, I had a girl of 11 years that was under close observation during her typhoid fever for several weeks. The case was one of unusual severity—spleen, lungs, skin and nervous system yielding the usual symptoms; there was no diarrhea at any time. She died with the symptoms of perforation. Perforation caused by one of the typhoid ulcerations was found at the autopsy. Nor is this the only case of the same description in my experience. In the Proceedings of the Pathological Society, twenty-five years ago, there is mentioned the case of a man who died in my service in Mount Sinai, also with perforation of an ulcerating intestine, with no previous looseness of the bowels.

Constipation is not an uncommon symptom in the beginning of typhoid fever of the young, though diarrhea may develop toward the end of the first or during the second week, while on the other hand, diarrhea may be observed among the prodromi or in the first week, and be replaced by constipation.

Almost in all cases of typhoid, in the young and in the old, intestinal ulcerations are common. But exceptions to this rule are met with.

S. Flexner and N. M. Harris (Bull. Johns Hopkins Hospital, December, 1897), detail the case of a man of 68 years who had typhoid fever with bacilli in many organs, but no intestinal lesions; A. G. Nichols and C. B. Keenan (*Montreal M. Four.*, January, 1898) one with positive Widal test, and tumefied spleen and mesenteric lymph nodes, and no intestinal lesions; E. Hodenpyl, one that died on the seventeenth day of illness with ulcerations in the large intestine, but none in the small. This absence of intestinal lesions is rare indeed in the adult; in the young, mainly in the very young, it seems to be less rare. As a rule, it may be stated that the intestinal tract suffers more in advanced age, the blood more in the early.

According to Bryant (*Brit. Med. Journal*, 1899, I., p. 766) fifteen cases of typhoid fever are known to have exhibited no intestinal lesions. His case was that of a boy of 1 year and 9 months; it occurred in a family in which there were other cases of typhoid fever. There was a characteristic fever curve, diarrhea, tympanites, tumefaction of the spleen, and a positive Widal reaction. At the autopsy there were pure cultures of bacilli in the enlarged mesenteric glands, but no intestinal ulceration.

In one of his autopsies Henoeh found but one Peyer's plaque that was slightly swelled.

In *N. Y. Med. Journal* of July 29th, A. J. Hartigan, assistant in the Bender Laboratory of Albany, N. Y., reports two cases of typhoid infection without any intestinal lesions. Of the older literature of such instances he quotes Louis, more than half a century ago, and Litten, Moore, and Church between 1880 and 1882. He then continues: "The bacteriological era in the investigation of these forms begins with Banti, in 1887. In his case death took place on the twenty-eighth day of the disease. No intestinal lesions were found but the spleen and mesenteric glands were swollen; in them bacilli morphologically similar to the bacillus typhosus were found." He quotes seventeen authors, and adds his own cases, without however mentioning Hodenpyl.

It should, however, be stated that the statistics of intestinal ulcerations with perforation are not conclusive; many are observed in private practice, not counted, not reported, and forgotten. Now and then, again, a case is reported as a curiosity without reference to the number of cases observed

and other important points. Barrier met with two perforations in 24 cases, a very unusual proportion.

Montmoullin reports seven cases in which perforation was diagnosed, three of which recovered—a proportion of spontaneous recoveries able to arouse the jealousy of any operator.

Barrier and Bouchut made long ago similar observations on the adult, so that they concluded that the anatomical alterations of the intestine may be absent. Chiari (*Z. f. Heilk.*, 1897) while finding lesions in the stomach, and bacilli in different organs, and septic symptoms, found no intestinal lesions. In nineteen collected cases, while the Widal test was positive, the same absence of intestinal lesions was marked. So the latter is not conclusive. The last case of the same nature was published by A. Mc. Phedran in the October issue of the *Philad. Monthly Med. Journal* (1899).

Gurgling in the ileo-cecal region, both with and without pressure, is common in intestinal catarrh, both infectious and non-infectious; that is why, under ordinary circumstances, it should not be held to be characteristic of typhoid fever. It would be more so, if complicated with constipation, and with some of the more frequent symptoms of typhoid fever.

Incontinence of the sphincter ani, when met with is not so much the local result of the infection as of unconsciousness; when it occurs during convalescence, it depends on hyperperistalsis, mostly combined with colic.

Tympanites is usually very moderate, for extensive peritonitis is very uncommon, except with perforation. Sensitiveness of the abdomen is frequent, without the diagnosis of local peritonitis being always within easy reach. This latter form is, however, quite frequent, for in the autopsies of children, or of adults who died of other diseases, local discolorations and thickenings, of a grayish white, or yellow color, are often found on the peritoneal layer of the intestine, above, near or below the cecum. They are the results of previous local peritonitis corresponding with the locality of ulcerations during typhoid fever, or any of the forms of enteritis in former years. Unexpected perforations of the intestine, occurring in advanced years, during apparently perfect health, are the final results of such local peritonitis.

Hemorrhages in the very young are exceptional, and

mostly mild in children of more than four years. I have seen it more than a dozen times. In a girl of ten years, the loss of blood was such, there being several hemorrhages in the course of the third week, that I attributed the supervening heart failure to exhaustion only. Both the number and severity of the hemorrhages appear to depend on the character of the epidemic or on the season. In the very young, I sometimes saw no tinge of blood in five years, and in a single season eight years ago, I met with two, not fatal, cases of hemorrhage, in girls of five and seven years. This very autumn I have seen four cases of typhoid fever in children of from five to nine years, in which mild hemorrhages occurred. Of Henoch's nine intestinal hemorrhages, five were quite mild.

