

Index

- abductors,
morphology, 127
function in respiration, 194
- adductors,
morphology, 131
function of, 194
- air sacs,
in Chiroptera, 100, 250–1
function in primates, 103
or expanded saccule, 96
or large ventriculo-saccular complex, 97
non-ventricular, 98
- airway resistance, role of stretch and chemoreceptors, 197
- ageing of the vocal cords and muscles, 197
- ageing and vocal changes, 234
- agouti (*Dasyprocta leporina*),
bowing of thyroid cartilage, 60
superior thyroarytenoideus muscle, 91
- altitude, problems of locomotion, 226
- Ama, diving women of Korea and Japan, 225
- anteater, giant (*Myrmecophaga tridactyla*),
'hairy epithelium', 45
no epiglottic pits, 121
supraglottis, 203
- apes,
air-sacs, 103
larynx of, 25, 82, 149–50, 245
sounds made by, 224
- aquatic mammals, physiology of diving, 221
- Aristotle,
comments on dolphin vocalization, 246
originator of comparative anatomy, 1
- Armadillo, nine-banded (*Dasypus novemcinctus*),
bilateral fenestra thyroid, 63–4
cartilage, 63
glandular epiglottis, 120
linguo-epiglottic muscle, 70, 71
ventricle, 90
- arteries, laryngeal, 185
- aryepiglottic folds,
general morphology, 33, 107, 116
in the immature larynx, 111
in sudden infant death syndrome, 113
- arytenoid cartilage,
role in immature larynx, 70–3
variations in size, 74–6
- baboon (*Papio cynocephalus*), oestrogen receptors, 76
- badger, common (*Meles meles*), divided thyroarytenoideus muscle, 89
- badger, hog (*Arctonyx collaris*),
epiglottic pits, 121
ossification in epiglottis, 80
ventriculo-saccular complex, 97
- bats *see* Chiroptera
- bear, black (*Ursus americanus*), third belly of cricothyroid muscle, 137
- bison (*Bison bison*),
ceratocricoid muscle, 131
X-ray of larynx, 83
- camel (*Camelus dromedarius*),
ability to pace, 208
racing, 211

- camel (*Camelus dromedarius*) – *cont.*
 size of thyroid cartilage, 59
 supraglottis, 42
- carnivore,
 fenestra in thyroid cartilage, 63
 general morphology, 33
 glands in, 119, 121, 124
- cats (domestic)
 climbing, 218
 fibre-size frequency, 163
 purring, 249
 sensory innervation, 146
- cats (Felidae),
 cricoid cartilage, 86
 larynx of, 32, 63, 240
 prutten, 249
- Cetacea,
 diving, 221
 echolocation, 246
 larynx of, 42
- cheetah (*Acinonyx jubatus*),
 cricoid cartilage, 86–7
 purring, 249
 speed of, 210
- chimpanzee (*Pan troglodytes*),
 air sacs, 95, 103
 larynx of, 25
 locomotion in, 216
 ossification in, 80
 vocalization, 244
- Chiroptera,
 air sac, 100, 250–1
 echolocation, 246
 general morphology, 220
 larynx of, 44, 67, 81, 101–2, 222
- climbing,
 role of vocal cords, 217–18
 techniques, 215
- classification systems, 19
- coati (*Nasua nasua*),
 absent laryngeal glands, 120
 muscle attachment, 128
- corniculate (Santorini) and cuneiform
 (Wrisberg) cartilages, morphology, 57,
 61, 116
- coypu (*Myocastor coypus*), superior laryngeal
 artery, 177
- circro-arytenoid joint,
- in the cheetah, 86
 measurement of facets, 282
 morphological variations, 84–5
- cricoid cartilage,
 anatomy, 65, 67
 fusion with thyroid cartilage, 68
 reconstruction in horseshoe bat, 66
- cricothyroid muscle,
 anatomy of, 134–6
 comparative data, 276
 role in respiration, 196
 third belly, 137
- deer (Cervidae),
 aberrant ventricle, 89
 epiglottis in, 125
 roaring in stags, 241
 running techniques, 209
- deer mouse (*Peromyscus maniculatus*),
 acclimatization at altitude, 227
- descent of the larynx,
 in humans, 54, 260
 in rats, 56
- diet, modifications for, 30, 110
- diving,
 physiology of, 221
 role of trachea in, 224
 Weddell seal, 73, 221
 women of Korea and Japan, 225
- dogs (*Canis spp.*),
 barking of, 249
 experimental sound production, 232
 greyhound racing, 211
 larynx of, 85, 89, 92, 124, 130
 pack hunting, 210
 third belly of cricothyroid muscle, 137
- dolphin (*Delphinus delphis*),
 echolocation in, 246
 larynx of, 42, 248
- echolocation in Cetacea and Chiroptera,
 246
- embryology,
 human sections, 53–4
 staging systems, 49–50
- epiglottis,
 function of, 57

