

analysis the totality of certain side-chains of the living protoplasmic molecule (biogen) which possess affinities for oxygen. These, in the nature of things, cannot be disrupted from the biogen without compromising its functional integrity. This sort of thing on ultimate analysis an *endo*-enzyme proves itself to be; and Vernon has indeed remarked on the insolubility of certain oxidases.

It is true that on this view the distinction between "vital protoplasmic activities" and enzymes is obliterated, but it is quite possible that that distinction has been made too absolute. When an *exo*-enzyme or enzymic secretion (such as ptyalin, pepsin) can perform its function equally well in the cavity of a viscus or *in vitro* we may be justified in maintaining the distinction between vitality and enzymic action. The secretion enzyme was, however, part of the protoplasmic molecule before its separation. It is not the act of disrupting the side-chain that constitutes an enzyme; doubtless disrupted side-chains are our separable ferments and because disrupted are more or less soluble. But non-separated side-chains can still be called ferments (*endo*-enzymes) which because undisrupted are "insoluble." The former—the secretion-enzymes—are destined to leave the parent protoplasm, the latter are not intended to be separated from the biogens and are, therefore, called *endo*-enzymes. It is not whether they act outside or inside the protoplasm that constitutes them ferments, it is their functional powers that confer the title on them. Since animal heat is genetically an intracellular affair, the ferments, therefore, which are concerned in its evolution, hæmoglobinase and the oxidases, are also intracellular. The former is non-specific, the latter highly specific: the former is for obtaining oxygen wherever available: the latter are specialized each for the oxidation of only one kind of substance.

But reductase is not merely a deoxidiser: although in Nature it is concerned only with the reduction of oxyhæmoglobin, yet it is a true reducer; it can reduce substances as stable as soluble Prussian blue; alizarine blue; methylene blue and indigo blue; it can reduce nitrates to nitrites and ferric chloride to ferrous chloride. Let us, therefore, in the light of recent work not hesitate to bring tissue-respiration under the category of fermentation; its oxidative side is now generally admitted to be *endo*-enzymic, let us complete the conception and regard its reducing aspect as also *endo*-enzymic.