EXPERIMENT #1. EXERCISE

The response to exercise involves the muscles, the circulatory system as a whole, and changes in ventilation. The exact mechanism is still uncertain. In HUMAN we can simulate exercise using one parameter to define intensity expressed in liters of O_2 consumed per min (EXER) and another to define duration (XERMIN). The primary effect is to reduce the resistance to bloodflow through skeletal muscle, with additonal actions upon the sympathetic outflow and upon the level of ventilation.

An oxygen use of 2 l/min is moderate while 3 l/min or greater is severe. Use the **TITLES*** command to set up column headings to the names of appropropiate computed variables.

Include cardiac output(CO), skeletal muscle blood flow(MUSFLO), oxygen debt(O2DEBT), ventilation(VENT), arterial oxygen content(O2A) and venous oxygen content (O2V) in your Tables*.

Establish the baseline values for these variables by running the model for 60 minutes with printouts every five minutes.

Set the exercise duration (XERMIN) parameter for some very large value (such as 100) and then do a simulation at EXER = 2.0 l/min..

How long can the subject exercise at this level of activity?

Start over by **Initializing**# again and see how long the subject can exercise at 3.0 l/min O_2.

Observe the change in cardiac output and its redistribution. At the peak of exercise what fraction of cardiac output goes to the exercising muscle?

* View Output: in web-HUMAN
\# Start Over: in web-HUMAN

Notes on the Use of HUMAN–80 Student Manual Experiments in *web*-HUMAN

Essentially all HUMAN-80 experiments run *perfectly* in *web*-HUMAN. Nevertheless, those using the HUMAN-80 experiments with the current *web*-HUMAN model should be aware of certain minor compatibility issues and limitations.

What is HUMAN–80?: There have been multiple past versions of the HUMAN model of which *web*-HUMAN and HUMAN–80 are but two. Human–80 was a version of the HUMAN model designed to run on desktop PC's. Although both versions of the model behave virtually identically *physiologically*, they obviously differ vastly in how the user interacts with them. This means that those parts of a HUMAN-80 experiment instruction sheet that are user-interface specific are not necessarily fully compatible with *web*-HUMAN.

Adapting HUMAN–80 Manual experiments to *web*-HUMAN:
Essentially all HUMAN-80 experiments run *perfectly* in *web*-HUMAN. Just follow Dr. Randall's instructions step by step.

- wherever possible the text of these exercises has been edited or annotated to increase compatibility of the instructions with *web*-HUMAN. Thus references to commands that differ between the two versions have been updated either by editing or by indication with a commented superscripted symbol (* or #) .

- experiment numbers in HUMAN-80 *DO NOT MATCH* those in those in *web*-HUMAN. To create your own tabular output format simply load web-HUMAN experiment #1 and follow Dr. Randall's instructions using View output: to create your own data tables.

- users should note that HUMAN-80 had no graphic output, only tables. In *web*-HUMAN you can choose to graph by simply selecting <graph> instead of just <text> below each variable in the View output: table.

- HUMAN-80 instructions sometimes ask for users to look at more than six variables. To do so simply rerun the experiment with the additional variables displayed or use the <View Variable> option to obtain a value for a variable that is not in the tables.