Index

285

- glandular filled pits, 106, 110, 117, 120–4
 in all larynges, 30, 33, 42, 70
 linguo-epiglottic muscle, 71
 ossification in, 80
 evolution,
 of brain size, 263
 of larynx, 30
 of speech, 260
- Fabricius,
 comparative laryngeal anatomy, 5, 7
 reference to ventricle, 87
- fennec fox (*Vulpes zerda*), glandular epiglottis, 121
- fox, red (*Vulpes vulpes*), screaming by, 243
- flying,
 and the bat larynx, 221, 222, 223
 wing mechanics, 220
- foetal larynx, sections from human, 40
- Galen,
 describes the recurrent laryngeal nerve, 141
 early reference to the ventricle, 87
 ganglia, relationship to laryngeal nerves, 147
- gaseous exchange,
 at altitude, 226
 in diving, 221
 in ruminants, 192
- gibbon (*Hylobates* spp.),
 saccules and glands, 119
 superior thyroideus muscle, 134
 valvular larynx, 216
 vocal repertoire, 243
- giraffe (*Giraffa camelopardalis*),
 dead space in trachea, 193
 recurrent laryngeal nerve morphology, 165–9
- glandular tissue,
 distribution in man, 106, 108
 role in the spread of cancer, 110
 sudden infant death syndrome (SIDS), 112–15
 within the epiglottis, 117, 124–5
- glottis,
 anatomical boundaries, 37–8
- climbers, 216
 during phonation, 232
 in relation to maximum running speed, 202–5
 in ‘roaring’ horses, 157
 role in respiratory resistance, 186, 195, 197
- gorilla,
 air sacs, 95, 103
 locomotion in, 216
 ossification of larynx, 82, 245
 vocal analysis, 244
- Harvey, W., theories of voice production, 8
- heart-nosed bat (*Cardioderma cor*), larynx of, 102
- herbivores,
 foraging of, 205
 general morphology, 32
 high posterior laryngeal wall, 73
 larynx of, 34, 119, 204
- horse (*Equus caballus*),
 breeding and training, 211–13
 early monograph on, 4
 expanding trachea, 204
 Hobday operation, 158
 optimal running speed, 206
 recurrent laryngeal nerve in, 155, 157
- howler monkey (*Aotus* spp.), loud calls, 243
- humans,
 acquisition of speech, 231, 260
 ageing vocal cords, 41
 brain size, 261
 glands in the spread of laryngeal cancer, 108
 laryngeal morphology in the adult and child, 36–40
 laryngeal epithelium, 35
 nerve ganglia, 147
 ossification, 78
 recurrent laryngeal nerve and thyroid gland, 145
 sudden infant death syndrome, 112–15
- hyaena (*Crocuta crocuta*), levels of circulating hormone, 76
- hyoid bone,
 ancient specimen (60,000 years), 263

- hyoid bone – *cont.*
 ossification in, 263
 suspension of, 239
- kangaroo, red (*Macropus rufus*),
 absent cricothyroid joints, 68
 absent epiglottic pits, 119
 fusion of thyroid and cricoid cartilages, 68
 mechanics of hopping, 207–9
 metabolism, 190
- kudu (*Tragelaphus strepsiceros*), larynx of, 34, 85, 89
- language, acquisition of speech, 231
- laryngocoele,
 enlarged saccules, 93
 history of, 104
- leaf-nosed bat (*Hipposideros caffer*),
 expanded trachea, 101
- learned societies,
 French Academy of Science, 11
 Royal College of Surgeons of England, 15
 Royal Society, 10
 Zoological Society of London, 12
- Leonardo da Vinci,
 artist and anatomist, 3
 on the horse, 5
- lemur,
 absent saccule, 95
Lepilemur (sp.), vertical climbers, 215
 mouse (*Microcebus murinus*), fenestra in thyroid cartilage, 62
 ring-tailed (*Lemur catta*), larynx of, 117
 ruffed (*Varecia variegata*), paraglottic glandular tissue, 122
- leopard (*Panthera pardus*), fenestra in thyroid cartilage, 63
- lion (*Panthera leo*),
 cricothyroid joint in, 85
 larynx of, 32, 240
- llama (*Lama glama*),
 locomotion at altitude, 227
 trachea of, 228
- lung volume, as a function of body size, 195
- mandrill (*Mandrillus sphinx*), saccule and glands, 97, 118
- marmoset,
 common (*Callithrix jacchus*), large saccules, 99
 pygmy (*Cebuella pygmaea*), vocalization, 243
- maximum running speed, 68, 209
- metabolic rates, in mammals, including marsupials, 189
- monkey,
 capuchin (*Cebus apella*), ventriculo-sacular fold, 94
 colobus (*Colobus satanus*), larynx of, 96
 howler (*Alouatta* spp.), loud vocalization, 243
- northern night (*Aotus trivirgatus*), glands and air sac, 123
 larynx of, 27, 30, 219
- Saki (*Pithecia pithecia*), large air sac, 117
- squirrel (*Saimiri sciureus*), larynx of, 26
 musculature of, 126, 140
- musculature,
 extrinsic, 141
 high concentration of myohaemoglobin in, 227
 intrinsic laryngeal, 127–40
 large in the bats, 80
 in running, 206, 211, 214
- muntjac (*Muntiacus muntjak*), mucosal depression but no ventricle, 36, 89
- museums,
 British Museum, 13
 Hunterian, 11–13
 Natural History, 13
- nasopharynx, intranarial larynges, 30, 54
- Neanderthal man, ability to speak, 262
- Negus, V., comparative anatomy of the larynx, 16, 50
- nerves, laryngeal,
 in the horse, 155
 measuring nerve fibres, 159
 morphology, 143, 160
 related ganglia, 147–9
 varied distribution, 152–4
- olfaction, relation to intranarial epiglottis, 30

