

which poison and depress the heart, and allow of an abnormal distension of its cavities. This distension of the heart and interference with its nutrition accounts for the great pain and distress in the precordial region. Smirnow, in speaking of the dilation and distension with blood, which the heart undergoes in the paroxysm of angina, attributes the torturing precordial pain to the stretching of the net-work of afferent nerve-fibrils, which are immediately beneath the endocardium.

The quality of the blood supplied to the nutrition of the heart is the cause of many true anginas of the heart. The effects of blood changes on the heart have been investigated by several authors. Ringer found that without the presence of a lime salt in the circulating fluid, contractility of the isolated frog's ventricle cannot be supported. He also found that the production of acid, particularly that which is formed in the course of, and as the result of, muscular contraction, is also inimical to cardiac contraction. A toxin within the blood depresses the heart, increases the length of the systole and finally causes a standstill in diastole. The accumulation in the heart's substance of a toxic material seems to act on the cardiac ganglia in such a way as to destroy the heart's excitability. Any slight obstruction of the supply of blood to any part of the myocardium leads quickly to the generation of a toxin. Cohnheim says the closure of one or both coronary arteries is not necessary, any one branch of a certain size, no matter which, is sufficient to produce a limited arterial ischemia, which in such deadly manner paralyzes irrestorably the whole cardiac musculature. The effect of this deficient nutrition is the product of a heart poison, a product of metabolism, which is in a normal state carried off in the course of the blood-current, but which accumulates under defective nutrition in the substance of the heart.

What makes the action of the heart regular? It is the change of nutrition, by which, through the blood circulating in its substance, the waste of its tissue is constantly supplied, the integrity of the fibers preserved and kept consequently in a condition to contract. If the supply of blood is cut off from the substance of the heart, the organ soon loses its irritability and power of contraction. Cohnheim and Schulthess-Rechberg, in experiments on dogs, observed that ligation of any large branch of either right or left coronary "has at first no effect whatever upon the rhythm or vigor of the cardiac contraction, nor consequently upon the blood pressure, but after the lapse of ninety seconds on an average, the heart beats begin to be somewhat irregular and infrequent, yet still without affecting the blood pressure, till suddenly and at the same instant both chambers stop in diastole. From this standstill, which occurs on an average not later than two minutes, there are no means of arousing the ventricles to new life and renewed contraction. It seems as if a deadly poison had forever destroyed the heart's excitability. Accordingly it is in all probability the system of ganglia which is affected in this fashion."

It would seem from all the facts at hand, clinic, pathologic and physiologic, that whereas sclerosis of the coronary arteries or aorta, or dilation of the heart, etc., is found in a large number of cases of angina pectoris, yet attacks of true angina may occur in patients who are entirely free from organic disease of the heart, and, vice versa, we may find most extreme calcareous conditions of the coronary arteries to exist, as in a pathologic specimen I have, from the patient living to some 60 years of age, with no obtainable history of cardiac distress, and dying of a complaint entirely foreign to angina pectoris. Frey maintains that stoppage of the heart in

angina is not a necessary result of closure of a large branch of the coronary arteries, but may be brought about by numerous other interferences with the heart.

