

Contents

Session I: Evolutionary Relationships: from Reptiles to Birds and Mammals	
Chairman: K. Johansen	1
General Morphological Principles of Amniotic Lungs H.R. Duncker (With 13 Figures)	2
Ventilation Mechanisms: Problems in Evaluating the Transition to Birds C. Gans	16
Lung Surfactant and Lung Lining in Birds R.E. Pattle (With 2 Figures)	23
Intrapulmonary Carbon Dioxide-Sensitive Receptors: Amphibians to Mammals M.R. Fedde and W.D. Kuhlmann (With 15 Figures) ...	33
Circulation: a Comparison of Mammals, Reptiles and Birds F.N. White (With 5 Figures)	51
Mechanisms Controlling the Oxygen Affinity of Bird and Reptile Blood: a Comparison Between the Func- tional Properties of Chicken and Crocodile Hemoglo- bin C. Bauer, W. Jelkmann, and H. Rollema (With 3 Fig- ures)	61
Session II: Adjustments to Changes in Oxygen Avail- ability and Requirement: Hypoxia, Diving, Flight	
Chairman: K. Schmidt-Nielsen	67
Effects of Hypoxia on Heart Activity in Diving, Flying, and Land Birds P.D. Sturkie and A. Abati (With 1 Figure)	68
Cardiopulmonary Responses to Acute Hypoxia in Do- mestic Fowl E.L. Besch and H. Kadono (With 4 Figures)	71
Oxygen Transport During Progressive Hypoxia in Bar- Headed Geese (<i>Anser indicus</i>) Acclimated to Sea Level and 5600 m C.P. Black, S.M. Tenney, and M. van Kroonenburg ..	79

Role of Arterial Chemoreceptors in Ventilatory Acclimation to High Altitude in Unanesthetized Peking Ducks	84
P. Bouverot	84
Ventilation in the Hummingbird <i>Colibri coruscans</i> During Altitude Hovering	85
M. Berger	85
Respiration During Flight in Birds	89
J. Torre-Bueno	89
The Contribution of Arterial Chemoreceptors and Baroreceptors to Diving Reflexes in Birds	95
D.R. Jones and N.H. West (With 6 Figures)	95
Adjustment of the Regional Pulmonary Circulation to the Profile of Oxygen Pressure Along the Parabronchus in the Duck	105
P. Scheid and J.P. Holle (With 3 Figures)	105
 <u>Session III: Avian Respiratory System: Structure and Function of Lungs</u>	
Chairman: G.M. Hughes	111
The Structure of the Intrapulmonary Vasculature in the Domestic Fowl	112
A.S. King, D.Z. King, and M.A. Abadalla (With 16 Figures)	112
A Model of the Capillary Zone of the Avian Ter-tiary Bronchus	125
J. Brackenbury and A.R. Akester (With 4 Figures)	125
Ventilatory ¹³³ Xenon Distribution Studies in the Duck <i>Anas platyrhyncha</i>	129
B. Burns, A.E. James, Jr., G. Hutchins, G. Novak, and R.R. Price (With 6 Figures)	129
Diffusion in Avian Pulmonary Gas Exchange: Role of Diffusion Resistance of the Blood-Gas Barrier and the Air Capillaries	136
P. Scheid, R.E. Burger, M. Meyer, and W. Graf (With 3 Figures)	136
Airway Resistance	142
V. Molony	142
Origin of Carbon Dioxide in Caudal Air Sacs of Birds	148
J. Piper (With 2 Figures)	148

<u>Session IV: Control of Ventilation: Intrapulmonary CO₂ Sensitivity and Respiratory Centers</u>	155
Chairman: P. Dejours	
Effects of Intrapulmonary Chemoreceptors in Per-fused and Nonperfused Lungs R.E. Burger, M.R. Barker, P.C.G. Nye, and F.L. Powell (With 5 Figures)	156
Role of Avian Intrapulmonary Chemoreceptors in the Ventilatory Response to Inhaled CO ₂ : Effects of Acetazolamide in the Duck F.L. Powell, M.R. Fedde, R.K. Gratz, and P. Scheid (With 1 Figure)	164
Ventilatory Response During Arterial Homeostasis of P _{CO₂} at Low Levels of Inspired Carbon Dioxide J.L. Osborne and G.S. Mitchell (With 3 Figures) ..	168
Effect of Middle Cardiac Nerve Stimulation upon the Respiratory Response to P _{aCO₂} in the Chicken J.A. Estavillo and M.L. Youther (With 3 Figures) ..	175
Effect of F _{LCO₂} Dynamics on T _i and T _{tot} in Spontaneously Breathing Birds A.L. Kunz and R.D. Tallman, Jr. (With 5 Figures) .	182
Effect of Stretch on the Respiratory Pattern of a Chicken D.A. Miller (With 7 Figures)	188
Central Nervous Mechanisms Regulating Thermal Panting S.A. Richards and P. Avery (With 2 Figures)	196
Control of Panting by Thermosensitive Spinal Neurons in Birds W. Rautenberg, B. May, R. Necker, and G. Rosner (With 5 Figures)	204
<u>Session V: Respiration of the Embryo: Eggshell, Embryonic Membranes, Circulation, Blood</u>	211
Chairman: J. Metcalfe	
The Avian Egg: in vivo Conductances to Oxygen, Carbon Dioxide, and Water Vapor in Late Development C.V. Paganelli, R.A. Ackerman, and H. Rahn	212
Pore Size Versus Pore Number in Avian Eggshells S.G. Tullett (With 2 Figures)	219
Interdependence of Gas Conductance, Incubation Length, and Weight of the Avian Egg A. Ar and H. Rahn (With 1 Figure)	227
Metabolism of Avian Embryos: Comparative Ontogeny D.F. Hoyt, C.E.M. Vleck, and D. Vleck	237

The Kiwi: a Case of Compensating Divergences from Allometric Predictions W.A. Calder III	239
Gas Conductance in the Eggshell of the Mound-Building Brush-Turkey R.S. Seymour and H. Rahn	243
Acid-Base Balance During Eggshell Formation P. Mongin (With 6 Figures)	247
Development of the Avian Respiratory and Circulatory Systems H.R. Duncker (With 13 Figures)	260
Gas Transfer in the Chorioallantois H. Tazawa (With 13 Figures)	274
Respiratory Function of Embryonic Chicken Hemoglobin R. Baumann and F.H. Baumann (With 3 Figures)	292
The Effects of Restricted Gas Exchange on Embryonic Heart Rate K.F. Laughlin (With 2 Figures)	298
 List of Participants	305
Subject Index	309