





AN ESSAY
ON THOSE
DEFECTS OF BUILDINGS
DEPENDANT ON THE
NATURE AND PROPERTIES OF AIR.

B9061

2-185

AN ESSAY

ON *The: H Foxcroft*

Those Defects of Buildings

DEPENDANT ON THE

NATURE AND PROPERTIES OF AIR:

CONTAINING

A REPORT

ON THE

CAUSE OF THE DRY ROT IN THE ROYAL NAVY,
AND THE MEANS OF PREVENTION, AS NOW ADOPTED IN
HIS MAJESTY'S DOCK YARDS.

Published by Permission of the Lords of the Admiralty and of the Navy Board.

BY JOSEPH GREGSON,

INTERIOR SURVEYOR.

Ex aqua oritur aer, ex aere aether.—Cic.

LONDON:

PRINTED FOR JAMES RIDGWAY, PICCADILLY;
AND SOLD BY J. TAYLOR, ARCHITECTURAL LIBRARY,
HIGH HOLBORN, AND BY ALL OTHER BOOKSELLERS.

1816.

TO

HIS ROYAL HIGHNESS

PRINCE EDWARD,

DUKE OF KENT AND STRATHERN,

K. G. AND K. P. &c. &c.

MAY IT PLEASE YOUR ROYAL HIGHNESS;

IN having the distinguished honour and permission of dedicating these few but important Observations to your Royal Highness, I can claim no other privilege than that of addressing an

| 国立公衆衛生院附属図書館 | |
|--|--|
| 受入先 | |
| 受入日 | |
| 登録番号 | |
| 所在 | |
| Library, National Institute of Public Health | |

C. WOOD, Printer,
Poppin's Court, Fleet Street.

Illustrious Personage aware of the necessity of the considerations, and fully competent to decide on the truth or propriety of the remarks.

It was not with a view to screen it's errors, but to shelter it from the prejudices of the ignorant, and to obtain, if possible, the attention of those whom it most concerns, that I presumed to solicit this suffrage; in granting which your Royal Highness has added an additional mark to that greatness and condescension that so nobly dignifies the House of Brunswick.

That your Royal Highness may long live to enjoy those great, transcendant, and intellectual pleasures, which arise from the

contemplation of the works of nature, is my most fervent wish.

I remain,

With the most profound Respect,

and greatest Obedience,

Your Royal Highness's

Very humble Servant,

JOSEPH GREGSON.

P R E F A C E.

THE object of a Preface is too frequently applied to apologize for those errors that, through inadvertency, or otherwise, are found in the body of a Work. In looking over the following Treatise, there are few productions, that more require a Preface of this description; being conscious, that it is dignity and perspicuity of style, and neatness and precision in detail, that gives to a composition, as it were, the polish to the diamond: for, where the taste is not improved, it is, by familiarity, too often vitiated; a consideration at once sufficient to repress the publication, did not the subject, while important, and at the same time so *unique*, demand some public attention. Information, more than classical

erudition, will, I trust, be the readers' pursuit; and I shall regret if their attention has been called in vain, or that I have not sufficiently pointed out to their consideration those Defects of Buildings dependant on the Nature and Properties of Air, with the general principles on which their remedies or preventives must be founded: their application will, of course, depend on each particular case; though I cannot expect them to be understood by those who have paid no attention to the Properties of Air; and many there are, who have no other knowledge of the atmosphere in which they breathe, than the effects produced on windmills, or in tempests and in hurricanes: to those, the following Observations will either appear ridiculous, or I shall be blamed for not expatiating more largely on the subject. I trust, however, to the candour and knowledge of an enlightened public, that they have too much discrimination to value the real excellence of a Work by it's apparent magnitude; being certain,

that the largest volumes are not always found the most conducive to the true objects of science, or most satisfactory to the reader. I would here beg leave to claim the attention of the gentlemen of the medical profession, in stating, that a larger work, of more minute detail, and definite conclusion, cannot, I think, be formed without their assistance; feeling assured, that, to accomplish it, a more general knowledge is wanted of those diseases and complaints of the body, dependant on the Nature and Properties of Air: and, of such, we shall find the *gaol distemper, contagious fevers, asthmas, complaints of the lungs, faintings in crowded assemblies, violent colds, declines and consumptions* from unhealthy apartments, or prejudicial employments, &c. &c.; and, in many cases, *instantaneous death!* A definite and chemical knowledge of the natural operations in these cases, combined with it's application to buildings, can alone produce a habitation suitable to the inhabitant. Much care is taken in the health

of our cattle, and the ventilation of stables; and shall our mansions, then, remain unaltered? I am well convinced that, for one house built through ignorance, subject to these defects, there are hundreds so constructed, through *the want of consideration of them*; considerations, in my opinion, of the greatest consequence to those who are engaged in building, or making alterations, and which ought not to be the less studied by the buyer or seller, by the landlord or tenant.

