excrescence differs from every known malignant tissue in its mode of growth. "It grows *by imbibition from the blood, but beyond the capillaries.*" This view of the morbid anatomy of the disease, its uniformly fatal issue when left alone, and the comparative success of Dr. Simpson's operations, would induce me, if consulted at a very early stage, unhesitatingly to advise excision, provided the diagnosis demonstrated the growth to be of that description which Dr. A. Anderson has described. If asked at a later period, I would not advise the same course to be adopted, unless the symptoms were, as in the case of Mrs. G., so urgent as to threaten speedy death; and then, we are not only justified in operating, but imperatively constrained to do so. If an operation be decided against, the proper treatment to adopt would, I apprehend, consist in the use of astringent anodyne injections, and gallic acid as a constitutional remedy. Each case will however demand its own special appliances.

The question as to the disease being hereditary I do not now enter upon. I may state, however, that the mother of my patient died from what was described to me as "cancer of the womb".

Essex House, Putney, November 1850.

**THE CHARACTERISTIC PECULIARITIES, PATHOLOGY,
AND TREATMENT OF RHEUMATISM,
MORE PARTICULARLY AS IT IS FOUND PREVAILING
WITHIN THE TROPICS.**

By JAMES BIRD, A.M., M.D.

IMPROVED views of the humoral origin of Rheumatism have from time to time arisen, to claim the attention of the profession; and the exclusive opinions of solidism, from the beginning of the present century, have been gradually giving place to that more eclectic and rational system of pathology, which looks not on diseases as confined to particular organs or tissues, but as the manifestations of more general and deep-seated lesions, to be sought for in the abnormal deviations of the blood, and the perverted actions of the nervous system. Among those whose judicious observations have tended materially to improve our knowledge of this subject, the names of Drs. Todd and Bence Jones stand prominently forward, as worthy of honourable mention. There is yet, however, much left for study and analysis in the natural history of the disease, particularly as it is found prevailing within the tropics, among a class of patients subsisting almost exclusively on non-azotised articles of diet. Excepting fever and cholera, there is no disease which proves more fatal to the sipahies of our native army; nor is there any which annually renders so many Native and European soldiers unfit for the active duties of their profession, by placing them on the invalid or pension list. Tropical climates seem to have considerable influence in modifying the character of rheumatism among the people of India; and the completion, in that country, of a truly philosophical investigation into the chemical pathology of this and other diseases, might be attended with useful results, in helping us to ascertain the true nature of the rheumatic diathesis, its modifications

under climate, and the relation of rheumatism to other diseased conditions. In this country, too, the practice pursued in rheumatism is undefined and somewhat empirical; one employing lemon-juice, another colchicum, and a third a purely alkaline treatment, without any explanation of the principles, or differences of diseased condition, on which such opposite systems of treatment are recommended. It is therefore matter for wonder and regret that, with the exception of the late Dr. Malcolmson in his *Essay on Beriberi and Rheumatism*, and Dr. Geddes in his *Clinical Illustrations of Indian Disease*, almost every writer on tropical diseases has passed over, without notice, this prevalent and important complaint. The latter author states, that he found rheumatic cases formed about one-eleventh part of all other complaints admitted; and that, during the five years he was in charge of the Madras European Regiment, 457 cases were admitted; of which, the detailed records of 312, including relapses, and occurring in 160 individuals, formed the subject of his statistical remarks and experience. Regarding the seat of the disease, he observes: "On a general review of the whole, forty-seven individuals are discovered to have been subject, either in their primary or relapsed attacks, to rheumatism, both in the muscles and ligaments; forty-three had those structures affected along with that of the periosteum; twenty-eight and twenty-three had respectively disorders of the ligaments, or of the muscles only; in five individuals the disease was confined to the periosteum; in eight this structure was attacked with that of the joints, and in three with that of the muscles only. In the remaining three, the disease was chiefly of a neuralgic character, attended, in two, with rheumatism of the ligaments and muscles."

In the narrow compass of this paper it would be impossible to enter on a complete consideration of the several points connected with the rheumatic diathesis, its paroxysmal progress, and local manifestation in particular organs: I must, therefore, confine my present observations to—1st. Leading varieties of tropical rheumatism, and the points in which articular rheumatic inflammation differs from simple suppurative inflammation. 2nd. Origin of the rheumatic diathesis, nature of the paroxysmal fever accompanying articular inflammation, and causes which produce them. 3rd. The general principles of treatment.

I. LEADING VARIETIES OF TROPICAL RHEUMATISM, AND THE POINTS IN WHICH ARTICULAR RHEUMATIC INFLAMMATION DIFFERS FROM SIMPLE SUPPURATIVE INFLAMMATION.

