SECTION II.

CONSTITUTIONAL DISEASES.

I. RHEUMATIC FEVER.

Definition.—An acute, non-contagious, febrile affection, depending probably upon an unknown infective agent, and characterized by multiple arthritis and a special tendency to involve the heart.

Etiology.—Acute rheumatism prevails in temperate and in humid climates. It is rare in the tropics. Statistics on the point are not available, but, judging from my own observations, I think that, in hospital practice at least, cases are much more frequent in England than in America. It prevails most extensively during the spring months. In Bell's statistics, of 456 cases treated at the Montreal General Hospital during ten years, the largest number of cases were admitted in February, March, and April. The same proportion seems true in Europe and in the cities of the Atlantic coast.

Age.—Young adults are most frequently affected, but the disease is by no means uncommon in children between the ages of ten and fifteen years. Sucklings are rarely affected, and probably many of the cases which have been described belong to a totally different affection, the arthritis of infants. In exceptional cases, however, true rheumatism does occur. The following age table is based upon 456 cases admitted to the Montreal General Hospital: Under 15 years, 4·38 per cent; from 15 to 25 years, 48·68 per cent; from 25 to 35 years, 25·87 per cent; from 35 to 45 years, 13·6 per cent; above 45 years, 7·4 per cent. Of the 655 cases analyzed by Whipham for the Collective Investigation Committee of the British Medical Association, only 32 cases occurred under the tenth year and 80 per cent between the twentieth and fortieth year. These figures scarcely give the ratio of cases in children.

Sex.—If all ages are taken, males are affected oftener than females. In the Collective Investigation Report there were 375 males and 279 females. Up to the age of twenty, however, females predominate. Between the ages of ten and fifteen girls are more prone to the disease.

Occupations which necessitate exposure to cold and to great changes

in temperature predispose strongly to rheumatism. We meet the disease oftenest in drivers, servants, bakers, sailors, and laborers. Heredity seems in some cases to have a special influence, and the disease is more common in certain families. Of all etiological factors, cold is believed to be the most potent. Many cases follow a sudden wetting or chilling of the skin.

The essential cause of rheumatism is still unknown. There are three chief theories:

(*a*) *Metabolic:* that it depends upon a morbid material produced within the system in defective processes of assimilation. It has been suggested that this material is lactic acid (Prout) or certain combinations with lactic acid (Latham). Our knowledge of the chemical relations of the various products produced in the regressive nutritive changes is too limited to base much reliance upon these views. Richardson claims to have produced rheumatism by injecting lactic acid and by its internal administration.

(*b*) The *nervous theory* advanced by J. K. Mitchell has many advocates. According to this view, either the nerve-centres are primarily affected by cold and the local lesions are really trophic in character, or the primary nervous disturbance leads to errors in metabolism and the accumulation of lactic acid in the system. The advocates of this view regard as analogous the arthropathies of myelitis, locomotor ataxia, and chorea.

(*c*) *Germ theory:* that the arthritis is due to a specific microbe. In favor of this view may be mentioned the close analogy which exists between rheumatism and certain of the infectious diseases. The analogy is marked with gonorrhœa, scarlet fever, and septic processes, which are frequently associated with arthritis and endocarditis. The investigations hitherto made have not, however, shown the constancy of any microorganism in the disease. Mantle and others have described micrococci in the blood, and several organisms have been found in the secondary inflammations of the disease, but none of them can be said to be specific or peculiar.

Morbid Anatomy.—There are no changes characteristic of the disease. The affected joints show hyperæmia and swelling of the synovial membranes and of the ligamentous tissues. There may be slight erosion of the cartilage. The fluid in the joint is turbid, albuminous in character, and contains leucocytes and a few fibrin flakes. Pus is very rare in uncomplicated cases. Rheumatism rarely proves fatal, except when there are serious complications, such as pericarditis, endocarditis, myocarditis, pleurisy, or pneumonia. The conditions found have nothing peculiar, nothing to distinguish them from other forms of inflammation. In death from hyperpyrexia no special changes occur. The blood usually contains an excessive amount of fibrin. In the secondary rheumatic inflammations, as pleurisy and pericarditis, various pus organisms have been found, possibly the result of a mixed infection.

