Mind your step!

The fourth, and most recent, volume of Wilson & Mittermeier's *Handbook of the mammals of the world* (2011a, 2011b, 2013, 2014) was published this year. Each volume has, on average, almost 800 pages, and when turning these pages the reader is overwhelmed by a plethora of insights and details about carnivores, hooved animals, primates and sea mammals. Approximately half of the pages are filled with excellent photographs depicting, in detail, morphological aspects, methods of communication, eating habits, home ranges, social organisation and more. All these details are based on copious scientific references and citations. For instance there are 57 double column pages of literature on carnivores. While this new assemblage of information is very interesting, it raises the question of what major advances (if any) have been made in mammalogy in recent decades and their nature. There definitely have been some, three of which are worthy of mention. First, there is the bat detector, which has enabled acoustic surveying of bats in the field, allowing people to record their ultrasonic sounds for subsequent analysis. Second, the application of DNA technology allows mammalogists to analyse all sorts of mammal body parts and excretions. And, thirdly, there is telemetric equipment and other, more recently developed and sophisticated devices that use the global positioning system (GPS) which allow us to detect the movements or whereabouts of tagged mammals. It goes without saying that none of these technologies were primarily invented or developed in order to study mammals. Rather, mammologists have taken advantage of technological advances in other fields: adapting music recording technology slightly in order to study bats; using advances in the unravelling of human protein structures to help differentiate between mammal species; using telemetry or GPS to track wild mammals.

The knowledge gained from applying these technologies appears in these four volumes, and there are another four volumes to come, which will cover the orders of marsupials, rodents, insectivores and bats. When these are published, we will have a description of all of the approximately 5500 known mammal species of the world.

On reflection, progress in modern mammalogy occurs through both large and small steps. Many of the smaller steps are recorded in scientific magazines, which are important as they disseminate details of scientific progress. The bigger steps often appear in books, such as those described above, that provide an overall view of the current state-of-the-art knowledge in any field, giving the authors the chance to extract fundamental theories and general ideas.

In complete contrast to these compendious handbooks are the short notes in this issue,

of which one is only two pages long, which nonetheless provide useful observations. One of these is the observation of damaged Longworth live-traps by van Boekel, which was until now taken for granted by fieldworkers. Besides his observations and description, there is another point of special interest: his use of the word 'gnawing'. The order of Rodentia is characterised as having two pairs of incisors and a bunch of molars. Typically Rodentia take their food by fixing the upper incisors in the object and using the lower incisors as chisels, scraping the material off by moving the lower jaw, with its powerful masseter muscles, against the inside part of the uppers. The different positions of the incisors of different species can be utilised in a range of narrow spaces (proodont) through to more open and accessible food objects (hypsodont). But what about the linear furrows van Boekel describes as the result of the activities of common shrews or water shrews? Can these activities been described as 'gnawing'? While Rodentia have a single mandibular joint at both sides, the articulating mandibular connection to the skull of Soricidae is divided into two joints. It seems plausible that this special anatomical feature enables common shrews and water shrews to use their lower incisors like engraving tools, moving to and fro in a forward-backward direction. However this theory cannot be confirmed without further biomechanical physiological evidence.

The short note from Bekker et al. on the remains of grey long-eared bats *Plecotus austriacus* in the pellets of barn owls (*Tyto alba*) in the Netherlands clearly underlines the fact of predation. The question of whether these bats were caught within, or immediately outside, the lofts remains open to further investigation.

Dekeukeleire and Janssen present an observation of a maternity colony of 85 Bechstein's bats (*Myotis bechsteinii*), one of the largest colonies to have been found in Western Europe. An interesting point here is the use of four different techniques using specific devices to gather information: a voice recorder as a lure, a mist-net for capturing bats, a glued-on tracking system to locate the exact tree hole used by the bats and a night vision camera with an IR lamp to count the bats emerging from their roost.