Tropical rheumatism presents two principal forms; the sthenophlogistic or acute, and the asthenocachexial or chronic. The former, in its attack of particular tissues, shews a preference for the compound membranes of a mucous and serous kind; the latter affects the muscular and nervous tissues, and has much of a neuralgic character, accompanied by vitiated nutrition, and wasting of the parts affected. The very acute variety, associated, as in Europe, with pericarditis, or endocarditis, is a form of the complaint seldom presented to observation in India; though cases presenting the ordinary symptoms of heat, pain, redness and swelling of the joints, accompanied by fever, occur both among natives and Europeans. The greater number of such

attacks, however, happen among those who are located in the colder, drier, and more elevated table-lands of that country; while the more common form of the disease, prevalent among the natives, particularly those inhabiting malarious districts, is the astheno-cachectic variety; which, when it assumes the form of periostitis, has all the character of mercurial syphilitic cachexia. This latter has been sometimes named pseudo-rheumatism, though no well founded distinction between it and rheumatic affection of the synovial tissues of the joints has yet been established.

Stheno-phlogistic rheumatism is generally attended by disorder of the intestinal mucous membranes and abdominal secretions, much constitutional disturbance, and aggravation of the fever and pain at night. It is often associated with hepatic congestion and colonitis; but when the phlogistic symptoms are unsubdued, they are accompanied by much destructive irritation and waste of tissues, total failure of the digestive powers, emaciation, loss of strength, pale anasarctous visage, and other signs of cachexia, so that too active or injudicious employment of bleeding, or of the diaphoretic and purgative treatment, must be guarded against. The following are cases of the stheno-phlogistic kind.

CASE I. Joseph Fido, engineer of the steamer *Atalanta*, aged 23, was attacked, on the evening of the 8th August, 1838, by extensive swelling and redness of the left knee-joint, accompanied by tenderness of the parts, and inability to move the limb. The inner edge of the knee was most affected, but the whole presented a puffy elastic swelling of the joint, accompanied by slight heat of skin, accelerated pulse, some degree of headache, furred tongue, and a constipated state of bowels, which had existed for some time previous to the attack. Mr. Sproule, the assistant-surgeon of the vessel, repeatedly abstracted blood from the joint by means of cupping-glasses, caused the patient's bowels to be freely acted on by purgatives, and then administered four grains of calomel, with tartar-emetic solution, three times daily, till the gums became slightly tender from the calomel. This result followed in a few days, accompanied by diminished swelling of the knee-joint and disappearance of all cutaneous redness, with a return of the skin's natural temperature. The joint, which was still swollen, remained incapable of motion. Repeated blistering was had recourse to, previous to his admission into the European General Hospital at Bombay, on the 11th of September. At this time, swelling and thickening of the parts surrounding the joint still existed, accompanied by inability of motion. Straps of mercurial plaster were applied around the joint, iodide of potassium in sarsaparilla decoction was given daily, and purgatives, with the addition of colchicum wine, were administered occasionally. Under this treatment the joint soon resumed its natural appearance and power of motion, and the patient was discharged well.

The next is a case illustrating the same disease as it attacks a native of India.

CASE II. Body Sing, private in the 18th Regt. of Native Infantry, aged 30, admitted at Kalludghee, 3rd September, 1835. Complained much of pain in the joints of his upper and lower extremities; swelling, heat, and tenderness of the left knee; pulse 120, firm; bowels re-

ported regular; tongue excited. He took an emetic, which produced vomiting of much bilio-mucous matter; he was afterwards bled from the arm to fifteen ounces, without experiencing any relief from pain. The blood drawn was cupped and a little buffy. From the 5th Sept. till the 10th October, the treatment consisted of small doses of calomel with fifteen-grain doses of Dover's powder, administered at bed-time, followed next morning by occasional brisk purgatives, combined with full doses of colchicum wine. After this time, the knee-joint being very painful, accompanied by loss of flesh, and other symptoms of incipient cachexia, the patient was ordered to take half a pint of compound sarsaparilla decoction, with an equal quantity of warm milk, twice daily. On the 28th following, the health was much improved, and the pain and swelling of the knee-joint were greatly lessened. From the 28th October to the 12th December, when he was discharged to perform easy duty, he took three-drop doses of cajeput oil twice daily, and had his left leg and knee-joint firmly bandaged with flannel. Copious perspirations followed the administration of the oil, giving great relief to the rheumatic symptoms, and a small tender swelling, which made its appearance on the sternum, completely subsided at the same time.

Astheno-cachectic rheumatism is so generally associated with arthritic periostitis and constitutional *cachæmia*, that we must beware of employing long-continued mercurial courses for the cure of even its sthenophlogistic variety, as these are apt to give rise to much derangement of the primary assimilation and to obstinate forms of periostitic inflammation. This caution is particularly necessary in regard to the mercurial treatment of rheumatism among the natives of India, who, from their more general use of non-azotised articles of diet than the European inhabitants of India, possess less vital power of resistance to the destructive metamorphoses of the tissues, and heedlessly employ cold bathing while under the constitutional effect of mercury.