Circulatory Organs.—The organs of circulation are not affected to the same extent as in adults. The average heart of the young is stronger, and less diseased. Endo- and pericarditis, embolisms and thromboses are rarer than in advanced age, except in very bad and protracted cases, in which the myocardium was deteriorated by the bacillary toxin. For the same reason complete adynamia is not so frequent at least in the first week or weeks. During increasing inanition, however, the circulation is impaired, as best shown by the coldness of the feet. The gums bleed but rarely, the nose not so often in infants, and the very young, as in older children. The pulse, mainly during the first two weeks, except in the small infant, where it is liable to be feeble and frequent, is either in correspondence with respiration and temperature, or frequently slower and quite strong. When it becomes feeble and frequent, with or without intermissions, it impairs the prognosis, and demands persistent stimulation. It is rarely dicrotic.

When it is in this weak condition, the heart sounds are no longer distinct; they are muffled, one or the other splits in two, and an apex murmur becomes audible. This should not be taken as merely functional; the myocardial weakness which occasions it is toxic and organic, and may remain a permanent lesion.

Spleen.—The irregular respiration of nervous, or frightened infants and children, their tympanitic colon, and high diaphragm, possible exudation in left pleura or lung, and the struggle against examination, whether painful or not, render

the diagnosis of the condition of the spleen difficult. In perhaps one-half of the cases it is, however, successful. Percussion succeeds less than palpation, which may reveal the lower edge of the spleen. It is rarely felt before the end of the first week, about the time when roseola appears; earlier, however, when the fever is unusually high. When it diminishes rapidly in the middle of the third week, the prognosis is good; if not, there will be a relapse. When a relapse takes place, the spleen which was greatly reduced in size, is liable to swell very rapidly. Permanence of this swelling of the spleen, however, is much rarer after typhoid, than after severe malarial fevers, and abscesses are quite exceptional.

The Respiratory Organs.—The nasal mucous membrane is dry, covered with thin crusts, and irritated like the lips, which are in a similar condition. Epistaxis is not infrequent in older children. Together with pharyngitis there may be a catarrhal laryngitis. This, and the dryness of the mucous membrane cause hoarseness and cough. Edema of the glottis, which is fortunately rare, causes dyspnea and strangulation. Superficial and deep ulceration of the trachea or larynx, and perichondritis are exceptional, but I have met the necessity of performing tracheotomy in such cases twice. One was the case of a girl of seven, in which scarification of the interior of the larynx was unsuccessful—the child was saved by the operation. The other tracheotomy was made during convalescence on a boy of ten years, because of an abscess developing over and behind the manubrium sterni. He died after many weeks of pyemia, the main source of which was found about the lowest rings of the trachea, and the mediastinal lymph-nodes. Bronchial catarrh is frequent, without much cough, as long as the respiration is shallow; with cough on deep inspiration; catarrhal pneumonia is not rare, and mostly bilateral; croupous pneumonia is also apt to be bilateral. The more frequent form of pneumonia, however, in the protracted cases of feeble patients, is hypostatic, with a tendency to become bilateral at once, and to extend. Pulmonary gangrene is exceptional, but should be feared in every case of infectious broncho-pneumonia, complicated with a weak heart.

Pleuritis is comparatively rare, purulent in exceptional cases only, sometimes sanguinolent, though there be no complication with tuberculosis.

Complications with diphtheria of the bacillary variety (nasal, pharyngeal, or laryngeal), are not common. When they occur during the prevalence of a diphtheria epidemic, they are grave accidents.

Urinary Organs.—The urine is mostly of a high color, contains in the beginning much urea and uric acid, less chlorides than normal, indican sometimes, albumin frequently at an early period and more so during the height of the disease, renal epithelia, blood, thin granular casts, and occasional bacilli. The renal irritation* exhibited by the microscopic appearance is that which is usual in most infectious diseases, and is due to the effect of the toxin while being eliminated through the kidneys. Symptoms connected with this elimination need not be very marked and need not lead to nephritis. Still, the latter may follow. Even pyuria has been found, for instance, by G. Blumer, in children, one of 13 and one of 10 years (Johns Hopkins Rep., Vol. V).

Retention of urine is rare in children, but occurs when there is coma or much peritonitis. In that case, and whenever it is important to secure urine for examination, catheterization should be resorted to. It is more easily performed in the young than in the adult and more readily in boys than in girls. Under ordinary circumstances, when the catheter is not employed for some reason or other a big ball of absorbent cotton will collect urine enough for the usual examination of the urine. Polyuria is seen during convalescence when much water is drunk. In that period dropsical effusions may be observed with or without albumin; it should also not be forgotten that salicylic acid or antipyrin when employed may cause edema; and, further, that there may be nephritis without albuminuria. The Diazo test is mostly positive towards the end of the first week, and remains so until the middle of the third, sometimes very much longer. At all events, however, its absence is no proof against the presence of typhoid fever. Roemheld missed it altogether in many cases.

The observations made by Lafleur and others, that the urine voided after cold bathing exhibits a high degree of toxicity, would rather speak in favor of that treatment; for the more toxic the urine and dangerous to the laboratory animal, the less toxin there is left in the patient. Elimination, as speedily as possible, is what should be aimed at. And whatever diuretic

effect there is in cold bathing, as in other remedies, is welcome as long as the condition of the patient permits it. How rarely that is so, will be seen in the remarks I have to make on therapeutics.

Skin.—The tendency of the skin is to be dry; that is why chronic eruptions are liable to disappear during the illness and to return when recovery is complete. This dryness is also the cause of the transverse fissures under the knee which Koebner explains by the co-operation of the lifeless epidermis, the vigorous growth of the extremities and the flexed posture of the knee; it also causes the extensive desquamation before and during convalescence.