Nor should this knowledge be applied only to houses; the prevention of the dry rot in the Royal Navy and merchantmen, the promoting the health of the transport service, the preserving of stores and merchandize at sea, as well as on shore, are advantages that the Navy, the Army, and the Commercial interests may derive, in the greatest degree, by following up the suggestions and plans herein mentioned. Indeed, these may be considered national benefits, that, before the time called for them, were beyond the contemplation of

the most sanguine expectation, in the humble desire of improving only the interior comfort of houses: nor will there appear any disparity, in the benefits that may be produced from one and the same study, as we invariably find the public good linked together with private happiness; any attempt, therefore, to improve the one, must proportionally advance the other.

It will, perhaps, be required, that I should state my qualifications for drawing up these considerations; that I would rather abstain from, as it could only show the little that had been done, from the opportunities that had been enjoyed; though it may be necessary to state, that the grounds of my experiments, and the induction of my reasonings, were founded on the principles of some of our first popular professors, whose lectures I had studiously attended: in *Chemistry*, under Sir Humphrey Davy and Professor Brande; in *Galvanism* and *Animal Physiology*, by Drs. Stancliffe and Roget; on *Pneumatics* and *Experimental*

Philosophy, Mr. Dalton, Rev. Mr. Powell, &c.; *Natural Philosophy and Astronomy*, Mr. Banks, Mr. Walker, Dr. Evans, &c.; and, in *Botany*, Sir J. E. Smith, M. D. Nor am I less indebted to many authors, who have treated relatively on the subjects of the following Essay, particularly Professor Leslie, Drs. Black, Priestley, and Franklin, Count Rumford, Mr. Smeaton, Mr. Buchanan, Mr. Nicholson, &c. &c.; any one of which gentlemen, had they taken these defects into their consideration, would immediately have come to those conclusions, that I have only formed by dint of practice and experience.

CONTENTS.

| | PAGE |
|---|------|
| INTRODUCTION | 1 |
| <i>Observations on the Drains and Sewers</i> | 9 |
| <i>the Fogs of London</i> | 12 |
| <i>Damp Walls</i> | 14 |
| <i>the Dry Rot</i> | 15 |
| <i>Report of a Survey on the Dry Rot in the Royal Navy, taken in Deptford Yard in 1811</i> | 17 |
| <i>Observations on the Means for preventing the Dry Rot</i> | 19 |
| <i>Observations on the Means for preventing the Wet Rot</i> | 22 |
| <i>Observations on Smoky Chimnies, Public</i> | 24 |
| <i>Private</i> | 26 |
| <i>Warming of Rooms</i> | 29 |
| <i>the present State of Ventilating Public Buildings, presented to the Supervisors, for erecting the Penitentiary House</i> | 31 |
| <i>Observations on Chester Castle</i> | 34 |
| <i>the House of Lords</i> | 34 |
| <i>the Theatres</i> | 34 |
| <i>Churches, Chupels, &c.</i> | 35 |
| <i>Assembly Rooms</i> | 35 |
| <i>the Habitations of the Poor</i> | 36 |
| <i>King's Bench Prison</i> | 37 |

| | PAGE |
|--|------|
| <i>Observations on Beds and Bed Rooms</i> | 38 |
| <i>Uninhabited Houses</i> | 39 |
| <i>Compound Ventilation</i> | 40 |
| <i>the Ventilating of Ships, by Dr.</i> | |
| <i>Hales</i> | 40 |
| <i>Observations on the Ventilating of Mines, by Mr.</i> | |
| <i>Taylor</i> | 48 |
| <i>Observations on the Safety of Buildings from Fire</i> | 50 |

POSTSCRIPT.

| | |
|--|----|
| <i>Observations on Mr. Accum's Treatise on the Gas</i> | |
| <i>Lights</i> | 53 |
| <i>Observations on Mr. Bowden's Treatise on the</i> | |
| <i>Dry Rot</i> | 57 |
| <i>Circular Letter to the Landed Interest on the</i> | |
| <i>Management of Oak Timber</i> | 60 |

INTRODUCTION.

“THE state and condition of the great fluid mass, the atmosphere in which we breathe, and the changes, which take place therein, are objects of no small importance to the chemical philosopher; the effect of furnaces, the clearing of laboratories, burial vaults, mines, and other excavations, and houses of office, from their noxious effluvia, are all governed by general laws of the same nature as those, which cause the currents of air and winds around us.”