In our treatment we must ever keep in view the picture of the heart whose muscular structure is improperly nourished, whose ventricles are suddenly distended, and whose nerve and muscular fibers are stretched, and I might say stunned, by the rapid engorgement of a circulating fluid, which from the apparent embarrassment in respiration, becomes poorly oxygenated. Relieve the tension of the vascular system by inhalation of nitrite of amyl, and if pain persists, give a few whiffs of ether, which, as there is danger of heart failure, is to be preferred to chloroform on account of its stimulating effects. Morphia should not be continuously used because of its resulting depression, and if given should always be combined with atropia, which is an excellent analeptic. Camphor, also, is one of the best of the cardiac stimulants. Irritation, in the way of sinapisms, etc., to the precordia, eases the distress. The ice-bag or very hot applications have the same effect. The kidneys, skin and respiratory functions should be kept active. In the interval nitroglycerin or nitrite of sodium and iodid of potassium should be used, and the doses should be pushed to tolerance. Good results are obtained from the baths as recommended by the Oertel's method or as carried out by Dr. Schott of Nauheim. A saline bath at the temperature of 92 and reduced 5 or 6 degrees in the course of the treatment has many of the good effects of the Nauheim bath. It is well in ordering the bath to see that your patient is gently massaged, and while in the bath, which should last not longer than ten to fifteen minutes, that slight restraint be given to the flexion and extension of the limbs and body, which the patient is directed to follow. These movements draw blood to the parts and lessen the arterial tension in the system, and with the stimulating effects of the bath have a most beneficial and somewhat lasting good effect on the heart and circulation, the blood pressure being lowered, the diastolic rest of the heart lengthened, and the force of the systole increased. The result is, the ventricles are fully emptied, the peripheral resistance lessened, the whole circulation becomes freer and more active and changes in metabolism promoted, and a general well-being of the patient is noticed. With the results of the use of electricity some claim good results, but it may be said that electricity seems to be more of an adjuvant than a curative agent. To obtain any measure of success in our treatment all excesses of every kind must be corrected and the general functions of the body made to act properly.

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TUBERCULAR PELVIC PERITONITIS.

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It seems to be generally held that the lymphatic system affords the main avenue for tubercular invasion. Thus in children, whose exposed facial integument, with repeated abrasions, invites a tubercular cervical adenolymphangitis,⁽¹⁾ in the adult the nasopharyngeal space, directly exposed to multiple bacterial irritations, favors this predisposition an entrance into the lymph-channels and, with suitable soil, general dissemination through the larger ducts to the bronchial and mediasti-

¹ De Forrest Willard: *Annals of Surgery*.

nal glands. Through the same system a tubercular invasion may develop from the genital lymphatics, with easy access to the histologically allied tissue—the serous peritoneum. These neighboring glands in the process of caseation may directly infect the peritoneum, or a hematogenic deposit in this region of recurrent congestions may follow as a secondary expression of a distant tuberculosis. From the intestinal canal also an ulceration may allow the tubercle bacilli to reach the peritoneum, and thus start the destructive process on this organ.

Reasons are manifest, therefore, for the exposure of the general peritoneum to this disease, while there seems to be a strong analogy between the elective area in children—the cervical and bronchial lymphatics—where the surface of the body offers least resistance, and in the invasion of the pelvic peritoneum, occurring as it usually does in females between the ages of 20 and 40 years, during which time there is most exposure to the lymphatic system in the pelvic region.

That tubal tuberculosis is elective seems well established by an analysis of 1200 autopsies by Wothien, (2) in which 20 per cent. showed tubal deposits, involving in every case the peritoneum and in the majority of cases the tubal mucosa. This relatively large proportion of tubal disease includes primary deposits only, without general peritoneal or other tubercular expressions.

Studying this disease, therefore, as a pelvic manifestation, we find its occurrence bearing a direct relation to the circulatory changes and the lymphatic engorgements which occur with greatest frequency during the functional activity of the genital system. In either case the tubercle bacilli may primarily enter the lymphatic space, or they may gain entrance through a soil previously exposed by protracted multiple bacterial infection. The types of this disease are usually well-defined, and may be said to occur in three forms.

The acute miliary form generally involves the entire peritoneum and presents a well-marked train of an acute systemic disease, with early ascitic accumulations, attended by fever, emaciation, and as a rule the general expression of a well-defined tubercular disease. The chronic caseous type of inflammation is attended by a local collection of purulent material with extensive adhesions, tissue degeneration, involving the intestinal tract. The chronic fibrous type is a more subacute form, or it may be a late stage of the types mentioned, and is attended by a dense fibroplastic exudate, a small amount of blood-stained fluid in the cavity, and as a clinic evidence, nodular masses may be felt in the pelvis, and as pointed out by Kelly, these enlargements are apt to change their relations with the pelvic organs from time to time.

The prognosis of this disease is good, although some diversity of opinion is entertained by different writers on its ultimate termination. So able and experienced a man as Munde recently said that he had not yet seen, in his own experience, one case go on to complete recovery; yet, he added, other practitioners report successful terminations, and he expects to be able to score greater success in the future.

