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STUDIES ON THE CONTROL OF VENTILATION
AND PULMONARY GAS EXCHANGE DURING EXERCISE

BRIAN J. WHIPP

SUBMITTED FOR THE DEGREE OF DOCTOR OF SCIENCE
OF LOUGHBOROUGH UNIVERSITY OF TECHNOLOGY

1981

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LAC HARBOR—UCLA MEDICAL CENTER
UCLA SCHOOL OF MEDICINE
DEPARTMENT OF MEDICINE
1000 CARSON STREET
TORRANCE, CALIFORNIA 90509

September 22, 1981

Dear Sir:

The publications which are incorporated into this thesis, submitted for the degree of Doctor of Science of Loughborough University of Technology, have been selected from a larger body of published work as the essential representation of my research on the control of ventilation and pulmonary gas exchange during exercise. I have included major reviews only when they contain previously unpublished data and new conceptual analysis of the particular topic under consideration. To this effect, I consider all the submitted manuscripts to be primary material for consideration.

As a faculty member of the University of California at Los Angeles and in particular at its major teaching hospital, the Harbor-UCLA Medical Centre, I have considerable responsibilities for the research training in respiratory physiology of both pre- and post-doctoral fellows. This necessitates on most occasions multi-author publications, with the research fellow as first-listed author. In those cases where the fellows have worked under my direction, I am listed as second author. I have therefore utilized in the index the symbol "s" for such pre-doctoral and "*" for post-doctoral and sabbatical fellows.

These publications, along with those on which I am the first-listed author, may be considered the best representation of my research over the past fifteen years.

In other cases, I have served a similar, but more advisory role on the research of newly-appointed or junior faculty who joined our group. The resulting publications are represented without symbol in the index. Finally, a small number of publications are included (# 15, 21, 36, 40, 46 and 53) on which I have collaborated as a co-investigator with senior scientists of international repute who have particular skills and acknowledged expertise in areas which interface with the interests of our group. These are represented by the symbol "+" in the index.

My collaboration with Karlman Wasserman, M.D., Ph.D., deserves special mention. Since gaining my Ph.D. at the Stanford University Medical School with Dr. Wasserman as my thesis advisor and scientific mentor, we have worked together as colleagues with a single, sustaining research goal: that of elucidating the physiological mechanisms of the control of ventilation and gas exchange during exercise, and how impairments of the interacting systems induce "shortness of breath" upon exertion. It would not be entirely accurate to consider work on which we both appear as authors to be necessarily "mine" or "his". We meet to plan long-term policy for our research and also to formulate new directions which might be dictated by the results of a particular experiment. This work is a collaboration; we plan to continue the collaboration in the pursuit of our scientific goal.

Two manuscripts were published which contain data from my Ph.D. thesis submitted to Stanford University; these being manuscripts #1 and 3 listed in the index. Other than these, no part of this submitted work has been previously submitted by me or my collaborators for a degree or qualification of a university, professional body or learned society. This, of course, does not apply to the listing of publications required for membership of the professional societies to which I belong. Manuscripts # 34 and # 37 resulted from experiments performed by a graduate student for an advanced course in pulmonary research which I teach, and which proved worthy of publication; although the work was not part of the student's subsequent thesis.

This body of work, therefore, accurately represents my research on the control of ventilation and pulmonary gas exchange during exercise.

I respectfully submit the work for the degree of Doctor of Science of Loughborough University of Technology.

Brian J. Whipp, Ph.D., D.L.C.
Professor of Physiology and Medicine

INDEX

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