These are a few of the observations with which Mr. Nicholson has defined the importance of meteorology, and which form the basis of the following Essay relative to those defects of Buildings dependant on the Properties of Air. Their application, or utility, at the present time cannot be much doubted, when we consider how many new and

large buildings are in contemplation in the metropolis, and other parts, as well as the taking down and rebuilding of whole streets. It is true, there are numerous buildings already extant, which, as examples for imitation, cannot be surveyed without filling the mind with a dignified contemplation of the powers, the faculties, and the exalted taste of man, in the architectural composition of exterior grandeur: and full as many, whose interior demands an equal attention, though not comprising so large a scope for investigation, yet their fixed and moveable decorations presenting to the eye "a never fading source of ever varied beauties:" and how many, possessing these superior advantages, in the whole, or in part, are nevertheless not only uncomfortable and unhealthy, but, to those of acute feelings and more refined sentiments, even uninhabitable, and that from causes entirely distinct from their exterior grandeur, or interior elegance, depending alone on those laws of nature governing the atmosphere with which they are surrounded. In this metropolis, we shall find the exhalations arising from the drains and

sewers a leading complaint; the intolerable nuisance of smoky chimnies not less notorious; and, while many persons are apprehensive for the safety of their building, as to the best means of warming it, others are not less anxious in preventing a premature decay from the dry rot; while the adoption of a better, and more general system of ventilation becomes the least considered amongst these existing evils, though at one time it formed the principal object of my attention, and from which the consideration of the other defects have only emanated. There are many persons, whose opportunities, had they been cultivated, would long ere this have come to some definite conclusions on these points; and, as there are few publications in the course of the last thirty years, that mention these defects even abstractedly, it may therefore be satisfactory to state how it has come to claim my attention and peculiar consideration.

Having taken up the study of meteorology for the amusement of a leisure hour, and carefully collecting and registering the changes of the weather under the planetary

aspects, I was struck with the great coincidence of the meteorological phenomena, as indicated by the barometer and other instruments, under the same aspects at different periods. My attention however became more directed to the current and approximations of the wind, that being a point little developed; and in this I found, that, out of 210 observations, the variations were only 61, making an average of the wind approximating to the same quarter of the compass under similar planetary aspects as nearly 4 to 5. Considering the vast importance of a more accurate knowledge on this subject in all nautical and maritime affairs, I submitted my opinion of the propriety of scientific institutions being adopted, and those measures taken in all sea-port towns, that would ultimately lead to that conclusion, which could not be fully accomplished by the exertions of any individual, and was answered in the *Liverpool Chronicle*, Sept. 14, 1803, with a few remarks, concluding thus:—

*Non obtusa adeo gestamus pectora pœni
Nec tam aversos equos Tyria sol jungit ab urbe.*

Nevertheless, above ten years passed away without any attempt there at enlarging the cultivation of the sciences; the establishment of the *Liverpool Institution* will, it is now to be hoped, promote that of meteorology, particularly as it may be found applicable to commercial dealings. For myself, about that time, my leisure hours gradually passed away into the vortex of business; and I had to study, in the interior of houses, the effects of those elements, that before had only been contemplated in the lofty and extended regions of the atmosphere. One striking instance may perhaps suffice, having closed up several doors and windows, to avoid the cold drafts of air, the chimnies were found to smoke; the remedy was therefore worse than the disease; and, as it was my business to make the interior of a house not only elegant but comfortable, I found, that had to be made a professional study that had hitherto been only cultivated as an amusement and recreation.

The following items are the result of nearly sixteen years practice and theory. The whole of that period has not been ex-

clusively engaged upon the subject, as it requires not only time, but opportunities, to suggest, improve, and correct the results of even the best founded experiments; and no discovery in the arts and sciences, however important, can possibly be expected to arrive at maturity on its first developement. If, therefore, in pointing out these defects, it shall lead to a scientific and *specific pre-consideration*, of the best means of remedying, or preventing them before the foundation stone of any building is laid, or projected alterations effected, it will not only be the means of avoiding in general nearly one half of the present defects, but every shilling, so expended in the construction, would be worth twenty in after alterations. To enter more into the details, each case would nearly form a volume, in explaining what is or is not a remedy, or what would, or would not be a preventive. Every person, within these few years, pretends more or less to a knowledge of pneumatic chemistry, and all have particular prejudices in favour of some plan or other towards the remedy of these defects. But the more extended their knowledge, in practice and

theory, the nearer they will all come to the same definite conclusion; the operations of nature being unchangeable, though many circuitous routes are often taken to ascertain them.

I have now only to apologise for offering these remarks in their present crude state, from the importance and extent of the great improvements going forward, which has already called forth a few *Observations on the Architectural Defects of the Public Edifices of this Metropolis*, and from the necessity of these considerations having been agreed to by very great architectural authorities.

Charles Street, Grosvenor Square,

NOVEMBER 16, 1815.