The characteristic roseola exhibits the same peculiarities that are noticed in the adult; it is absent in perhaps 20 per cent. Morse collected 671 cases, in 406 of which it was present; Henoch found it 362 times in 381 cases. It is not uncommon in the very young. I found a few spots on the epigastrium of a newly born that died on the sixteenth day of its life; Gerhard (Handb. Vol. II, p. 373) met with roseola (and a tumefied spleen) in a baby of three weeks. It may appear as late as the eleventh, even the fifteenth or seventeenth day, is mostly not so copious as it is in the adult, and occurs preferably on the chest and abdomen, but also on the back and on the extremities. When the temperature is high at an early date, roseola may appear early, on the third or on the fourth day, and new crops may occur afterwards. In relapses it is more frequently missed than in the primary attack, but a new crop in the fourth week means a relapse. Petechiæ are not frequent but do occur in children of more than seven or eight years, also in the very young; when complicated with extensive purpuric extravasation they are ominous.

Miliaria is sometimes observed when there is exceptional perspiration; and erythema during the height of the disease when there is much intestinal disorder and coma as the result of direct toxic, or of auto-infection. Eczema is the result of uncleanliness only; gangrene, abscesses, furuncles, and pustules are frequent occurrences, but in the later periods of the disease only.

In bad cases, and mainly when the hygiene of the skin was neglected, abscesses will appear in it and in the subcutaneous tissue, preferably on the head, face and chest. Slight

irritations are sufficient to act as proximate causes. A child of two years developed the first abscess on the epigastrium in consequence of a subcutaneous injection of quinin. More followed, mainly on the hands, fingers, and feet, more than sixty were incised in the course of a few weeks, until, finally, recovery set in.

In a child of two years I saw copious hemorrhages about the ear, groins, and neck with consecutive gangrene; in a boy of nine, extensive destruction of the skin over more than one-half of the abdomen; in both cases with final recovery.

The desquamation of typhoid fever may be quite copious and resemble that of measles or even of scarlatina. On the other hand, some of the eruption of the two latter may resemble the roseola of typhoid fever. That is why the diagnosis may become difficult, particularly as there are cases of which I have seen some, in which the latter and one of the former may be contemporaneous. Thus Cosgrave (*Brit. Med. Jour.*, Jan. 16, 1897), reports five cases in which scarlet and typhoid fever were coincident without seeming to increase the degree of danger. Both started at the same time.

From George M. Gould's American Year Book, 1898, p. 625, I quote Amitrano, who reports a case of typhoid fever developing in convalescence a scarlatiniform eruption with fever which was followed by desquamation. After this fever had subsided marked meningeal symptoms appeared for a few days. These disappeared, and after desquamation was complete a second intense erythema appeared, which was also followed by desquamation after which recovery ensued.

Bones.—The bones suffer in different ways. The characteristic increase of growth after infectious fevers is mostly observed in scarlet, and in typhoid fevers. Epiphyseal and general pain about the extremities is frequent in typhoid fever, and some degree of epiphysitis is common, in consequence of this irritation. Periostitis and osteomyelitis have been observed, and bacilli have been found in the latter. Before the advent of the bacillus, I lost a child of four years with osteomyelitis of the right femur, in spite of early operation. Such cases are fortunately not frequent, but it appears they occur in from one to two per cent. of all typhoid fevers. Chondritis is still more infrequent, with less serious results.

Nervous System.—The nervous system of the young is believed not to be affected by typhoid fever, as it is in the adult. There are cases in which the general condition of the patient appears to be unusually good, compared with the toxic nature of the whole process, and with the height of the temperature. In many instances I concluded, from nothing but the apparent comfort and ease of the patient, when the high temperature would have suggested the presence of severe subjective symptoms, that everything but typhoid fever could be excluded. The same holds good of that in adults. In them ambulant cases are by no means rare, and those in bed often demand permission to get up, expressing the most complete satisfaction with their condition, while their temperature ranges at or above 104. Other children are apathetic, or somnolent, or peevish, and restless. The "typhoid state" should not by itself be taken as a symptom of typhoid fever. It may be absent altogether, and is found now and then when there is no typhoid. Headache is frequently complained of, or is betrayed by vertical wrinkling. Hearing may be bad, the conjunctiva injected and the cornea cloudy under the influence of the toxic disturbance of the trifacial nerve. Grinding of the teeth, sopor, or delirium, and vehement screams resembling those of meningitis, are occasionally met with. Such symptoms, though ever so severe, need not correspond with the elevation of the temperature at all; the latter may be rather low, while the intoxication is quite pronounced. Not every case of seeming cerebral or meningeal symptoms should be attributed to cerebral affection only; still, contractures, or convulsive movements may occur when there is an effusion from the pia mater. Such complications of genuine meningitis with typhoid fever certainly occur, and not only after the eighth or tenth year when gradually the typhoid fever in the young resembles more and more that of advanced age. Kernig's symptom may be employed to clear up the diagnosis of genuine meningitis.

Some of the symptoms common to both may be explained differently. Vomiting may be due to the toxic degeneration of the cerebral substance, or to meningitis, or to the abnormal condition of the stomach, or even of the pharynx, or to nephritis. Coma or delirium I have seen in typhoid, in meningitis, also in cinchonism, and under the influence of salicylic acid.

As a consecutive symptom aphasia was found twenty times by Hensch; half a dozen times I have seen it in the course of many years; with the exception of one that suddenly died, probably of myocardial degeneration, all of them got well. Polyneuritis is not rare. In severe epidemics it is frequently seen, usually with a favorable termination. It is due to tissue alterations, occasioned by the influence of the bacillary toxin. Hemiplegia is rarely observed; a case of "cerebellar ataxia" in a boy of seven, which terminated in recovery, was reported by Luigi Concetti, in *La Pediatria*, No. 8, 1898.

