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ON THE TREATMENT OF FEBRILE DISEASES BY THE APPLICATION OF COLD.*

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GENTLEMEN,—I intend in this paper to present for your consideration some observations on the therapeutic uses of cold applied externally. The subject commends itself to me on account of the great efficiency of this agent in properly selected cases, and also on account of the neglect it has suffered at the hands of the profession generally.

There is reason for believing, that beyond sponging the bodies of fever patients with cold water for a few minutes night and morning, its employment is seldom resorted to by medical men in general practice. While sponging the skin for ten minutes with cold water may cleanse it and so render a patient more comfortable, it will not reduce the temperature, when much above the normal, one half of one degree Fahr. It is as an antipyretic that cold applications will be considered in this paper; it is therefore desirable to inquire into some of the phenomena of the febrile state. No question in experimental science presents greater difficulties than that of the causes of fever and their mode of action in producing it. By the light already shed on this subject it is justifiable to believe that essential fevers result in most cases from the introduction of a poison into the system, and that its presence initiates that complexus of morbid phenomena known as essential fever. As heat is only a mode of motion, all abnormal elevation of temperature in the animal organism must be the result of excessive motion therein, and is only an index of morbid processes taking place in disturbed cystogeny and retrograde metamorphosis. An eminent English writer, whose name I forget, believes the

heat of fever to be the result of intensely rapid cell generation, but as the elevation of protoplasm to more complex matter is a synthetical process, heat would be used and not produced in accomplishing it. It may be, however, that cells thus rapidly formed, being ephemeral in their nature undergo equally rapid disintegration, and are decomposed into substances much simpler in chemical composition than the protoplasm from which they were formed, and that the excess of heat so produced over the amount used in the cell formation accounts for the increased heat observed in the pyrexial state. If, to heat so produced, be added that resulting from rapid retrograde metamorphosis of tissue previously formed, a plausible explanation of the rise in temperature is reached. In whatever way produced, the abnormal temperature becomes the chief factor in a chain of morbid action always injurious and often dangerous.

I have here the heart of a turtle recently removed from the body. It will be observed that when heat is applied by holding the plate over a lamp, the pulsations become more frequent, and that placing it on a piece of ice causes the heart to beat more slowly. Placing it again over the lamp the pulsations immediately increase in frequency, and again changing it to the ice the pulsations fall as before. This phenomenon was first observed by Dr. Brunton, and suggested to my mind the propriety of instituting a series of observations on the action of cold applied to the surface of the human body during febrile action.

The result of these observations has convinced me, that in the external application of cold we possess an agent that merits far more attention from the profession than it receives. Although we cannot apply heat and cold directly to the human heart as has been witnessed in the experiment just made, we can deprive the blood in the superficial capillaries of its heat and send it back in a cooler stream to the laboring and exhausted heart, and so produce a similar effect to that produced by cold upon the heart of the turtle. The nerves of the heart are not alone susceptible to the influence of heat and cold, but every organ under the control of the great sympathetic, responds to the influence of these agents. Nor is this all. It will be shown in this paper that they are also capable of producing, by reflex action through the cerebro-spinal system, the most marked effects upon the organs

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