The periostitis which we meet with in such cases affects the head, the vertebræ, or the sternum, and sometimes the shin-bones; but when the cachexia accompanying it proves fatal, either by diarrhœa, dysentery, or hectic, follicular ulceration of the intestines is generally found associated with the other symptoms. The strong constitutional disposition existing in such cases towards wasting decay and ulceration of particular tissues, originates probably in the disproportionate use of farinaceous articles of diet without a sufficient admixture of azotised food; and the extreme irritability and obstinacy of ulcers among the natives of India may be ascribed, I think, to the same cause. There is good ground for concluding that the frequency of periostitis in Indian rheumatism arises from the enervating influence of climate, malarious causes, and a poor vegetable diet; though its occurrence, consecutively to abused mercurial courses and exposure to cold, is observable among well-nourished Europeans unattended by that defective assimilation and rapid emaciation, which accompany it in native constitutions. Such cases, however, have been generally those of seamen who have been exposed to cold and the use of salt diet, and were received into hospital from the ships in harbour. The constitutions of these men manifested slight signs of a scorbutic diathesis, caused by the

salt diet, and by neglect of those measures for keeping the bowels in a healthy state of excretion. Hence the rapid and well-marked utility in such instances of removing the men from ship-board to a hospital on shore, with the use of fresh meat diet, warm bathing, the necessary employment of purgatives, and an allowance of lime-juice and potatoes.

As cachexia advances in cases of this kind, attended by a complication of rheumatic symptoms, the skin, which becomes harsh and dry, is covered by white scales, or papular eruptions, having all the character of obstinate psora. The intimate sympathy existing between the epithelial covering of the intestinal mucous surfaces, and that of the skin, helps us to an explanation of the occasional association of cutaneous eruptions with derangements of the primary assimilation and intestinal mucous surfaces, as observable in the different forms of arthritic complaints. This deranged condition of the digestive organs and skin may be found co-existing in most cases of phlogistic and cachexial rheumatism; but one or other of these has precedence and predominance in the complaint, just in proportion as there exists some original defect in the assimilating power of the one, or the eliminating function of the other.

The intimate relation that subsists between milder and modified degrees of scorbutic *dyscrasia* and the forms of *astheno-cachexial* rheumatism, has of late years been almost lost sight of; notwithstanding that the great and accurate observer, Sydenham, described a species of rheumatism resembling scurvy in its capital symptoms, and requiring nearly the same method of cure; and which he distinguished by the name of scorbutic rheumatism. This species of the disease will be found, under ordinary circumstances, on ship-board, and among European sailors, using in excess salt-meat diet, with little or no admixture of succulent vegetables; as well as among bodies of men, on land, living on farinaceous seeds destitute of anti-scorbutic properties, or on a diet of unvaried character with total abstinence from animal food. Such are the circumstances, aided by extreme aridity or dampness of climate, under which land scurvy prevails among prisoners in the jails of India, and also among bodies of native troops, in particular seasons and localities. The same unvaried farinaceous character of diet, used by many of our sipahies, predisposes them to attacks of cachexial rheumatism. In the eighth volume of the *Calcutta Medical Society's Transactions*, there is an interesting account, by Messrs. Ross and Macnab, of this kind of land scurvy, as it appeared in 1834, among the native troops at Nusseerabad. Many of the cases appear to have been of a mixed scorbutic and rheumatic character; and so closely, says Mr. Macnab, did the excruciating pains of the extremities simulate rheumatism, that, in some instances, the distinction could not well be established; and even when tumefaction took place about the joints or in the periosteum, the difference was by no means distinct. Removal of the patient from the station, and change of air, were attended by well-marked benefit; and the transition from an arid to a milder and more humid state of the atmosphere was followed by amelioration of the malady among the troops.¹

CASE III. William Collier, baker of the ship *Herefordshire*,

¹ Transactions of the Medical Society of Calcutta, vol. viii, p. 118.

aged 26 years, was admitted into the European General Hospital, at Bombay, on the 8th Dec. 1836, complaining of swelling, pain, and stiffness of the large joints, more particularly the elbows, accompanied by loss of appetite, leucophlegmatic countenance, and tenderness and enlargement of the right tibia. He had been more or less affected, on ship-board, by these symptoms for the three previous months, had gradually lost flesh, and used nothing but friction with camphorated liniment to the swelled joints. He was ordered to take half a pint of compound sarsaparilla decoction, with three grains of iodide of potassium twice daily, along with three ounces of diluted lime-juice, and was placed on the chicken diet of the hospital, with half a pound of potatoes. His health gradually improved; the swelling of the joints, and the tenderness and enlargement of the tibia disappeared; and the patient was quite well by the 2nd of December, twelve days after his admission.

CASE IV. James Cleet, aged 30, seaman of the ship *Herefordshire*, was admitted into the European General Hospital on the 7th Dec., 1836, complaining of nearly the same symptoms as the last-named patient, with the addition of some livid spots on the calf of his left leg. He was treated by four ounces of bark infusion, given twice daily, and acidulated with diluted sulphuric acid; used a warm bath at bed time; had the same diet, with an allowance of lime-juice, as the former patient, and was quite well in fifteen days after the date of his admission.

The next case is a still better illustration of the intimate relation between milder degrees of the scorbutic diathesis, and the forms of astheno-cachexial rheumatism.