Paraplegia is more frequent, and still more so is local paralysis, under the influence either of the toxin, or of a hemorrhage, or of an embolus. Amongst them are paralysis of the glottis, which necessitated a tracheotomy in a case of Rehn's, and of the abducens (which I have seen in quite a number of cases, most of which were obstinate, some permanent) and of the accommodation muscles of the eye. Paralysis of the sphincter of the bladder is not infrequent.

Psychical disturbances are seen as the sequelae of every infectious fever, mainly scarlatina and typhoid. Four such cases were reported by S. S. Adams to the American Pediatric Society in 1896. They may result from inanition, or from the parenchymatous tissue changes caused by the toxin, or from meningitis. Mania and melancholia are the two forms mostly met with. Not all of them terminate favorably. Two of my early cases died in lunatic asylums in rather advanced years. The motor disturbances not paralytic, which follow typhoid, particularly chorea, have all got well in my recollection, a few only with relapses. It struck me that post-typhoid chorea was less subject to recurrences than other forms.

I now give the particulars of two sets of observations, which will prove that the symptoms, course and complications of the typhoid fever of the young may greatly differ from one another, or from any average description of its nosology. One I published in the *Arch. Ped.*, March, 1885.

The number of typhoid fever cases treated in the Children's Pavilion of Bellevue Hospital, from October, 1882, to September, 1884, was 25. Of these 11 were males, 14 females; 17 ran a single course, 5 had relapses, 3 were sick over a period of from four to six weeks, without permitting the second attack to be distinguished from the first by an alleviation

of the symptoms. In seven cases a distinct chill was mentioned as ushering in the illness; in half a dozen more several attacks of chilliness were noticed. The ages of the patients ranged from 2 to 14 years, the average 9. Pain in the ileocecal region was complained of in fourteen cases, diarrhea was noticed in fifteen, bloody stools not amounting to hemorrhages in three; in three constipation was mentioned as a notable fact; in the first week of six epistaxis was observed. Tumor of the spleen was noted in sixteen; roseola was observed in fourteen cases. Its first appearance was noticed between the fifth and seventh day; it lasted from five to ten days. Premonitory symptoms were reported in nine cases; in four they lasted two weeks. They consisted in lassitude, loss of appetite, change of temper, and in some few cases diarrhea set in a week before the initiating chill or chilliness. Five of my cases died; one remained stupid and hard of hearing for sometime, but recovered.

Contrary to my experience, as expressed in a lecture on typhoid fever (*Medical Record*, Nos. 17 and 18, 1879), in which I claimed a mild type and a low mortality for the typhoid fever of infancy and early childhood, this Bellevue service of mine had a mortality of 20 per cent.—similar to that of Cesterlen, who estimated it at 22 per cent., and Friedrich, who reported 23 per cent., in children under five years of age.

In 1882 and 1883 we had a bad epidemic of typhoid amongst all classes and ages. The guests of summer hotels and boarding houses imported hundreds of cases, and the whole population suffered in consequence, infants and half-grown children as much as the rest, and the mortality all over the city was high. The hospitals have always more than their share, however, and their statistics must necessarily be erroneous. Errors are occasioned by the fact that with us at least hospitals do not contain the average cases, but as a rule those only who fare badly and promise badly. A poor family will nurse their children, while they require but little care; only that one which is seriously ill, and gives a great deal of trouble and a bad prognosis is sent to the hospital. Of that class, many will die. That is why the mortality of a hospital does not indicate the general character of the epidemic. That is also why the general practitioner, singly or collectively, is the better judge and statistician. He sees all the cases in a

family, those remaining at home, and those sent to a hospital; sees the mild and the severe cases, and counts those who survive. Six cases in a family, one of which is sent to and dies in the hospital, may give the family practitioner a mortality of 16, the hospital attendant one of 100 per cent.

Another series of observations was published by F. Sbrana (*Arch. de Méd. des Enf.*, Jan. 1899). He reports on seventy-two cases of typhoid children, from 16 months to 8 years old, whom he observed in Tunis; 75 per cent. of all cases occurring in that sub-tropical city were in children; in one family there were four, in another three cases. Why there should be a prevalence of cases in children, is perhaps best explained by Jeannel's report made to the fourth French Congress of International Medicine, in 1898. He observed an epidemic of typhoid fever, in which the communication may have occurred through the dust of the street into which the typhoid dejections were thrown. The principal and first sufferers were children who were playing in the street, and not very particular as to what they carried to their mouths. Both their size and their habits I counted many years ago and repeatedly since, amongst the causes of the frequency with which follicular angina, and also diphtheria are observed amongst the young.

The premonitory symptoms of the majority of cases consisted in anorexia, with headache, vomiting and constipation; the run of temperatures was quite irregular. In 50 per cent. there was epistaxis in the beginning; diarrhea began at a later period of the disease. Gurgling in the ileo-cecal region was not observed in patients less than three years old, and was altogether not common. Roseola was noticed in one-third of the cases, the spleen was enlarged in every one after the fifth or sixth day. There was no intestinal hemorrhage, and the fever disappeared by lysis. There was a furfuraceous desquamation in four cases; the mortality was 11 per cent.

There were many complications; suppurating parotitis in two; peritonitis from perforation, one; purulent pleuritis, one, with considerable dilatation of the stomach during convalescence; aphasia in five; orchitis of the left side without suppuration, one; and meningitis, three; two of the last terminated fatally. All these cases looked very much like cerebro-spinal meningitis; still there was the tumefied spleen, and no herpes. In other cases there were milder cerebral symptoms, such as

dysphagia, partial convulsions, aphasia, and inequality of the pupils, without strabismus, or vomiting.

