THE CANADIAN MEDICAL

hæmoglobins from various animals are more numerous than the differences. The physiological significance of the absence of any specificity between reductase and hæmoglobin is that foreign blood introduced into any animal can still be reduced by that animal so that, for instance, human tissues can obtain oxygen from the hæmoglobin of any lower animal. The danger to the human being as regards blood-transfusion is not that the foreign blood will not be reduced, but that it may act hæmolytically toward the red corpuscles of the receiver.

The object of the tissue reduction of oxyhæmoglobin is virtually to cause the oxygen to dissociate from the pigment; all work therefore on the subject of the dissociation of oxyhæmoglobin has a bearing on the present problem. Some workers have laid stress on rise of temperature as a factor in this dissociation. Where this factor is operative, it is a vastly slower action than that of reductase. After many hours a tube of oxyhæmoglobin kept at 40°C. is still unreduced, whereas, as we have seen, certain juices at room temperature will reduce twice or more of their volume of diluted hlood in two to three minutes. Temperatures above body-temperature (40°C.) do not enter into the problem in healthy animals. Since oxyhæmoglohin can be slowly reduced at 10°C. and even at 0°C. we hold that reductase is the factor operative at low temperatures in the cold-hlooded animals. The almost complete cessation of reduction at 0°C. and helow is an interesting demonstration in vitro of the artificial counterpart of that cessation of tissue respiration which constitutes the condition known as "latent life."

In the next place the presence of carhon dioxide in the hlood has been proved by Barcroft to be a factor in facilitating the dissociation of oxyhæmoglobin in vitro. This is regarded as a most important factor in the case of cold-blooded animals. Important as this has been shown to be in laboratory experiments, we are fully convinced that it is not the chief factor in the reduction of oxyhæmoglohin even in the poikilothermic animals. The factor responsible for the reduction of oxyhæmoglobin is highly insoluble; but carbon dioxide is very soluble. Similarly, traces of acid have in lahoratory experiments been demonstrated to facilitate the separation of oxygen from oxyhæmoglobin. We do not think that this either is a factor of high importance in tissue reduction. Since it is true that juice kept aseptic developes acidity in autolysis, the older the juice the more vigorously it ought to reduce if acid were an important factor, but we have shown that the exact opposite is the case. Traces of acid tend to form methæmoglobin, a pigment

8