That this disease subsides without treatment is admitted. The process of involution leaves but slight thickening in the shape of fibroplastic or pigmentary changes as traces of what was once well-defined tubercular disease.

Symptoms.—Pelvic pain is regarded as a very constant expression of this disease, although the symptomatology takes a very wide range, and a marked development of this trouble may remain for a long time unrecognized. The increased thickness of the pelvic peritoneum, due to the tubercular inflammatory process, may be looked on as the cause of frequent and painful micturition, which is a fairly constant symptom.

Should this type become chronic and assume the fibrous form, partial fixation of the uterus, with irregular pelvic indurations, will be noted. The local tenderness and the low septic range of temperature will be of value in directing attention to the nature of the trouble, while a curettage may lead to very conclusive evidence, if the bacilli are found in the debris. Local ascitic accumulations in the pelvis, in this disease, may increase in size until there is marked abdominal enlargement; yet the general peritoneum remain uninvolved. In two cases we have met this condition, and in one tubercular masses in the pelvic omentum gave the first opportunity for certain diagnosis.

Treatment.—The outcome of these cases has grown to be recognized as more successful, since 1862, when Sir Spencer Wells recorded a recovery after celiotomy. The unmistakable spontaneous recoveries that are met are also an evidence of the favorable response which may be expected under intelligent treatment, and while medicinal and hygienic treatment must be accorded a very useful place in the therapeutic measures employed in the management of this disease, yet exploration of the abdominal cavity has led to convalescence in so large a number of cases, and at the hands of so many observers, that surgical treatment must be looked on as promising.

In the employment of surgical measures, our care must be directed not only toward the removal of extensively diseased organs, but to the release of adhesions, when these adhesions threaten the welfare of the patient, and this is more particularly true in the caseous type, which may usually be regarded as the most serious form of trouble; yet it is true that in the recent miliary invasion, or in a fibroplastic involvement the simple abdominal exploration, with salient irrigation, without drainage, is the appropriate and conservative measure which promises the largest number of recoveries.

The reason for such convalescence may be accounted for by the relief of pressure, the removal of ptomains, and gain in nutrition, with the inhibitory effect on the tubercle bacilli of the phagocytic process thus established. And although Gregg Smith records as his most unexpected recovery a case of operative infection, yet we should take all surgical precautions against the introduction of sepsis.

Representative of the fibrous type of this disease is the case of a multipara, 52 years old, who for several weeks complained of severe pain in the right lower quadrant of the abdomen, in whom a bimanual examination revealed a firm mass fixing the right tube; the temperature ranged between 99 and 101 degrees, micturition was frequent and painful, and marked tympany and constipation were present. Abdominal exploration revealed a dense mass involving the cecum, some coils of the ilium, the right tube and ovary. The peritoneum was much thickened and removal of this extensive pelvic involvement was clearly inadvisable. The abdomen was closed without drainage, and at one and a half years after the operation the patient's condition remains good.

A caseous form of tubercular inflammation with very large cystic accumulation was met in a patient 35 years old, multipara, whose trouble was fairly acute, the

² Med. News, Nov. 18, 1898.

symptoms having been in evidence but a few weeks. Pronounced pain, fixation of the pelvic organs, dysuria, constipation, and notable emaciation were the leading symptoms.

Exploration revealed a large tubercular cyst springing from the left tube, with nodules scattered over the pelvic peritoneum and involving the omentum. Removing this cyst and the affected part of the omentum, with irrigation and drainage, was followed by a convalescence in which, one year later, was found a postuterine tenesmus; vaginal tampons of guaiacol and oil led to a disappearance of the enlargement, and to a symptomatic recovery.

A third case was met in a nullipara, aged 31, whose disease had been present for several months, and in whom the symptom of pain was not leading, but disturbed digestion, loss of weight, partial fixation of the pelvic organs and marked rectal tenesmus were prominent symptoms. A large tubercular cyst was found on exploration, springing from the left side of the pelvis, and surrounding the base of which broken-down glands and purulent material were found. The cyst was removed, the pelvic deposits evacuated, with free irrigation and drainage, followed by convalescence, in which case an unfavorable termination was expected, and this points to similar experiences at the hands of others, which go to prove that a tubercular peritoneum loses, in a large measure, its susceptibility to other forms of bacterial inflammation.

