

is not restricted to them, having been observed in children of a scrofulous diathesis, in whom ossification of the bones had not proceeded far. Hodgson mentions a case of an infant 15 months old, in which the coats of the temporal artery were converted into a complete tube of calcareous matter. A remarkable fact in connection with arterial disease, alluded to by Rokitsky, is interesting in this connection, namely, that it confers an immunity from tubercle. In cases of tubercular disease of the lungs, we have seen concretions of phosphate of lime abundantly expectorated with the sputa. In these cases the phosphate of lime is the product of effete tubercle. It proves that tubercle has existed, and that it is disappearing. It results naturally where tubercle is cured by absorption. The animal matters being absorbed, the earthy matters passing through the epithelium of bronchial tubes, thus escapes. In post mortem examinations, these cretaceous masses are frequently found encysted in the lung.

Rheumatic affections furnish many illustrations of disease, from the accumulation of morbid products in the blood. Dr. Watson said, "rheumatism is a blood disease, that the circulating fluid carries with it a poisonous material which by virtue of some mutual or elective affinity falls upon fibrous tissues in particular." There have been many theories advanced, concerning the nature of the irritating and exciting cause of rheumatism. It was first suggested by Dr. Prout, and since verified by other observers, that all the phenomena of rheumatism are referable to the generation of lactic acid in the blood. The well-known experiments of Dr. Richardson, show the effect of lactic acid in inducing symptoms of acute rheumatism and endocarditis. In 16 experiments on animals, lactic acid largely diluted was injected into the peritoneal cavity. If the animals died, or were killed at a period when the symptoms denoted commencing inflammation, the endocardial membrane presented a brilliant vermilion colour, it had a velvety or villous appearance, and beads of lymph or fibrine were abundant. In those killed at a later period, the auriculo-ventricular valve was found thickened or œdematous. He says: "I have seen the segments of the tricuspid valves fixed in this swollen condition, resembling an injected uvula, and lying close to each other, so that when the heart was contracting, they must have cushioned against one another, thus fulfilling their

office of preventing regurgitation passively, *i.e.*, without tension or movement. In this œdematous stage if the valve be pricked with a needle a clear lymph fluid exudes, and by frequent prickings the valve structure, emptied of its effusion, collapses, and resumes a flaccid condition. At a later period the valves remained thickened but the red colour and the œdematous state were both reduced. Beneath the endocardial surface of the valve, there was a paleness as of coagulated effused lymph. Dr. Richardson noted that these morbid appearances induced by the introduction of lactic acid into the systemic circulation, were firstly confined to the *right side* of the heart, because, being absorbed by the veins it comes into contact with the inner surface of the right side of the heart first. In the pulmonic circuit it undergoes some loss, and entering the left cavity is less active in its effects, in other words so far as the heart is concerned the poison is derived from the systemic circuit and lost in the pulmonic. But in rheumatism the endocarditis is located principally in the left cavities of the heart. To account for this Dr. Richardson supposes that the poison in rheumatic carditis is a product of respiration, and is contained in the ærterial blood, hence it comes in contact first with the inner surface of the left side of the heart. Lactic acid therefore, as a product of mal-nutrition acts not only as the exciting cause of inflammation in endocarditis, but also in arteritis, since those who are constitutionally predisposed to rheumatic affections are also subject to arteritis.

The production of lactic acid in these affections depends on the same cause as that of sugar in diabetes, namely, mal-nutrition. A case recorded by Dr. Foster, as having occurred in the General Hospital, Birmingham, is an interesting evidence of the effect of lactic acid as a morbid product, and when administered as a therapeutic remedy in disease. A man 31 years of age, who had never suffered from rheumatism was admitted to the hospital to be treated for diabetes. On admission he voided 180 ozs. of urine daily, containing gr. 49 of sugar, *ad.* 3j. He was ordered gtt. xv. doses of lactic acid 4 times a day. The next day the dose was increased and in the evening he complained of acute pains in the joints, which rapidly increased. The lactic acid was omitted, followed by cessation of the pains; the occurrence of the rheumatic pains being regarded as a coincidence, the lactic acid was repeat-