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## Meteorological Essays and Observations

By the early nineteenth century, meteorologists were equipped with plenty of useful devices: barometers, thermometers, hygrometers, and any number of variations thereon. But the nature of these instruments was not wholly understood. While it was possible to take accurate measurements with a barometer, what physical process made the mercury move? What exactly is atmospheric pressure? And how can one measure sunlight? Ranging from wild theories of gravity-resistant air particles to the latest experiments in altitude, chemist and physicist John Frederic Daniell (1790–1845) presents his answers in this collection of essays. First published in 1823, this enlarged second edition of 1827 includes his work on the climate of London, the effect of atmospheric conditions on human health, and suggested improvements for the design of a new hygrometer. Daniell later became the first professor of chemistry at King's College, London, and foreign secretary of the Royal Society.

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# Meteorological Essays and Observations

J. Frederic Daniell

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# METEOROLOGICAL

# ESSAYS AND OBSERVATIONS.

BY

J. FREDERIC DANIELL, F.R.S.

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*SECOND EDITION, ENLARGED AND REVISED*

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The wind goeth toward the south, and turneth about unto the north; it whirleth about continually, and the wind returneth again according to his circuits.

All the rivers run into the sea, yet the sea is not full; unto the place from whence the rivers come thither they return again.

ECCLESIASTES, Chap. I.

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TO

WILLIAM THOMAS BRANDE, Esq.,

FELLOW OF THE ROYAL SOCIETY, AND PROFESSOR OF
CHEMISTRY AT THE ROYAL INSTITUTION
OF GREAT BRITAIN.

THESE PAGES

ARE INSCRIBED AS A TESTIMONY OF REGARD
AND ESTEEM.

# PREFACE

TO

# THE SECOND EDITION.

THE reasons which originally induced me to adopt the form of Essays in the arrangement of my Observations and Speculations upon Meteorology have acquired new force from further reflection. Too many branches of the science are still open to experiment and discussion to allow of their connexion with advantage, on account of the details which their progressive state requires. In this edition I have, therefore, adhered to my original plan, and have availed myself of the facility which it affords to throw all the new matter into a separate form, which will enable the possessors of the former edition to complete the work by the purchase of the Second Part. This mode of proceeding is attended by some inconveniences, such as repetitions, two or three inconsistencies, &c., which might otherwise have been avoided, but none of which, I conceive, counterbalance its manifest advantages.

I have, however, taken the opportunity of correcting all the greater errors which I have either discovered myself, or which have been pointed out to me by others,—the most important of which is the miscalculation of the Table in the essay upon the Hygrometer, for finding the specific gravity of any mixture of atmospheric air and aqueous vapour. This was first indicated to me by an unknown friend in the Dublin Philosophical Journal, and afterwards by Monsieur Gay Lussac, who most obligingly favoured me with the formula from which the present Table is derived. This corrected table, as being of considerable importance, I have also added to the Second Part.

To my other critics, known and unknown, I beg to return my best acknowledgments, and I have endeavoured to profit by many of their hints. In many instances I am afraid that the praise bestowed upon my labours has been beyond their desert; and if, on one occasion, I have been rather roughly roused from the dream of satisfaction which such approbation was calculated to produce, I trust that I do not retain my opinion upon the point of controversy without a due consideration of

all the real argument which has been brought against it.

In one particular the present edition will be found to differ from the last, and that is, in the careful avoidance of all allusion to subjects which, however intense the personal interest which they excite at the moment of their discussion, can be but of ephemeral importance. The motives to this forbearance will not, I trust, be misunderstood.

The assistance and advice of my friend, Capt. Sabine, R.A., have been of the utmost importance to me in the progress of my labours; and the interest which he has kindly taken in my work, from its commencement, has excited me to perseverance, under circumstances, at times, of no encouraging nature.

To Capt. Basil Hall, R.N., my special acknowledgments are also due for the great attention which he has given to my speculations, and for the practical illustrations with which his experience has supplied me. His remarks upon the Trade Winds have, of course, afforded me the highest gratification, and will doubtless be read with interest by all those who think upon Meteorology.

To Lieut. H. Foster, R.N., and to many others, I am indebted for the loan of some interesting registers; and to Mr. Galbraith of Edinburgh, for a very accurate Table of the force of Steam at various temperatures.

I greatly regret the failure of some attempts which have been made to produce more unity of action between those who are practically engaged in advancing our knowledge of atmospheric phenomena. Their labour and perseverance lose more than half their value by the want of a well-digested plan of mutual co-operation. I trust that untoward circumstances have only delayed such a union of those who are interested in the science, and that a Meteorological Society, or Committee, may yet be formed under more auspicious circumstances. If ever this should be effected, they cannot better commence their career than by adopting, as a model, the plan of the Meteorological Society of the Palatinate, of whose constitution and labours some account will be found in the following pages.