air. About eight weeks ago he had a few rheumatic pains in his shoulder. He had previously good health. On the 14th his legs were very painful and the joints tender. He was very feverish and had slight headache.

These are parts of histories of two cases which are here inserted as being illustrative of the general run of cases that occur in this affection. The majority of patients enjoy previous good health; but on a sudden exposure to cold and wet, sitting in a draught when heated or perspiring, or neglecting to change wet clothes, &c., a *sudden chill* is produced.

There are many other exciting causes no doubt—errors in diet, and scarlatina occasionally. The predisposing causes are still more numerous, *e. g.*, previous attacks increase the predisposition; individuals (males especially) from 15 to 36, especially from 16 to 20 years of age. Climate and season—the disease occurring especially in temperate climates, but these having moist air, and experiencing sudden changes in temperature. To these may be added a state of ill-health and mental depression and anxiety, which are all examples of predisposing causes of this affection.

And let it be noted that the disease frequently occurs in the apparently strong and healthy; in fact it would seem that the greater the strength the greater is the tendency for this exposure to lead to rheumatic fever, instead of pneumonia or pleurisy for instance,—these occurring usually if there have been any predisposition to them.

Now it would seem that this exposure to the action of cold whilst perspiring is in direct relation with the function of elimination and the *calorifacient* process.

How is the heat of the body generated and maintained? Most physiologists, not quite so radical as Dr. Draper, who maintained substantially (so far as I can recollect) that the process of heating the body is precisely analogous to the heating of our rooms on a cold winter's day—by putting coals into the grate and allowing free access of the oxygen of the air for the purpose of combustion. I say most physiologists agree that the process, whilst it is eminently chemical in its nature and behaviour, is pre-eminently a vital one. And this must needs be so, since, for the purposes of health, all other processes which take place in the human economy, physical, chemical, &c., must be subordinated to the dominance of the vital processes—dependent on the vital energy.

Let this vital energy or nervous force be below par, and we may have a stoppage or reversal of the current of many of the most important transformations that are incessantly taking place in the system.

It is a physiological fact that the starchy element of our food supply the calorifacient materials of the body. Converted into dextrine, then into glucose, it may be chemically found in the blood as the latte after the injection of starchy substances, &c.

The glucose is the *wood* which forms the coal—lactic acid—which is to be burnt (oxidised) in the furnace. This furnace is not the lungs, or the *general* circulation, or the systemic *capillary* circulation when taken singly; but it comprises all three, particularly the last. Let it be understood then that this lactic acid is but a *factor* in the whole calorifacient process. As to where it is first formed, it is not my purpose or duty here to stop to inquire. Suffice it to say it is itself the result of oxidation, and therefore glucose may be said to start the process of oxidation. Lactic acid then appears in the blood, normally, as lactate of soda, having chemically combined with that free alkaline base. It now becomes a neutral vegetable salt. The process of oxidation continuing from the lungs through the general circulation—but particularly in the systemic capillary circulation—this fuel of the system is converted into a carbonate, and water; the carbonic acid being afterwards freed from the base to be excreted via the lungs for the most part—a portion being excreted by the skin. The comparatively small excess of lactic acid that might normally be formed, is excreted through the cutaneous transpirations and urine—having been taken up by the absorbents.

I have said "comparatively small excess," for it should be considered what a large quantity of this acid must be expended in twenty-four hours, in the process of calorification, especially in those whose occupations call for bodily activity. That lactic acid is an ingredient in the sweat of the body may be considered as certain, it having been first discovered there in the year 1807, by the celebrated Berzelius, and subsequently confirmed by other chemists. It must be recollected here, also, that in cases where starchy food is withheld, and saccharine matters taken in small quantities, lactic acid is formed from animal food, glucose being manufactured out of albumen by the agency of the liver.

This oxidation under control of the vital energy necessarily results in a supply of heat to the body. Now this is what I believe to be one of those vital processes which are incessantly taking place in the animal economy. It is essential, of course, for its perfect performance that no *break* should occur in the concatenation of events which make up the entire