DISEASES IN SCHOOLS*.

SPREAD AND PREVENTION.

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By reason of my twelve years' intimate association with a school section of Philadelphia, having thirteen schools and 6031 children—5224 being in primary grades, ranging from 6 to 10 years of age, and the remainder in grammar grades—I have been able to make some valuable observations.

A trite remark of mothers, often heard by the family practitioner is: "My children were free from disease until they began attending school," and I can bear testimony to the truth of this saying, not alone from an experience in my own household, but also from the multitude of evidence gained otherwise.

One thing is evident: that there is an increase of contagious diseases during the continuance of the school period. The condemnation of Froebel's kindergarten schools is based on the necessary aggregation of little children in those tender years, when the susceptibility to contagious diseases is at its height. It is claimed that home teaching, and its consequent isolation, enhances the child's chances of attaining maturity while it lessens the possibility of other children obtaining disease. I have often watched little children in school-rooms, in and out of session, especially when seated at double desks, and have been impressed with their frequent and close personal contact, such as placing their faces together, blowing in each other's faces in a banter and, when scrutinizing a fellow pupil's work, bringing the inspiratory current in a direct cross line of the other's expiration. It often amazes me how careless physicians are in permitting children of an infected house to attend school, catering to the whims of parents,

who from stupidity or vicious indifference would rather see others contaminated than have their own children lose time by enforced absence.

The disease usually spread in schools, naming in the order of their frequency, are: diphtheria, scarlet fever, measles, whooping-cough, varicella and variola, or varioloid. There are three sources of danger: 1, being in school during the inception and development of the disease; 2, returning to school too early in the convalescence, or permitting children of an infected household to attend school; 3, in daily attendance in school during a light and overlooked attack of contagious disease.

When any of the contagious diseases occurred among children of my patrons I found in many instances that a child in the next seat had previously been absent on account of sickness, and often had the same disease as the child I was attending. In some cases I was unable to find the source of personal infection in that special classroom, but in contiguous classrooms on the same floor children had been absent with the same disease, and had but recently returned to school; from this I concluded that the mode of contamination was during recess. I have asked other physicians to investigate similarly, and they have had a like experience. One practitioner, of very large experience, stated that he believed seven-eighths of the contagious diseases in children were contracted in school.

I believe the most damage is done by children being in school during the inception and development of contagious diseases, and by a too early return during convalescence. When we consider the insidiousness of the period of incubation in children's diseases, and how often in their early stages the ambitious child will conceal its ills, knowing that absence lessens its chances of promotion, we readily understand why children are frequently found in filled classrooms with the diphtheria patch well developed in the throat, the scarlet-fever case either with a mild rash or an increasing fever preluding its appearance, or the child who will ultimately develop whooping-cough remaining in school, with that apparently innocent preliminary cough to spread its contagion. One can scarcely believe that fully-developed contagious disease could remain among forty or fifty children any length of time without being discovered, but this I have repeatedly seen. In several instances I have noticed children with their necks tied up, and on examination found them suffering with a light form of tonsillar diphtheria, or, if not with diphtheria, always sufficiently pronounced to alarm me. I have also found in several mild cases of scarlet fever in the class-room, and have frequently found children coughing suddenly in starts, and soon after detained at home with well-developed whooping-cough.

The commoner means of contamination are: by personal contact, inspiring exhalations, kissing; by the common use of a drinking cup; by exchanging working material, such as pencils, cleansing rags, or by passing around from mouth to mouth a whistle or a mouth-organ. The habit of children kissing one another, carrying the end of a lead or slate pencil to the mouth, lending it to a neighbor who also carries it to his mouth, prior to using it, is common.

A grave question arises, viz.:—When should we permit children to return to school during the convalescence of contagious diseases? My practice has been to recommend the return after the following lapse of time.

1. Diphtheria, four weeks from its inception and one week in the open air.

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