Symptoms.—As a rule, the disease sets in abruptly, but it may be preceded by irregular pains in the joints, slight *malaise*, sore throat, and particularly by tonsillitis. A definite rigor is uncommon; more often there is slight chilliness. The fever rises quickly, and with it one or more of the joints become painful. Within twenty-four hours from the onset, the disease is fully developed. The temperature range is from 102° to 104°. The pulse is frequent, soft, and usually above 100. The tongue is moist, and rapidly becomes covered with a white fur. There are the ordinary symptoms associated with an acute fever, such as loss of appetite, thirst, constipation, and a scanty, highly acid, highly colored urine. In a majority of the cases there are profuse, very acid sweats, of a peculiar sour odor. Sudaminal and miliary vesicles are abundant. The mind is clear, except in the cases with hyperpyrexia. The affected joints are painful to move, and soon become swollen and hot, and present a reddish flush. The knees, ankles, elbows, and wrists are the joints usually attacked, not together, but successively. For example, if the knee is first affected, the redness may disappear from it as the wrists become painful and hot. The disease is seldom limited to a single articulation. The amount of swelling is variable. Extensive effusion into a joint is rare, and much of the enlargement is due to the infiltration of the periarticular tissues with serum. The swelling may be limited to the joint proper, but in the wrists and ankles it sometimes involves the sheaths of the tendons and produces great enlargement of the hands and feet. Corresponding joints are often affected. In attacks of great severity every one of the larger joints may be involved. The vertebral, sterno-clavicular, and phalangeal articulations are less often inflamed in acute than in gonorrhœal rheumatism. Perhaps no disease is more painful than acute polyarthritis. The inability to change the posture without agonizing pain, the drenching sweats, the prostration and utter helplessness, combine to make it one of the most distressing of febrile affections. A special feature of the disease is the tendency of the inflammation to subside in one joint while developing with great intensity in another.

The temperature range in an ordinary attack is between 102° and 104°. It is peculiarly irregular, with marked remissions and exacerbations, depending very much upon the intensity and extent of the articular inflammation. Defervescence is usually gradual. The profuse sweats materially influence the temperature curve. If a two-hourly chart is made and observations upon the sweats are noted, the remissions will usually be found coincident with the sweats. The perspiration is sour-smelling and acid at first; but, when persistent, becomes neutral or even alkaline.

The blood is profoundly and rapidly altered in acute rheumatism. There is, indeed, no acute febrile disease in which the anæmia develops with greater rapidity.

With the high fever a murmur may often be heard at the apex region. Endocarditis is also a common cause of an apex *bruit*. The heart

should be carefully examined at the first visit and subsequently each day.

The urine is, as a rule, reduced in amount, of high density and high color. It is very acid, and, on cooling, deposits urates. The chlorides may be greatly diminished or even absent. Febrile albuminuria is not uncommon.

The saliva may become acid in reaction and is said to contain an excess of sulphocyanides.

Subacute Rheumatism.

This represents a milder form of the disease, in which all the symptoms are less pronounced. The fever rarely rises above 101°; fewer joints are involved; and the arthritis is less intense. The cases may drag on for weeks or months, and the disease may finally become chronic. It should not be forgotten that in children this mild or subacute form may be associated with endocarditis or pericarditis.

Complications.—These are important and serious.

(1) **Hyperpyrexia.**—The temperature may rise rapidly a few days after the onset, and be associated with delirium; but not necessarily, for the temperature may rise to 108° or, as in one of Da Costa's cases, 110°, without cerebral symptoms. The delirium may precede or follow the onset of the hyperpyrexia. As a rule, with the high fever, the pulse is feeble and frequent, the prostration is extreme, and finally stupor supervenes.