CASE V. John Reid, seaman, government steamer *Atalanta*, aged 26, was admitted into the European General Hospital at Bombay on the 1st Nov. 1839. He had rheumatic periostitis of the head and sternum, accompanied by pyrexia. The pyrexia was subdued by the warm bath, mercury and chalk, with Dover's powder and purgatives. Was soon after attacked by pain in the cardiac region, unaccompanied by any abnormal sounds of the heart. This was removed by looseness produced by the use of antimonial mixture and colchicum, two ounces of lime-juice being allowed him daily at the same time. Subsequently to this, quinine solution was given twice a day, with an anodyne at night; but the periostitis of the scalp returning, accompanied by pain at the base of the occiput, it was thought necessary to omit for a time the quinine solution, to abstract blood from the temples and nape of the neck, and to apply a blister over the cervical vertebræ from the base of the skull. After a time, the quinine solution was resumed with good effect, and the patient was discharged free from pain, and with a recommendation that he should be sent to England, as he was much debilitated and unfit for duty in a tropical climate. A month previous to his admission, he had been discharged from the hospital cured of a somewhat similar attack, accompanied by scorbutic symptoms.

The graduated forms of rheumatism just described derive most of their difference from constitutional causes of distinction, and the less or greater aberrations of the blood from its normal state; but the distinctions of this disease, according to its seat in various parts, though not affording like important grounds for opposite therapeutical prin-

ciples and modes of treatment, are still of utility in directing the mind of the practical physician to important local differences, associated with equally well-marked gradations of the constitutional symptoms which attend them. The chief varieties of tropical rheumatism, founded on such locality, are those divisions of the disease which have been adopted by M. Chomel. 1. Articular rheumatism, or rheumatism of the joints; 2. Muscular rheumatism, or rheumatism of the voluntary muscles; and, 3. Visceral rheumatism, or rheumatism of certain fibrous tissues situated within the splanchnic cavities. The generality of cases belonging to the first form, as met with in the tropics, oftener present symptoms of the mild chronic variety, than of the intense articular rheumatism of European climates; and though attacks are generally ushered in by febrile symptoms, these symptoms are of less severity than in colder climates, and the disease is less mobile in character. Muscular rheumatism, too, though met with in every part of the body, and usually more amenable to treatment than cases of the articular form, is more frequently met with in the loins and muscles of the limbs than in any other part of the sarcous tissues. This is peculiarly a disease of malarious districts, being very prevalent among the men of native regiments when located in such places.

The following extract from my quarterly report, on diseases of the 2nd Troop Horse Artillery, for 1822, then stationed at Kaira, in Guzerat, embraces the leading particulars of this variety of rheumatism, as we meet with it among Europeans. "The patients complained of severe pain in the joints, tenderness of the plantar fasciæ, and sometimes of the bones, or sharp lancinating pain beneath the sternum. There was seldom any swelling of the joints, but the muscles leading to them were painful when pressed, and were affected, in one case, with cramps. The disease appeared to be connected with considerable derangements of the biliary function; but the appetite was not in any case much impaired. Only two patients felt pain from pressure in the region of the liver; but tenderness of the sternum was a common symptom, and there was generally some variation of the stools from their natural yellow colour, indicating more or less derangement in the secretion of bile. All those who suffered from this disease had been much debilitated by intermittent fevers, or biliary affections, in the previous months." In general, articular rheumatism of the tropics is of the mild stheno-phlogistic character, while the muscular variety is of the astheno-cachexial type.

Did time or the limits of this paper permit, I could adduce many interesting illustrations of these several local forms of tropical rheumatism; but I must now proceed to inquire whether the phenomena of this disease be identical with those of inflammation and the phlegmasiæ. While rheumatism sometimes appears with all the phenomena of the phlegmasiæ, such inflammation still possesses a specific character, and is in its nature more symptomatic than idiopathic, manifesting in its progress that the local symptoms proceed from a particular constitutional taint, which gives to them a character distinct from that of simple inflammation. This taint may not always affect the joints, but successively various tissues of the body. The mobility of rheumatic inflammation, or disappearance from one part and appearance elsewhere; its pain, too, the manifestation of a constitutional

cause, being frequently diminished by compression and rubbing; its want of determinate progress and limit of duration; its tendency to periodicity and aggravation at night; its extreme susceptibility of impression from changes in the air and of electricity; and its readiness to return after errors of diet or exposure to cold, are all proofs that simple inflammation does not constitute the disease, but that it proceeds from a specific cause associated with abnormal sensibility of the nerves. Though the disease, therefore, generally presents quite as much the character of the neuroses as of the phlegmasiæ, evidence is not wanting to prove that acute articular rheumatism sometimes terminates in suppuration and purulent effusion into the joints affected. Few as these cases are, they are important proofs of the necessity of attending, in our treatment of this disease, to therapeutic means for subduing both local and constitutional symptoms. M. Bouillaud, in his researches on articular rheumatism, instances cases of the disease terminating in suppuration; and in a late discussion on this subject, before the Academy of Medicine, M. Andral brought forward the case of a woman, (who died at the Charité in Paris), whose shoulder-joints, after a severe attack of pneumonia, had been the seat of simple and complicated acute rheumatism. The patient, who was aged, had died in about eight days without an apparently sufficient cause. The interior of both scapulo-humeral articulations contained homogeneous pus, similar in character to that which is the result of phlegmonous inflammation. The surfaces presented innumerable minutely injected vessels, forming the closest network, except on the articular cartilages, where this injection was but slightly marked. The bursæ about the joints were also filled with pus. The parts external to the joints, as the muscles and ligaments, were in their normal condition.¹ In other cases, lesions of the synovial membranes, cartilages, and extremities of the bone, appearing to be of an inflammatory nature, have been found; but as these are not constantly connected with the rheumatic affection, they are not to be regarded as its anatomical cause, and must rather be considered as an effect.

