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## DISCUSSION

CHAIRMAN: Faulkner's runners were extremely slow, were they not?

PROFESSOR SHEPHARD: Of course, this is one of the criticisms which has been made of Faulkner's study relative to the others. You will remember that his was the one that showed benefit from altitude training, and several people have commented that his subjects were not in anything like the same category as those studied by Saltin for instance.

CHAIRMAN: Another point of interest is this question of what I consider not an anaemia, but hypoaemia (if that means anything) – the physiological hypoaemia of the man who is capable of using extremely large quantities of oxygen per minute.

When I gave up physiology three or four years ago, the record figure, expressed properly in ml oxygen/kg, was slightly over 6 litres of oxygen per minute. This was published in a paper of Hermansen. There was an enormous cardiac output too – 40 litres per minute, I think – but the blood was relatively low in haemoglobin. Probably a great deal of haemoglobin was being pushed round by a magnificent pump; but pushed round extremely fast because the blood was relatively dilute and its viscosity low.

There are all sorts of speculations in which one can indulge in this connection. I am not convinced that polycythaemia at sea level would be of much use. Looking on it as a total increase in haemoglobin, one would probably need an increase in the circulating plasma volume too – in other words, more haemoglobin more dilute. If that is achieved, the body weight is raised and more energy is needed to get over the ground – so perhaps we are back where we started.