A final intriguing short note is the observation and description of a *Copulatory lock of wild red fox (*Vulpes vulpes*) in broad daylight* by Bijlsma. It is not the peepshow character of this event that draws one's attention, but the balanced outcome that more than twenty biting bouts (almost one a minute over almost half an hour), with the risk of crippling the female, still pays off in providing progeny for the species.

We also have a paper on the American mink (*Neovison vison*). Dekker and Hofmeester describe the present status of the American mink in the Netherlands. This invasive species now has a balanced low population level fed by escapees from mink farms and controlled through by-catches of muskrat-eradication.

Another paper in this issue, by Mos et al., concerns the *Spring diet of Eurasian badgers in two contrasting habitats in the Netherlands*. The key issues here are not the badgers' fondness of earthworms, nor the technical details of how the authors estimated the number of earthworms consumed by badgers, although both issues are interesting to read about and might, perhaps, later be applied to other earthworm specialists. Of real interest is how predators, in this case badgers, devise strategies for dealing with deficits in their daily food uptake.

There was an epigraph on the wall of the hall of internal medicine at Leiden University that read: 'The patient is the centre around which the medical universe turns'. In the mammalogical world this could be paraphrased as 'The specimen is the centre around which the mammalogical universe turns'. A speci-

men can be a complete body, a single tooth or a skull. The contribution from Heerebout et al. contains a description of a newly discovered, but old, skull and a, previously documented, section of a mandible of rough-toothed dolphins and their museum history. This paper illustrates the dangers of almost uncritically accepting what others have done before, without verifying every detail. In older days lecturers presented ideas – often *ex cathedra* – that were based on a general robust theory that approximated the truth as they knew it. Those theories were based on series of observations and the long experience of scientists working alone. Nowadays evidence-based science is the globally accepted standard, while scientific work often involves scientists from different backgrounds working in multi-disciplinary teams. Such an approach can greatly advance progress in the study of mammals. Recently, in this magazine we set a record in Lutra for the largest team of authors (numbering 28); they researched the case of a dead wolf found by the roadside in the Netherlands. This finding attracted considerable media attention at the time, but turned out to be practical joke as the specimen had been dumped post-mortem (Gravendeel, de Groot & Kik et al. 2013).

This issue contains three full papers and four short notes. The latter in particular underline the character and importance of small steps forward: it is highly likely that the smaller the step, the more certain the information provided. Bigger steps run a higher risk of being fundamentally criticised on details. So don't ignore the warning: mind your step!

Gravendeel, B., A. de Groot, M. Kik, K.K. Beentjes, H. Bergman, R. Caniglia, H. Cremers, E. Fabbri, D. Groenenberg, A. Grone, G. Groot Bruinderink, L. Font, J. Hakhof, V. Harms, H. Jansman, R. Janssen, D. Lammertsma, I. Laros, L. Linnartz, D. van der Marel, J.L. Mulder, S. van der Mije, A.M. Nieman, C. Nowak, E. Randi, M. Rijks, A. Speksnijder & H.B. Vonhof 2013. The first wolf found in the Netherlands in 150 years was the victim of a wildlife crime. Lutra 56 (2): 93-109.

Wilson, D.E. & R.A. Mittermeier (eds.) 2011a. Handbook of the mammals of the world. Vol. 1. Carnivores. Lynx Edicions, Barcelona, Spain.

Wilson, D.E. & R.A. Mittermeier (eds.) 2011b. Handbook of the mammals of the world. Vol. 2. Hoofed mammals. Lynx Edicions, Barcelona, Spain.

Wilson, D.E. & R.A. Mittermeier (eds.) 2013. Handbook of the mammals of the world. Vol. 3. Primates. Lynx Edicions, Barcelona, Spain.

Wilson, D.E. & R.A. Mittermeier (eds.) 2014. Handbook of the mammals of the world. Vol. 4. Sea mammals. Lynx Edicions, Barcelona, Spain.

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