II. ORIGIN OF THE RHEUMATIC DIATHESIS, NATURE OF THE PAROXYSMAL FEVER ACCOMPANYING ARTICULAR INFLAMMATION, AND CAUSES WHICH PRODUCE THEM.

Rheumatism may be generally considered a result of pre-existing lesion of the assimilating and excretory organs of the body; which, on the application of cold, errors of diet, intoxication, malaria, and like exciting causes, gives rise to that abnormal change of the blood which constitutes the rheumatic diathesis. The sudden or continued influence of damp cold air, producing a powerful impression on the skin and nervous system, may in European rheumatism be considered the first link of the chain of changes connected with the generation of the *materies morbi* in the blood. The equilibrium of healthy nutrition is disturbed, the tissues cease to appropriate true nutritive materials, the assimilating functions of the stomach and collatitious viscera are deranged, and the eliminating excretory action of the liver, skin, and kidneys, further impaired or suspended, so as to admit of effete

¹ London Medical Gazette, vol. xlv, 1850, p. 304.

and imperfectly oxydized materials reverting into the circulating fluid. The two former cease to remove from the blood the healthy proportion of carbonised principles, and the constitutional disturbance following this state is still further augmented by the azotised products of secondary assimilation being retained in the system, as indicated by the deposition from the urine of various lithates after nocturnal rheumatic paroxysms. In place, therefore, of the lungs and their supplemental organs, the liver and skin, eliminating, in normal proportion, the non-nitrogenous and azotised elements in the form of carbonic acid and urea, there is now a morbid development of cutaneous perspiration, containing lactic acid, with imperfect excretory functional power of the kidneys. The latter having ceased to remove the normal proportion of urea from the system, excrete in its place uric acid and the urate of ammonia, or the imperfectly oxydized constituents of the body.

It may naturally be asked, is the blood altered previous to the appearance of swelling and local inflammation of rheumatism? Though this be a question most difficult of solution, even as regards other inflammatory diseases, the disposition of the circulating fluid to an altered abnormal condition in this disease, usually precedes the development of its local symptoms. We must admit, however, that cold and other causes occasionally produce rheumatism in constitutions little or not at all disposed to the disease, though the reverse be usually the case. In those instances the altered condition of the blood follows the development of the local affection; but, in either case, the physiological opinion of Simon, that the metamorphic power of the blood globules is increased, affords the best explanation of the chemical phenomena of rheumatism; as this heightened metamorphosis of the blood at once accounts for the greater relative formation of fibrin, and the progressive diminution of hæmato-globulin, as they occur in rheumatic fever and its consequences. The natural tendency of rheumatism is to *anæmia*, and to the production of phenomena, connected with a diminution of the blood globules, as lately prominently noticed by Dr. O'Ferral, in his observations on rheumatic cases with endocardic complications; where, after the employment of depletion and mercury, a cardiac bruit, different from that which originally presented itself, continued to persist, notwithstanding the steady employment of means for subduing inflammatory action.¹

That morbid condition of the blood, which constitutes the *rheumatic dyscrasia*, occurs in all cases where the circulating fluid either becomes deteriorated by the absorption of foreign poisonous matter, as in gonorrhœa, and in certain exanthematous diseases, accompanied by primary and secondary symptoms; or by the reversion into the blood of increasingly morbid secretions, as in uterine affections that give rise

¹ One of the most important bearings of improved physiological knowledge is on pathology and the primary element of diseased condition; and though our facts on the subject of blood-diseases be yet limited and undetermined, there is much reason for the belief, that the healthiness or unhealthiness of the blood itself depends on the greater or less perfection of its cell-development, and that wherever its colouring matter, *hæmatin*, is defective in quantity, or depraved in quality, it proves incapable of fixing the oxygen of the inspired air, and thus gives rise to perverted nutrition of parts, defective calorification, and ultimate anæmia.

to those diseased conditions, and which, though now fashionably treated as local disease by caustic and other like applications, are often, indeed, symptomatic of an acquired state of constitutional dyscrasia. Dr. Geddes, in his excellent clinical illustrations of Indian disease, observed that neither heat, rain, nor cold, appeared to have any reference to the prevalence of rheumatism; but that, in individuals possessing constitutional peculiarities, pseudo-syphilitic virus gave a tendency to the occurrence of rheumatic inflammation, aggravated in some cases by the exhibition of mercury. Impaired primary assimilation, defective clothing, and malarious locality, or whatever other causes, having a tendency to render defective normal excretion, seem to materially aid the absorption of such foreign matters, and to produce, in India, rheumatic cachexial affections of the utmost intensity. Such defective excretion gives rise to the undue production of lactic acid in the body; depending, as Dr. Bence Jones has shown, in some of the stheno-phlogistic cases, on excessive ingestion of azotised food; and, in those of an opposite kind, on the introduction of an insufficient amount of oxygen into the system, and on defective elimination through the excretory organs. In both cases, the urea, which is the produce of the molecular decomposition of the muscular and azotised tissues, is partly converted into uric acid and urate of ammonia, and appears in the urine as a fawn-coloured lateritious sediment.