(2) **Cardiac Affections.**—(*a*) *Endocarditis*, the most frequent and serious complication, occurs in a considerable percentage of all cases. The statistics upon this point are not of much value, as the diagnosis has been based, as a rule, upon the development of a systolic murmur at apex or base. This is quite untrustworthy; since it may depend upon causes other than endocarditis. The mitral segments are most frequently involved and the affection is usually of the simple, verrucose variety. Ulcerative endocarditis in the course of acute rheumatism is very rare. Of 209 cases of this disease which I analyzed, in only 24 did the symptoms of a severe endocarditis arise during the progress of acute or subacute rheumatism. This complication, in itself, is rarely dangerous. It produces few symptoms and is usually overlooked. Unhappily, though the valve at the time may not be seriously damaged, the inflammation starts changes which lead to sclerosis and retraction of the segments, and so to chronic valvular disease.

(*b*) *Pericarditis* may occur independently of or together with endocarditis. It may be simple fibrinous, sero-fibrinous, or in children purulent. Clinically we meet it more frequently in connection with rheumatism than all other affections combined. The physical signs are very characteristic. The condition will be fully described under its appropriate section. A peculiar form of delirium may develop during the progress of rheumatic pericarditis.

(*c*) *Myocarditis* is most frequent in connection with endo-pericardial changes. The anatomical condition is a granular or fatty degeneration of the heart-muscle, which leads to weakening of the walls and to dilatation. It is not, I think, nearly so common as the other cardiac affections. S. West has reported instances of acute dilatation of the heart in rheumatic fever, in one of which marked fatty changes were found in the heart-fibres.

(3) **Pulmonary Affections.**—Pneumonia and pleurisy are not uncommon, and frequently accompany the cases of endo-pericarditis. According to Howard's analysis of a large number of cases, there were pulmonary complications in only 10·5 per cent of cases of rheumatic endocarditis; in 58 per cent of cases of pericarditis; and in 71 per cent of cases of endo-pericarditis. Congestion of the lung is occasionally found, and in several cases has proved rapidly fatal.

(4) **Cerebral Complications.**—These are due, in part, to the hyperpyrexia and in part to the special action upon the brain of the toxic agent of the disease. They may be grouped as follows: (*a*) *Delirium.* This is usually associated with the hyperpyrexia, but may be independent of it. It may be active and noisy in character; more rarely a low muttering delirium, passing into stupor and coma. Special mention must be made of the delirium which occurs in connection with rheumatic pericarditis. Delirium, too, may be excited by the salicylate of soda, either shortly after its administration, or more commonly a week or ten days later. (*b*) *Coma*, which is more serious, may develop without preliminary delirium or convulsions, and may prove rapidly fatal. Certain of these cases are associated with hyperpyrexia; but Southey has reported the case of a girl who, without previous delirium or high fever, became comatose, and died in less than an hour. A certain number of such cases, as those reported by Da Costa, have been associated with marked renal changes and were evidently uræmic. The coma may develop during the attack, or after convalescence has set in. (*c*) *Convulsions* are less common, though they may precede the coma. Of 127 observations cited by Besnier, there were 37 of delirium, only 7 of convulsions, 17 of coma and convulsions, 54 of delirium, coma, and convulsions, and 3 of other varieties (Howard). (*d*) *Chorea.* The relations of this disease and rheumatism will be subsequently discussed. It is sufficient here to say that in only 88 out of 554 cases which I have analyzed from the Infirmary for Diseases of the Nervous System, Philadelphia, were chorea and rheumatism associated. It is most apt to develop in the slighter attacks in childhood. (*e*) *Meningitis* is extremely rare, though undoubtedly it does occur. It must not be forgotten that in ulcerative endocarditis, which is occasionally associated with acute rheumatism, meningitis is frequent.