AGE, MORTALITY.

Friedleben placed the greatest frequency of typhoid in childhood between the 5th and 8th year, Griesinger between the 5th and 11th, Loeschner and Friedrich between the 5th and 9th, Rilliet and Barthez between the 9th and 14th, Barrier between the 5th and 15th year, and Fauconnet between the 10th and 20th year. A few other figures contained with the above in *Gerhardt's Handbuch*, Vol. II., are as follows: Murchison noticed that 20 per cent. of all the inmates of the fever hospital were less than 15 years, Von Franque collected all the typhoid cases of the province of Nassau, and found 2,021 of 11,028 to be less than 10 years, Gaultier gathered many French statistics, and reported 31 per cent. below 15 years. In a small town Baginsky counted sixteen cases under 10 years out of a total of 50, Rosenthal 28 in 115, Schädler 11 in 144.

Holt (Textbook, p. 1,008) quotes 970 cases from eight authors; 8 per cent. were under 5, 42 per cent. from 5 to 10, 50 from 10 to 15 years old. Montmoullin (*Thèse de Paris*, 1885) reported fifteen cases under two out of a total of 295 under 15 years. Schavoir in Stamford, Conn., collected 406 cases of all periods of life; of these 68 were under 5 years, 72 between 5 and 10 years. Morse reports 284 cases in the Boston City Hospital; 3 were under 5 years, 77 from the fifth to tenth, and 204 from the tenth to the fifteenth year. He also concluded that typhoid is unusual in infancy, because the Widal reaction was negative in two cases of simple diarrrhea, forty-five cases of fermental diarrrhea, and three of ileo-colitis, with the exception of one whose mother had typhoid fever years before. It will be seen, however, that in none of these cases the diagnosis of typhoid fever was made or suggested. As there was no typhoid, there was no Widal.

All these figures and results are in confirmation of the earliest observations. Griesinger for instance wrote in 1857 (*Virch. Handb.*, II., 2, 124): "Typhoid fever is very rare in the earliest infancy; it is only from the second to the third year that the disposition becomes greater; after that time it grows rapidly, so that typhoid fever is quite frequent amongst us." (Germany). Bouchut denies the occurrence of typhoid in the

newly born. According to him it occurs first between the first and second year.

There are, however, well observed cases of typhoid fever in the newly born. Gerhardt quotes Charcellay who saw it in a child of eight days; Bednar, five days; Necker, thirteen days, and reports a case of his own at three weeks. I had a case, the mother having typhoid fever when the child was born. In the latter I diagnosticated the disease on the ninth day. There were a few spots on the epigastrium on the sixteenth day, a large and soft spleen, and Peyer's plaques swollen and rather soft, not yet ulcerated. The infant died on the sixteenth day of her life. C. P. McNabe (*New York Medical Journal*, Feb. 19th, 1898), observed typhoid fever, complicated with whooping cough and pneumonia in a baby a few weeks old.

The possibility of the transmission of typhoid fever to the fetus is beyond any doubt. Clinical experience proves such a transmission for typhoid fever, malaria, measles, scarlatina, variola and syphilis; also in erysipelas, relapsing fever, tuberculosis and sepsis. In young sheep anthrax was found as early as 1882; chicken cholera and glanders are transmitted in the same way. But it is possible that the epithelium of the placenta is a frequent barrier, and the suggestion of Malvoz's that the transmission of an infectious disease from the mother to the fetus takes place only when the villous epithelium is injured, I have always considered to be correct. He emphasizes the fact that of twins one may be affected while the other goes free. All these points are discussed by W. Fordyce in the *Brit. M. Jour.* of Feb. 19, 1898. The typhoid fever of the mother may destroy the fetus, may allow it to be born alive but weak, or alive and vigorous. Which of these results occurs depends on the amount of bacillary toxin transmitted or on circumstances unknown to us in an individual case. But the facts are firmly established. The fetal intestine was found diseased by Manzoni in 1841, Charcellay in the the same year, Weiss in 1862. Bacilli were found in the fetus by Reher and Neuhaus in 1886; in the blood by Eberth in 1893; and the same results were obtained by Freund, Levy, Ernst, and Durck. Other good observations were made on the living child. The Widal test was found positive in a healthy infant 7 weeks old, that was born when the mother was in the

third week of typhoid fever, by Crozier Griffith (*Med. News*, May 15, 1897); and by Mossé (*Progrès Méd.*, March 13, 1897) in a newly born, whose mother had typhoid fever when in the sixth month of her pregnancy, and whose milk and placental blood gave the same positive reaction. Perhaps the case of Landouzy's will also prove the possibility of transmission though not through the placenta (*Soc. de Biol.* Nov. 6, 1897). A healthy baby showed a positive Widal test, while the woman had typhoid three months after confinement. As the baby had no other symptoms of typhoid fever, it is fair to suggest or to believe that transmission to a sufficient degree took place through her milk.

The transmission of typhoid bacilli into the fetus is demonstrated by a case reported by Etienne (*Gaz. hebdom.*, 1896, No. 16). A woman of 18 years expelled on the twenty-ninth day of her typhoid fever a fetus in the fifth month of utero-gestation. In its blood taken from the right heart, the spleen, the liver and the placenta were typhoid bacilli, but no changes in the other organs. It appears that the death of the fetus resulted from the toxin which acted so rapidly that the organs had no time to participate in the process.

If, however, typhoid fever has been found by some in the fetus, in the newly born, in the nursling, there are those who never saw it at that age, and therefore are inclined to deny its occurrence.