The anatomical seat of rheumatism is peculiarly confined to the fibro-serous tissues, including the articular capsules, cellular tissue, mucous follicles, synovial glands, the interior ligaments of joints, the muscles and tendons, the dura mater as reflected on the medulla oblongata and spinal cord, the pleura, the peritoneum, and nerve tubules. The localized manifestations of disease are accompanied, according to age, temperament, and previous habits, by almost opposite conditions of the blood, states of *hyperinosis* and *hypinosis*; which differences of constitutional cause give the rheumatic swelling of the joints more or less the character of ordinary inflammation. The local swelling of stheno-phlogistic rheumatism differs from ordinary inflammation in having more a character of irritation than the latter; but, according to the researches of M. Andral, agrees with it in this, that the fibrin in the blood increases from two and a-half or three to as much as ten parts in one thousand, oscillates in the sub-acute form between four and five, and returns to the natural standard in well marked chronic cases. This state of *hyperinosis* is, however, rather relative than absolute, being accompanied by a corresponding diminution of the red corpuscles; which, as Simon supposes, are wasted in the metamorphic production of the fibrine. The following table exhibits the relative increase of fibrin to the ratio of *hamato-globulin*, both in rheumatism and scurvy, as compared with healthy blood, by which a well-marked analogy between the conditions of rheumatic and scorbutic *dyscrasia* is at once indicated. (*For Table, see next page.*)

Rheumatic paroxysmal fever, which is associated with much irritation, may be considered the manifestation of the rheumatic diathesis in the various tissues, brought on by the action of cold on parts, so that the condition of healthy nutrition is suspended, and hyperæmia with swelling, or inflammation of a destructive kind begins. The pain is accompanied by numbness, and the redness and swelling are

Blood and Diseases.		Water.	Blood Cor- puscles.	Fibrin.	Albu- men.	Fatty matters.	Salts and ex- tractive.	Density of defi- brinated blood.	Density of the Serum.
Healthy blood according to Becquerel and Rodier	Max.	800.0	152.0	3.5	73.0	3.255	8.	1062.0	1030.0
	Min.	760.0	131.0	1.5	62.0	1.000	5.	1058.	1027.
	Mean	779.0	141.0	2.2	69.4	1.600	6.8	1060.2	1028.0
Rheumatic blood from 14 individuals, and in 43 ana- lyses, accord- ing to Andral and Gavarret					Residue of serum, including albumen, fatty matter, and salts.				
	Max.	839.6	130.0	10.2	—	—	—	104.8	—
	Min.	771.6	70.1	2.8	—	—	—	76.9	—
Scorbutic blood, from three well- marked cases, according to Mr. Busk	Max.	849.9	47.8	6.5	84.0	—	9.5	150.1	—
	Min.	835.9	72.3	4.5	76.6	—	11.5	164.1	—
	Mean	846.2	60.7	5.9	74.2	—	10.9	153.8	—

often slight in comparison to its degree. A specific anormal change of the blood, and a greater alteration of the nervous force than occurs generally in simple inflammation, sometimes amounting to anæsthesia of the parts, or accompanied at others by greatly increased nervous sensibility, seem to mark the condition and progress of rheumatic inflammation. In one remarkable case of a seaman named John Brickle, aged 25, who had remained for four hours together under water while in the Persian Gulf, the rheumatic symptoms and tenderness of the voluntary muscles were preceded by well-marked peripheral anæsthesia. This patient was cured by an almost daily use of warm bathing, diaphoretics and purgatives, with friction and light flannel bandages to the limbs. The change of air, too, from the Persian Gulf to Bombay, exerted no small influence in improving the general health and removing symptoms of disease.

The irritative fever accompanying local rheumatic affection, sometimes precedes or simultaneously occurs with the symptoms of pain, stiffness and swelling of the joints; sometimes it is ushered in by chills, followed by heat of skin, frequency of pulse, and other pyrexial symptoms. More frequently, however, and particularly in malarious districts, the febrile symptoms are of an obscure hectic kind, presenting no very definite character; being marked, however, by nightly insomnia, aggravation of the pain, restlessness, and slight morning perspirations, which seldom bring much relief from the painful affections of the joints and muscles. The patients, when unrelieved, continue to lose flesh and strength, their muscles become attenuated, and their skins covered by various kinds of eruptions, as mentioned in the previous section. In such cases, particularly those of natives of India, change of air, and relief from the night watches and duties of a soldier, are followed by complete restoration of the persons to health, without any therapeutic means beyond a return to the diet and air of their native villages, with complete exemption from labour and fatigue.

We learn from Dr. Geddes's statistical experience of this disease in

India, that fever existed in less than one-third of his cases; was as common in relapses as in primary attacks; and was not more confined to one local variety of the disease than another. In one half of the patients who had fever, it existed only for a short period, and was, in the remainder, either slight or irregular. According to my own observation, there is generally an apparent disposition in rheumatic fever, like that accompanying exanthematous diseases, to subside after the local appearance of diseased action in the tissues. Though the febrile symptoms and pain will often be found to abate and increase irregularly, without any well-marked degrees of severity between the proportion of the local and the constitutional affection.