(5) **Cutaneous Affections.**—Sweat-vesicles have already been mentioned as extremely common. A red miliary rash may also develop. Scarlatiniform eruptions are occasionally seen. Purpura, with or without urticaria, may occur, and various forms of erythema. It is doubtful whether the cases of extensive purpura with urticaria and arthritis—peliosis rheumatica—belong truly to acute rheumatism.

(6) **Rheumatic Nodules.**—These curious structures, in the form of small subcutaneous nodules attached to the tendons and fasciæ, have been known for some years; but special attention has been paid to them of late, since their careful study by Barlow and Warner. They vary in size from a small shot to a large pea, and are most numerous on the fingers, hands, and wrists. They also occur about the elbows, knees, the spines of the vertebræ, and the scapulæ. They are not often tender. They do not necessarily come on during the fever, but may be found on its decline, or even independently altogether of an acute attack. They may develop with great rapidity and usually last for weeks or months. They are more common in children than in adults, and their presence may be regarded as a positive indication of rheumatism. They have been noted particularly in association with severe and chronic rheumatic endocarditis. They may occur in large numbers in adults, as in a case reported from my clinic in Philadelphia, by J. K. Mitchell. Histologically they are made up of round and spindle-shaped cells.

The *course* of acute rheumatism is extremely variable. It is, as Austin Flint first showed, a self-limited disease, and it is not probable that medicines have any special influence upon its *duration* or *course*. Gull and Sutton who likewise studied a series of sixty-two cases without special treatment arrived at the same conclusion.

Diagnosis.—Practically, the recognition of acute rheumatism is very easy; but there are several affections which, in some particulars, closely resemble it.

(1) **Multiple Secondary Arthritis.**—Under this term may be embraced the various forms of arthritis which come on or follow in the course of the infective diseases, such as gonorrhœa, scarlet fever, dysentery, and cerebro-spinal meningitis. Of these the gonorrhœal form will receive special consideration and is the type of the entire group.

(2) **Septic Arthritis,** which develops in the course of pyæmia from any cause, and particularly in puerperal fever. No hard and fast line can be drawn between these and the cases in the first group; but the inflammation rapidly passes on to suppuration and there is more or less destruction of the joints. The conditions under which the arthritis develops give a clew at once to the nature of the case. Under this section may also be mentioned:

(*a*) *Acute necrosis* or *acute osteo-myelitis*, occurring in the lower end of the femur, or in the tibia, and which may be mistaken for acute rheumatism. Sometimes, too, it is multiple. The greater intensity of the local symptoms, the involvement of the epiphyses rather than the joints, and the more serious constitutional disturbances are points to be considered. The condition is unfortunately often mistaken for acute arthritis, and, as

the treatment is essentially surgical, the error is one which may cost the life of the patient.

(*b*) *The acute arthritis of infants* must be distinguished from rheumatism. It is a disease which is usually confined to one joint (the hip or knee), the effusion in which rapidly becomes purulent. The affection is most common in sucklings and is undoubtedly pyæmic in character.* It may also develop in the gonorrhœal ophthalmia or vaginitis of the newborn, as pointed out by Clement Lucas.

(3) It is only in rare instances that gout and acute rheumatism are confounded. The localization in a single, usually a small, joint, the age, the history, the mode of onset—are features which enable us to recognize the cases readily.

Treatment.—The bed should have a smooth, soft, yet elastic mattress. The patient should wear a flannel night-gown, which may be opened all the way down the front and slit along the outer margin of the sleeves. Three or four of these should be made, so as to facilitate the frequent changes required after the sweats. He may wear also a light flannel cape about the shoulders. He should sleep in blankets, not in sheets, so as to reduce the liability to catch cold and obviate the unpleasant clamminess consequent upon heavy sweating. Chambers insisted that the liability to endocarditis and pericarditis was much reduced when the patients were in blankets.