In the *Arch. Ped.*, 1895, p. 916, Dr. W. P. Northrup speaks of the results of 2,000 autopsies in children under 5 years. Not one presented the lesions of typhoid fever. He also quotes Dr. N. Page of the Children's Hospital in Philadelphia, who says: "I have had from six to ten typhoid cases in children in the house constantly since I came on duty here, but not one of them was under 6 years." Dr. Ch. G. Kerley observed not a single case of typhoid fever among 1,326 children, 85 per cent. of whom were under 2 years, and 95 per cent. under 5 years of age; nor was a single typhoid lesion found in 410 autopsies. He adds that there was no case in the three years following his observations, under his successor in office.

Again, however, Steffen reports on 148 cases of typhoid in the young; 2 were less than 1 year, 26 from the third to the sixth, 34 between 6 and 9 years. Of Wolberg's 277 cases, however, the majority were as usual from 6 to 12 years old.

Henoch reports on 9 cases below 2 years, 59 from 3 to 5, and 187 from 5 to 10 years, with a mortality of 12 per cent. He also reports of the finding of typhoid ulcerations 14 times in 26 autopsies. Ashby and Wright declare typhoid fever to be "not common under 3 years," while Rilliet and Taupin as early as 1840 pronounced it to be "not at all rare." About the same time Billard published his experience. According to him typhoid fever was rare in the first year, increased slowly toward the fifth, and was quite frequent between the fifth and fifteenth.

Maria Rivoire described an epidemic which reigned in Marseilles in 1896 and 1897 (*Thèse de Montpellier*, 1898). In and after May of 1897 there were 105 cases among children, of whom 21 died—20 per cent.; in 1896 43 cases with 15 deaths—31 per cent. Of 1270 cases collected during those two years there were:

Below 5 years 26, 6 deaths—23 per cent.

Between 5 and 10 years 59, 13 deaths—22 per cent.

"	10	"	15	"	102, 24	"	—23.5	"
"	15	"	20	"	289, 42	"	—14.5	"
"	20	"	25	"	347, 63	"	—18.5	"
"	25	"	30	"	262, 54	"	—20.5	"
"	30	"	40	"	145, 25	"	—17	"
"	40	"	50	"	30, 7	"	—23	"

Above 50 years 10, no deaths.

According to these figures the largest mortality occurred between the tenth and fifteenth year; the mortality of children below 5 or below 10 years equaled that of adults between the fortieth and fiftieth year.

H. Curschmann (*Nothnagel, Spec. Pathol. u. Therap.* III.) reports on 451 children (250 male and 201 female) observed with typhoid fever in the Hamburg Hospital between 1886 and 1887. Of these, seven were 2; nine were 3; sixteen, 4; eighteen, 5; thirteen, 6; twenty-two, 7; twenty-seven, 8; forty-four, 9; fifty, 10; fifty, 11; sixty, 12; seventy-one, 13; and sixty-four, 14 years old.

Of Brouardel's 16,036 cases observed between 1880 and 1889, 36 were 1 year and under, 1041 under 5, 1,265 from 6 to 10, and 1,386 from 11 to 15 years old.

According to an excellent report, published by Dr. I. Rudisch, in the Mount Sinai Hospital reports (1899), on 974

cases of typhoid fever, which occurred from 1883 to 1898, 124 occurred in children below ten years, and 90 between the eleventh and fifteenth; a total of 214 cases. Of these one was six, another ten months of age. There were altogether below five years 37 cases, six of which died = 16.21 per cent., and 87 between the sixth and tenth, 7 of which died = 8.75 per cent. The exact figures for the first year were 5 cases with 3 deaths, for the second 6 with no death, the third 5 with no death, the fourth 10 with 1 death, the fifth 11 with 2 deaths, the sixth 16 with 2, the seventh 20 with 1, the eighth 11 with no death, the ninth 24 with 3, the tenth 16 with 1, and from the eleventh to the fifteenth 90 cases with 9 deaths.

One of the principal points made by Dr. Northrup is that the ulcerations claimed for typhoid fever are not characteristic at all; that, indeed, they are found in common intestinal diseases of non-infectious nature. That is what Hervieux contended thirty years ago, when he said that follicular swellings and superficial ulcerations in the intestines, and swelling of the mesenteric lymph nodes were found without any specificity in the morbid process.

This observation, and the assumption of uniformity in the nature of these ulcerations, was indeed the reason why in France for a long time the terms typhoid fever and dothien-enterite were synonymous. But as early as 1877 C. Gerhardt emphasized the fact that the peculiar typhoid ("markige") infiltration and the formation of scurfs, which are mentioned now and then are distinctively different from the ulcerations of follicular or other enteritis. It is true, however, that in many cases there is a difference between the young and the adult. The changes in the plaques of the former are more hyperplastic (they are not so in enteritis), of the adult more necrobiotic. Nowadays the presence of the bacillus typhosus in and about doubtful ulcerations would furnish another positive diagnostic sign.

DIAGNOSIS.