III. TREATMENT.

The general therapeutic principles to be followed in attacks of tropical and European rheumatism, are—1. to subdue constitutional irritation and fever by bleeding, narcotics and refrigerants. 2. To eliminate from the system the retained cholæic elements, and other excrementitious matters of the blood, which render the urine acid, and occasion its lithic deposits. 3. To restore the condition of normal nutrition by suitable diet in the sthenophlogistic kinds; and by iron, cod-liver oil, and tonics, when the rheumatic symptoms are associated with *cachemia*. 4. To subdue local symptoms of swelling and pain by leeching, cupping, and blisters, followed by anodyne applications, or local anesthetics.

In order to fulfil the first indication, which is the principal and leading one, in cases of the sthenophlogistic kind, much professional discussion and difference of opinion have arisen, regarding the efficacy and propriety of general bleeding, as one of the means. The extent to which this remedy may be usefully employed, will depend much on the youth and naturally plethoric constitution of the patient, the inflammatory character of the local affection, the severity and tonic nature of the accompanying fever, and the purity and bracing influence of the air to which the patient has been habitually exposed. The degrees of fever are found to correspond generally to the coldness and purity of the air in which the patient has lived, the azotised richness of his diet, and the proportionate *hyperinosis* of the blood accompanying good air and rich nourishment. In a general inflammatory diathesis, therefore, the propriety and efficacy of general bleeding are fully established by our own experience, and recommended by a host of unexceptional authorities. But the natural tendency of rheumatic inflammation and fever being to produce anæmia, we must not be too prodigal in wasting the nutritive resources of the constitution; and should be guided in repeating the bleeding, according to the quantity and inflammatory firmness of the blood-clot, and the effect which the first bleeding may have had in subduing irritation and mitigating fever. The same extent of general blood-letting, that might be useful to the temperate and well-fed inhabitants of cold salubrious localities, would be highly injurious to the nervous irritable bodily habits, of those addicted to excessive beer drinking and other dissipated practices. The same quantity of blood, then, abstracted to cure quickly the plethoric mountaineer of Scotland, would endanger the life or render tedious the convalescence of an inhabitant of London, breathing an atmo-

sphere deteriorated by sulphuretted hydrogen. The necessity, too, of general bleeding in tropical rheumatism is rather an exception than the rule, as might be expected from the comparatively mild character of its fever and inflammatory symptoms.

To carry out further this indication, after a moderate bleeding, recourse may be had to ten-grain doses of nitrate of potash, given along with small doses of tartarized antimony and citrate of potash, three or four times a day, in the form of effervescing draughts. Or the nitrate of potash may be combined with nitrous ether and other diuretics; the intention in either case being to subdue heat and irritation, by restoring the normal excretory functions of the skin and kidneys. The utility of nitrate of potash seems dependent on its power of diminishing the plasticity of the blood and suspending the metamorphic disposition of the blood-globules to produce fibrin. Under its use, the specific gravity of the urine is increased, this being a medicine which possesses the power of eliminating urea and other compounds of lithic acid from the system. Such power is probably increased by the combination of nitrate of potash with other alkaline compounds, as the citrate and acetate of potash, which are converted into carbonates in the course of the circulation. All such means, however, prove refrigerant by subduing the heat and irritability of the body; and the effect of such may be greatly increased by the addition, at bed-time, of anodynes, either opium or aconite.

Of medicines best adapted to carry out the second indication, calomel and Dover's powder at bed-time, followed, next morning, by a solution of sulphate of magnesia in compound senna infusion, with the addition of an alkali and colchicum, will be found among the most useful. Much misapprehension regarding the beneficial therapeutic action of the latter medicine seems to exist, some deeming its chief efficacy consists in its power of eliminating urea and uric acid from the system; while others deny to it any efficacy in subduing symptoms of true rheumatism. It is chiefly useful in cases of the acute disease, accompanied by a foul loaded tongue, biliary derangement, and intestinal mucous accumulation. Both my Indian and European experience have convinced me of the fact, that without its purgative effect being induced, the urinary secretion is seldom so much increased in quantity as to bring with it any considerable relief of rheumatic symptoms. The most beneficial mode of administering it in India is to give the wine of colchicum, twice or thrice a day, in a weak solution of tartarised antimony, along with liquor potassæ, and tincture of the hydrochlorate of morphia. Free action of the kidneys and skin is thus kept up, and the feverish frequency of the pulse reduced; but, even in such a case, the use of purgatives, and the elimination of the biliary secretion, must not be neglected or lost sight of. Where diarrhœa, or the purgative effect of colchicum is established, there the amount of urea and uric acid in the urine appears to be diminished; these compounds being eliminated, as would appear by the intestinal evacuations. Dr. Boecker, in a late minute examination of the action of various medicaments, with reference to the changes produced by them in the constituents of the urine, the exhalations of the lungs, and the blood, found that, contrary to the general opinion of pharmacologists, the use of colchicum produced but slight diuretic action,

and had very little effect on the constituent parts of the urine. During its employment, the activity of the skin and lungs, in exhaling carbonic acid, is considerably augmented, and after a time its effect in causing an augmented secretion of bile becomes apparent; the melanotic blood globules, which are unable to combine with the oxygen of the air, being destroyed in the hepatic system, afford materials for an augmented secretion of bile. The result of his analyses, thirteen in number, on the action of colchicum, and its known utility in rheumatism, seem to bear strongly on the truth of the opinions expressed as to the pathological nature of this disease.

