

into action the organic processes which naturally protect the economy against certain poisons. These normal protective processes, which may be impeded by certain poisons or exalted by the presence of certain substances in the blood, are of two kinds: (1) the destruction or chemical transformation of the toxic substances; (2) a stimulation at a distance of portions of the nervous system which the poisons tend to paralyze.

After reviewing the proteid products of metabolism, Bouchard points out that many of them possess powerful physiological action; they possess a certain degree of toxicity which is destroyed by heat; they are therefore of a proteid nature. The primary products of metabolism have been termed toxalbumins, and their unfavorable influence only has been studied, but their benign effects when acting in moderate quantities have been ignored. They differ in their physiological activity and in their effects, even those derived from the same cell, according to the variation in the functions and activities of such cell. By these products each cell influences its fellow, both as regards their nutrition and function, either temporarily or permanently, whilst beyond, and more important than this, the effect may be transferred to other animals, and even to different species. He goes so far as to say: "It is by the soluble products which the cells elaborate, much more than through the nervous system, that vital equilibrium among the cells is established." Such equilibrium is unstable. The opposition of antidote to poison, of antitoxin to toxin is constantly going on. The cells react against the poisons coming to them from other cells, whilst even the primary products of metabolism may have their molecules divided into two sets—hemialbumose or hemipeptone, and antialbumose or antipeptone; the products of the two sets may differ from the originals, but they have not different properties, although when acting on the organism they may have different or contrary effects.

Taking a pancreatic cell as an example, Bouchard points out that it secretes a ferment which passes out from the cell, and which certainly interferes with the process of coagulation. At the same time the cell manufactures a ferment which remains in the cell, but which, if set at liberty—by death or weakness of the cell—actually induces this same process of coagulation. It is, he argues, a matter of little importance whether the organism produces an antidote at the same time and place at which the poison is produced, but it is important that the presence of poison, naturally or artificially brought about, should be followed very closely by the formation of a counter poison or antidote.

The protective substance may be (1) a ferment which destroys the poisonous substance, for example, in the liver; (2) an internal secretion which may become more active in the formation of substances for the purpose of stimulating those tissues which are specially exposed to the attack of the poison, or which are specially necessary to the well-being of the organism.