It is determined by the symptoms enumerated above, and while it is mostly easy in the adult, becomes more difficult in the very young. I choose to take it for granted that in doubtful cases the diagnosis of dentition and worms is nowadays confined to a certain class of illiterate women and obsequious prac-

titioners only; but the differential diagnosis of typhoid in the very young from a catarrhal fever, or influenza, or glandular fever, even from an intestinal auto-infection may remain difficult through many days—even for the skilled and thinking. The fever curve is very apt to be irregular, mainly in enfeebled children and in the presence of one of the many complications. There are even some cases in which the disease sets in suddenly with a high temperature; there are those, however, in which a high temperature is apt to be deceptive, for I believe with A. Fairbarn (*Jour. Am. Med. Ass.*, April 12, 1897) that the first symptoms may be overlooked for many a day. A cerebral pneumonia may exist half a week or more without being recognized, until the development of the disease and careful examination clears up the diagnosis. Influenza may assume the characteristics of typhoid to a certain extent. Meningitis may be recognized, if by no other symptoms, by means of a lumbar puncture and examination of the cerebrospinal fluid. Altogether a rather slow pulse when not in proportion to the height of the temperature, the condition of the tongue, the swelling of the spleen, and the presence of roseola render the diagnosis secure even without the Diazo and Widal tests. In other instances, however, we arrive at a result by exclusion only. There is hardly a single clinical symptom which alone proves the presence of typhoid fever; the simultaneous presence of many is a more perfect guide. The diazo test is nearly conclusive when tuberculosis and pneumonia may be excluded; it may be expected to be positive in 90 per cent. of all the cases between the end of the first and the middle of the third week. The greatest difficulty is met with in those infants that yield few or no local symptoms except those of a septic infection only. Lymph nodes are sometimes found tumefied; their swelling in the inguinal region, however, from other causes is so frequent that, when found alone it should not count. The presence of herpes should generally be taken as proof of the absence of typhoid fever. The presence of the bacillus in the discharges would be the best symptom if we commanded a readier practical method for its discovery, provided there be other symptoms which make the case suspicious of being typhoid fever.

Much is naturally made of the presence of bacilli in the discharges of doubtful cases, and quite often the diagnosis had

to depend on it. To what extent is that justified? There may be cases in which I should utterly refuse to accept the diagnosis of typhoid fever unless there be some one or more adjuvant symptoms, for the same reason that makes me refuse the diagnosis of diphtheria when there is nothing but the presence of Klebs-Loeffler bacilli, or that of tuberculosis when bacilli are deposited on some mucous membrane.

PROGNOSIS.

The character and the mortality of typhoid fever are apt to vary according to seasons and epidemics. Baginsky places the mortality at 9 per cent., Montmoullin at 8.8, Steffen at 6.7, Henoch at 7.5, Wollberg at 4.7. In hospitals it is liable to be greater than in general practice for the reason that as a rule bad cases only are sent to public institutions. Still, in the Children's Hospital of Philadelphia, there were 137 cases, three of whom died (2.66 per cent.); in the Boston City Hospital, the mortality in 284 children, under 15 years, was 6 per cent., while amongst 3,396 adults it was 13.5 per cent., and Holt collects 2,623 children with a mortality of 5.4 per cent. On the other hand, of Schavoir's (*New York Medical Record*, 1895) 192 patients (mostly in private practice), under 15 years, 2 died = 1 per cent.

Nurslings and the very young, also those approaching adolescence, are more endangered than those in the intermediate years, according to Roca (*Ann. de Polyclin. de Bordeaux*, 1897), and Roemheld (*Fahrh. f. Kinderh.*, Vol. 48). High continuous temperatures are not always fatal, though they be complicated with a frequent pulse, nor are petechiæ absolutely ominous. A moderately slow pulse, and the occurrence of marked remissions are favorable, particularly when the fever is not terminated within three weeks. This continuation beyond the usual time is quite common in the very young, and when the case is apparently mild. A speedy recovery may be expected when the spleen gets smaller about the sixteenth or seventeenth day; if it remains large, the case will go on. Complications of any kind, pneumonia, meningitis, previous heart diseases, with feeble peripheral circulation (cold feet), laryngeal edema, hepatic or splenic abscesses add to the danger; that with malaria is not very dangerous provided it be recognized at an early time. Some of these complications are

frequently called sequelae; but as they share in the microbic etiology of the disease, they should be considered here. To this class belong erysipelas (mostly facial), otitis media, hematoma, which are sometimes very large and destructive to the implicated or superjacent cutis, arthritis, furunculosis, abscesses of all kinds, and occasionally an anemic dropsy, not attended with an affection of the kidney, the occurrence of which was noted by Griesinger nearly half a century ago.

Relapses are by no means rare, either after complete apyrexia, or with a moderate amount of remission about the end of the third week, or without any or much change in the temperature. They come after apparently mild, or after severe cases, without or with errors in hygiene or diet; when there was apyrexia, they were mostly of a shorter duration than when the fever remain continuous, or exhibited a slight remission only.

TREATMENT.

The food should be liquid. My invariable rule is, with adults also, to insist upon that demand until apyrexia has lasted ten days. The patient should be encouraged to drink water frequently; the admixture of from eight to twelve drops of dilute hydrochloric acid to a tumbler full of water, or sweetened water, is a pleasant and disinfectant drink. Of albuminoids, peptones, and "peptonoids," and of beef-juice, only a certain quantity is digested or absorbed; the good that is to come from them is not from swallowing, but from digesting. The lips and tongue should be kept clean. Older children will wash and gargle. When the tongue is red and dry, and fissured, one or two daily applications may be made with a clean camel-hair brush, of a one or two per cent. solution of nitrate of silver. The nose should be kept clean, washed out with normal salt solution in urgent cases. To guard against hypostasis of the lungs and the cord, the posture in bed should be changed from time to time.