Index

287

- onager (*Equus hemionus*), high supraglottic walls, 42, 204
- orang-utan (*Pongo pygmaeus*), arboreal existence, 103, 216 large air sacs, 95 laryngeal paraganglia, 149–50 vocalization, 244
- oryx (*Oryx tao*), anterior bowing of thyroid cartilage, 61
- ossification, in epiglottis, 80 pattern within human larynx, 77 in primates, 82 in yellow-winged bat, 81
- otter (*Lutra lutra*), glands in epiglottic pits, 121
- Owen, R., contribution to comparative anatomy, 13
- panda, giant (*Ailuropoda melanoleuca*), third belly of cricothyroid muscle, 139 vocalization, 237
- pig (*Sus scrofa*), early research on, 5, 7, 88 laryngeal ganglia, 147 vocalization, 141
- porcupine (*Hystrix cristata*), large lingual-epiglottic muscle, 70
- prosten and purring in cats, 249
- prairie dog (*Cynomys ludovicianus*), bilateral superior thyroarytenoideus muscle, 134 glands in epiglottic pits, 122, 124
- rat (*Rattus rattus* and *R. norvegicus*), fibre-size frequency in laryngeal nerves, 165 identification of nerve ganglia, 147 ultrasonic vocalization, 236
- recurrent laryngeal nerve, morphology, 143 paresis in the horse, 157
- reindeer (*Rangifer tarandus*), sub-hyoid air sac, 98
- respiration, evolution, 30 laryngeal movements, 194–5
- neurophysiology, 196 role of larynx in controlling, 188
- roaring, in cats, 239 in horses, 155
- rodents, larynx of, 33
- running, in humans, 213 maximum running speeds, 209 techniques and training, 211, 213
- saccule *see* ventricle and saccule
- seal, elephant (*Mirounga angustirostris*), deep diving, 225 grey (*Halichoerus grypus*), large trachea, 224
- Weddell (*Leptonychotes weddelli*), diving abilities, 221 sexual variations, 73
- sheep (*Ovis*), variations in size of laryngeal cartilages, 59
- shrew, Etruscan (*Suncus etruscus*), oxygen consumption by, 190
- tree (*Tupaia tana*), anterior bowing of thyroid cartilage, 61
- singing, 235
- snow leopard (*Panthera uncia*), non-roarer, 242
- sudden infant death syndrome (SIDS), 112–15
- subglottis, anatomical boundaries, 39 in the foetus, 40 in sudden infant death syndrome, 112
- suckling, role of the larynx, 31
- supraglottis, in camel, onager and anteater, 42, 203–4 modifications for swallowing, 33, 74
- sound, alarm calls, 244 imitation of, 230 loudest, value of, 242 role of the pharynx, 235, 240
- stroboscope, 233
- symmorphosis, 201

- tapir (*Tapirus terrestris*),
larynx of, 123, 238
vocalization by, 237
- Tasmanian devil (*Sarcophilus harrisii*),
muscle insertion, 129
- Tamarin, 97
- emperor (*Saguinus imperator*), larynx of,
218
- thyroid cartilage,
fenestra, 62, 63
variations in size and shape, 58, 60,
64
- tiger (*Panthera tigris*), larynx of, 241
- trachea,
comparative morphology, 192
effect of dead space on, 192–4
in aquatic mammals, 225
related to body size, 69
- tree hyrax (*Dendrohyrax arboreus*), larynx of,
70, 132
- Tyson, E., anatomy of the chimpanzee
(‘Pigmie’), 9
- ultrasound,
in the Cetacea and Chiroptera, 230,
246–9
by woodmice, 236
- van Leeuwenhoek, A., early use of the
microscope, 10
- Vesalius, A., 3, 134
- vascular supply,
distribution in man, 174, 177
nomenclature, 170
- ventricle and saccule, 89–95
- viscacha, plains (*Lagostomus maximus*), very
large air sacs, 98
- vocalization,
articulation in humans, 230
in panda and tapir, 237
in primates, 243
singing, 235
voice production, 232
- vocal cords, anatomy of, 38, 44, 64, 233
- waterbuck (*Kobus defassa*), larynx of, 31
- wolf (*Canis lupus*),
larynx of, 92
pack hunting, 210
third belly of cricothyroid muscle, 137
- wombat (*Vombatus ursinus*), blood supply of
larynx, 176
- Yak (*Bos mutus*),
increased level of myohaemoglobin, 191
locomotion at altitude, 227