

Cambridge University Press

978-1-107-69060-8 - Air Currents and the Laws of Ventilation: Lectures on the Physics of the Ventilation of Buildings Delivered in the University of Cambridge in the Lent Term, 1903

W. N. Shaw

Table of Contents

[More information](#)

## CONTENTS.

	PAGE
<b>CHAPTER I. LAWS OF FLOW IN AIR CIRCUITS AND THEIR VERIFICATION . . . . .</b>	<b>1</b>
Definition of Air Circuit . . . . .	1
Law I. Continuity of flow . . . . .	2
Weight of air required for ventilation . . . . .	3
Further consideration of the law of continuity . . . . .	3
Law II. The relation of the flow in an air circuit to the head, or aeromotive force, producing it . . . . .	5
Table showing the amount of aeromotive force or "head" produced by various agencies . . . . .	9
Direct evidence for Law II. . . . .	10
Indirect evidence for the truth of the law . . . . .	11
Electrical analogy. Standard of resistance . . . . .	11
Law III. Pneumatic resistances in series . . . . .	13
Law IV. Resistances in parallel, or multiple arc . . . . .	14
Indirect verification of the laws . . . . .	15
Measurement of the effective or equivalent area of a chimney . . . . .	16
Experiments on the flow of air up chimneys . . . . .	17
Experiments of the Cowl Committee of the Sanitary Institute . . . . .	23
The pneumatic analogue of the Wheatstone bridge . . . . .	27
The pnéumatic analogue of the potentiometer . . . . .	30
The interference of air-flows from pipes delivering into a common conduit . . . . .	33

Cambridge University Press

978-1-107-69060-8 - Air Currents and the Laws of Ventilation: Lectures on the Physics of the Ventilation of Buildings Delivered in the University of Cambridge in the Lent Term, 1903

W. N. Shaw

Table of Contents

[More information](#)

xii

## CONTENTS

	PAGE
<b>CHAPTER II. PHYSICAL PRINCIPLES APPLICABLE TO THE VENTILATED SPACE . . . . .</b>	<b>37</b>
Energy and momentum . . . . .	37
Convection . . . . .	38
Apparatus . . . . .	39
Experimental results . . . . .	42
Supply of warm and cold air . . . . .	47
Fresh air and used air . . . . .	47
Automatic records of temperature . . . . .	49
Actual and ideal temperature-changes in a crowded building . . . . .	52
The convection of particulate impurity . . . . .	54
<b>CHAPTER III. APPLICATION OF PHYSICAL LAWS TO PRACTICAL VENTILATION . . . . .</b>	<b>56</b>
Size of openings . . . . .	61
Distribution of head . . . . .	62
Elements required for the ventilation of a room . . . . .	64
Open fires . . . . .	69
Automatic cross ventilation . . . . .	72
Automatic ventilation by cowls . . . . .	73
The Vacuum system . . . . .	74
The Plenum system . . . . .	76
The Zero potential system . . . . .	77
Characteristic curves for mechanical ventilation . . . . .	79
Effect of wind . . . . .	82
Comparison of systems of mechanical ventilation . . . . .	83
Numerical computations . . . . .	85
Conclusion . . . . .	86
<b>NOTE A. MEASUREMENT OF THE FLOW OF AIR . . . . .</b>	<b>89</b>
<b>NOTE B. DATA FOR THE DETERMINATION OF THE HEAD OR AEROMOTIVE FORCE DUE TO VARIOUS AGENCIES . . . . .</b>	<b>91</b>
<b>INDEX . . . . .</b>	<b>93</b>