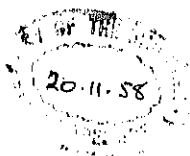


STUDIES OF LUNG FUNCTION BY ALVEOLAR GAS ANALYSIS




John B. West, M.B., B.S. (Adelaide)

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INTRODUCTION

The chief aim of this thesis is to present a new method of measuring the degree to which gas and blood are unevenly distributed throughout the lungs by analysing the gas contents of a single expiration.

The clinical value of measuring the regional inequality of alveolar gas flow (or ventilation) has been accepted for several years. However, the gas exchange which takes place in any part of the lung is determined by the ratio of gas flow to blood flow (ventilation-perfusion ratio). An inequality of the ventilation-perfusion ratio throughout the lung is the chief defect of gas exchange in emphysema and the commonest clinical cause of respiratory failure. Yet no simple method of measuring the ventilation-perfusion ratio inequality has hitherto been available.

In chapter I, previous knowledge about alveolar gas is traced to the present day. Chapter II is devoted to theoretical relations between alveolar gas measurements and ventilation or the ventilation-perfusion ratio. In chapter III a series of experiments to determine whether these theoretical relations form a basis for a practical test is described, and the results are discussed in chapter IV. Final modifications of the test are presented in chapter V.

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SUMMARY

SYMBOLS AND ABBREVIATIONS

ACKNOWLEDGEMENTS

BIBLIOGRAPHY