Milk is the most suitable diet. It may be diluted with alkaline mineral waters. Lemonade and oatmeal or barley water should be freely given. The thirst is usually great and may be fully satisfied. There is no objection to broths and soups if the milk is not well borne. The food should be given at short and stated intervals. As convalescence is established a fuller diet may be allowed, but meat should be used sparingly.

The local treatment is of the greatest importance. It often suffices to wrap the affected joints in cotton. If the pain is severe, hot cloths may be applied, saturated with Fuller's lotion (carbonate of soda, 6 drachms; laudanum, 1 oz.; glycerine, 2 oz.; and water, 9 oz.). Tincture of aconite or chloral may be employed in an alkaline solution. Chloroform liniment is also a good application. Fixation of the joints is of great service in allaying the pain. I have seen, in a German hospital, the joints enclosed in plaster of Paris, apparently with great relief. Splints, padded and bandaged with moderate firmness, will often be found to relieve pain. Friction is rarely well borne in an acutely inflamed joint. Cold compresses are much used in Germany. The application of blisters above and below the joint, often relieves the pain. This method, which was used so much a few years ago, is not to be compared with the light application of the Paquelin thermo-cautery.

Medicines have little or no control over the duration or course of the

* Townsend, Acute Arthritis of Infants, American Journal of the Medical Sciences, January, 1890.

disease, which, like other self-limited affections, practically takes its own time to disappear. Salicyl compounds, which were regarded so long as specific in the disease, are now known to act chiefly by relieving pain. R. P. Howard's elaborate analysis shows that they do not influence the duration of the disease. Nor do they prevent the occurrence of cardiac complications, while under their use relapses are considerably more frequent than in any other method of treatment. In acute cases with severe pain the salicyl compounds give prompt relief and rarely disappoint us in their action. Sodium salicylate, in fifteen-grain doses for eight or ten doses, may be given. The bicarbonate of potassium in twenty-grain doses may be used with it. Many prefer salicin (gr. 20) in wafers; others the salicylic acid (gr. 20) or salol. I have for the past five or six years used the oil of wintergreen, recommended by Kinnicutt, and have found it quite as efficacious. Twenty minims may be given every two hours in milk. The salicyl compounds are best given in full doses at the outset of the disease, to relieve the pain. Then the dose should be reduced in frequency, or, if the symptoms have abated, stopped altogether, as relapses are certainly more frequent under their use.

Alkalies may be combined with the salicylates, or may be used alone. The potassium bicarbonate in half-drachm doses may be given every three or four hours until the urine is rendered alkaline. Fuller, who so warmly supported this method of treatment, was in the habit of ordering a drachm and a half of the sodium bicarbonate with half a drachm of potassium acetate in three ounces of water, rendered effervescent at the time of administration by half a drachm of citric acid or an ounce of lemon-juice. This is given every three or four hours, and usually by the end of twenty-four hours the urine is alkaline in reaction. The alkali is then reduced, and the amount subsequently regulated by the degree of acidity of the urine, only enough being given to keep the secretion alkaline. Opinion is almost unanimous that, under the alkaline treatment, cardiac complications are less common. The combination of the salicylates with the alkali is probably the most satisfactory. Care must be taken to watch the heart during the administration of these remedies. In the only fatal case of rheumatism which has come in my experience the patient had, owing to an error, taken the full first day's dose of Fuller's alkaline treatment for five successive days, instead of having the salt gradually reduced. She died suddenly on the fifth day after sitting up in bed. Salicylates also, if given largely, are very depressing to the circulation.

To allay the pain opium may be given in the form of Dover's powder, or morphia hypodermically. Antipyrin, antifebrin, and phenacetin are useful sometimes for the purpose. During convalescence iron is indicated in full doses, and quinine is a useful tonic. Of the complications, hyperpyrexia should be treated by the cold bath or the cold-pack. The treatment of endocarditis and pericarditis and the pulmonary complications will be considered under their respective sections.