The employment of calomel, with a view of obtaining its full purgative effect in cases of the stheno-phlogistic variety, should be more steadily pursued to carry out this indication than the plan of giving it with opium, in order to obtain its constitutional effect. From its special action on the biliary organs, it is in Indian rheumatism an invaluable remedy; and in this country too, when properly administered, in aid of colchicum and other purgatives, will be found of much utility, by depurating the blood, through increased biliary secretion, in those hypercarbonised states of the system associated with the disease in many of those cases met with in London. The practice of mercurial fumigation, as successfully used both in this country and in India, proves useful by increasing the elimination from the skin, and restoring the cutaneous functions to a normal state. The same result may be partially secured in both varieties of the disease, by means of warm bathing, warm clothing, and friction of the surface.

The third indication has more immediate relation to cases of the astheno-cachexial kind than to those of acute rheumatism. The impaired state of the digestive function being so intimately associated with the origin and progress of the rheumatic constitution, it is of much importance, while carrying out the second indication in acute varieties of the disease, that due attention should be given to the diet of the patient, which must be diluent and of easy assimilation. In the early stage of disease it should consist of gruel, thin arrow-root with milk, or weak broth; and if beef-tea be allowed, it may be given with the addition of twenty or thirty drops of liquor potassæ; the alkali serving to neutralise the lactic and other acids which accumulate in the stomach along with diseased mucous secretions. As phlogistic symptoms, even in the worst examples of acute Indian rheumatism, are associated with much destructive irritation and waste of tissues, a too active or injudicious employment of the diaphoretic and purgative treatment must be avoided, as it will both derange the primary and secondary assimilation. Such derangement is marked by emaciation, loss of strength, pale anasarctous visage, and other signs of cachexia; and as the early appearance and rapidity of such symptoms are most remarkable in persons inclining to the leuco-phlegmatic temperament, the treatment for carrying out the two previous indications should not be such as makes too great a demand on the resources of the constitution. When cachexia appears we must have recourse to bark, sulphate of quinine, preparations of iron or iodide of potassium, all of which operate beneficially on the constitution, by improving the tone of the organs of primary assimilation, modifying the nutrition of the tissues, and increasing the *hæmatin* of the blood. A combination of

these several remedies may be necessary, according to the nature of particular cases; and where iodide of potassium, if given alone, would utterly fail in relieving symptoms, it may be usefully employed in combination with the decoction of bark or sarsaparilla, or extract of taraxacum; by which the double effect of healthy cutaneous action, and increased elimination by the kidneys, may be generally secured. The iodide of potassium must not be given in large quantities, but along with it laxatives are as essential as in using colchicum. In many such cases, the compound decoction of sarsaparilla, to the extent, at least, of half a pint twice daily, with an equal proportion of warm milk, has been found to be of much utility in promoting the nutrition of the tissues, and bringing back healthy cutaneous action. The extract of sarsaparilla in pills, with resin of guaiacum and sulphuret of antimony, may be given advantageously with the same object; care being taken to supply the patient with light easily digested elements of nutrition. Among such elements we may mention cod-liver oil, which in two cases, when prescribed in this country, proved of much benefit. One of these was a case of excruciating pericranitis, affecting the aponeuroses of the cervical vertebræ, and accompanied with neuralgia of the superior maxillary branch of the fifth pair of nerves; the other was hysterical neuralgia of the intercostal muscles. In both cases counter-irritation was employed by means of a liniment of oil of turpentine with pyroligneous acid over the pained parts; and, in the former, the oil was given along with the extract of aconite at bed-time.

The last and fourth indication is to employ remedies suited to subdue the pain and swelling of the local affections. If such are of a muscular kind, strongly stimulating terebinthinate liniments, warm fomentations, and shampooing of the parts, will be found beneficial in relieving pain; but in some cases, such was its severity and persistence, that the patients were relieved by nothing except the abstraction of blood from the parts by means of cupping-glasses. When the joints suffer, and are much pained and swollen, we found no local applications more useful than leeches and repeated blisters to the parts. If the latter be employed, the blistered surface may be dressed with an ointment containing small quantities of the hydrochlorate of morphia, or extract of belladonna. The application also of a wet bandage, saturated with a lotion of camphor mixture, wine of colchicum, and tincture of the hydrochlorate of morphia, covered over by cotton wool and a piece of spongio-piline, to prevent evaporation, will be found of much utility. Others have of late recommended for the same purpose a chloroform lotion, or one of Dutch liquid, stating such to be of great utility in relieving the pain and swelling of the joints; but though we have had no experience of their efficacy, they appear well calculated to fulfil the same intentions as other like remedies which have been long in use. More might be said as to the degree of efficacy of special remedies; but as we place little faith in such, when used without discrimination, we defer their consideration to a more fitting opportunity, the great object of this paper being to delineate the leading characters of rheumatic disease, and the therapeutic indications most applicable to each.

Hyde Park Square, February 6, 1851.