A purgative dose of calomel in the very beginning will act beneficially; not so after the second half of the first week when diarrhea and hemorrhages may be caused by it. Constipation requires warm water enemata daily; diarrhea, frequent irrigations with water of from 95 to 100° F. When the discharges are offensive, thymol, or permanganate of potassium may be

added in a proportion of 1 : 3,000-4,000. Internally, bismuth, sulpho-carbolate of zinc, salol, naphthalin are indicated. Bronchial catarrh demands no special treatment in most cases; if the secretion is viscid, and dyspnea present from that cause, camphor is serviceable. Collapse requires strong stimulants, by mouth and sub-cutaneously; diluted alcohol, camphor in sweet almond oil 1:4, and the salicylate or benzoate of sodium and caffeine, soluble in two parts of water, answer best for that purpose. Insomnia, great excitement, and consecutive psychoses may require chloral hydrate. When the heart is feeble, croton chloral should be selected instead. When these symptoms are accompanied with heat of the head, cold applications to the head, ice water, ice bags are soothing. The head should, under such circumstances, be kept as high as comfort permits. Sopor or coma should be treated with cold affusions, while the body is submerged in water of 90 or 95 degrees.

Is it desirable to resort to antipyretic treatment? If so, in what class of cases, mild, medium or grave? This latter classification, however, should not exist, for the apparently mild case may turn out to be a grave one. Or is it desirable to allow high temperatures to persist?

The *vis medicatrix naturæ* has been eulogized in infectious fevers. However, the wholesome influence of intense body heat on bacteria and toxins has become very doubtful, and good observers, like Flügge deny the new gospel of the increase of phagocytosis by high temperatures absolutely. Nor is the disintegration of tissues by heat alone successfully contradicted. Thus, after all, we need not enjoy the presence of high temperatures as a blessing, disguised or undisguised, and should reduce them. This much is certain, that the comfort of the patient is enhanced, and grave nervous symptoms alleviated, when the hot, dry skin becomes cooler and moist in proportion to the reduction of the general temperature.

Which are the means by which we can effectually obtain it? The number of antifebrile medicaments has grown immeasurably; the cautious practitioner will do well, however, not to embark in the dark sea of unknown territories, guided by nothing but the flashlight advertisements of the drug manufacturer. Some of the new remedies are actual dangers. Acetanilid is a poison like all anilins; it changes hematin into methemoglobin, and thus causes the cyanosis that is so fre-

quently noticed. Antipyrin is perhaps the safest; sodium salicylate annoys the stomach and the kidneys, which are very liable to suffer from the typhoid toxin alone. Quinine acts well during intermissions and remissions, not however when high temperatures are continuous. The cardiac stimulants—digitalis, strophanthus, spartein, camphor, alcohol—which improve the general and cutaneous circulation, and thereby the radiation of heat from the skin, are mighty weapons in the hands of the intelligent medical adviser, who moreover need not limit himself to the few remedies I mentioned.

All of these remedies, however, do not exhaust our resources; indeed they are only of minor importance. Without knowing all of it the old poet exclaimed "*hudos ariston*," the water is the best. Cold water and warm water are our most reliable and at the same time the safest antipyretics. Stress should be laid on the latter title, because many of the very apostles of hydrotherapy, perhaps influenced by shaky phagocytosis and toxin theories, belittle it in comparison with the nerve stimulating powers of water. Now, cold bathing is frequently contraindicated; it is not borne when the heart is feeble from whatsoever cause; for instance, long duration of the disease, complications with pneumonia, peritonitis, or hemorrhages, previous bad health, or, in the adult, excesses. No stimulant given before or during the procedure is certain to counteract the paralyzing effect on the peripheral circulation. When after a cold bath the feet remain cold and the pulse small, the bath was contraindicated, and did harm. The patients in public hospitals are quite often of a low vitality, and feel the cold bath as a shock; at all events, most of those who arrive in the hospital after a week or two have passed the time when the cold bath might have done good. Of this nature is the latest experience of I. Rudisch in the Mount Sinai Hospital (Mt. S. Rep., Vol., 1899). He says: "The Brand treatment reduced the mortality a little over 2 per cent. This reduction occurred in the cases which had been sick two weeks or longer, outside the hospital. Since the introduction of the Brand treatment there has been an increase in the number of cases of pneumonia and phlebitis, and a decrease of those of furunculosis and nephritis. Relapses have increased 2.5 per cent. The death rate in the relapse cases before and since the introduction of the Brand

treatment is practically the same. It has not reduced the number of complicated cases as a whole, but has decreased the number of deaths from toxemia in the causation of the mortality of typhoid fever."

This does not speak well for the indiscriminate use of cold water for hospital patients.

The dangers of cold bathing are not encountered in warm bathing. This is not the place to prove for the thousandth time that a bath of 95° or 90° F. when of sufficient, even when of short duration, will reduce a temperature of 104° or 106°. It is simply a fact. Such a bath may easily be given every three or five hours; even apparently mild cases should have two or three daily, from the beginning to the end of the illness. They reduce the temperature, the accompanying frictions stimulate the cutaneous and general circulation, the general condition is improved, the so-called typhoid state relieved, and relapses become less frequent. Warm bathing should be *the* principal treatment of all typhoid fevers, not to the exclusion, however, of occasional medication calculated to have similar effects. The combination of frequent and protracted bathing with proper medication will always remain appropriate, though our resources should, as we expect, be increased by serotherapy. The searching for it, and the frequent insufficiency of medication in skilful or unskilled hands, both by thoughtful or routine practitioners, have caused us too often to neglect our most active helps. Even where serotherapy has scored its most deserved laurels, for instance, in diphtheria, the almost boastful limitation to the use of antitoxin, to the exclusion of other internal and external treatment, is a mistake. What is to be treated is not the bacillus, but the organism invaded by the bacillus; and the clinician should know that bacteriology is an indispensable aid to clinical medicine, but not clinical medicine itself. Thus, when we shall find an antitoxin for the typhoid bacillus, we shall still require adjuvant treatment for the typhoid man, woman and child.

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