Ornithology from the Lakeshore

There is no denial. We, ornithologists, suffer from a mild form of schizophrenia. Most of us love our study subjects, and many of us actively work to protect them. But most of us also harm them, at least somewhat. If you want to study birds in the wild, if you want to learn something about their behaviour, about their nests, their eggs, their young, or even simply about their presence, it is almost impossible to do so without disturbance. Just finding a nest can become the end of it, as I painfully found out in the summer of 2004. I was resting on a pingo in the tundra near Barrow, Alaska, smugly smiling because in the previous hour I had found and marked four sandpiper nests with freshly laid clutches, when I observed an Arctic Fox retracing my steps, and consuming the little birds’ reproductive effort of that season.

Modern methods in ornithology go far beyond simple observing and searching for nests. It is an exciting time, because never before have we had so many tools at our disposal to learn a thing or two about birds that had previously remained invisible, or not amenable to study. Starting with the use of aluminium numbered rings at the end of the 19th century, the toolbox of bird-mounted devices has strikingly expanded to include radio-transmitters, passive integrated transponder (PIT) tags, light-sensor geolocators, satellite tags, GPS tags, accelerometers, heart-rate monitors, electromyogram and electroencephalogram (EEG) recording devices, microphones and cameras. Fast miniaturization in combination with increased energy-efficiency and data-storage capacity has made the impossible possible. It requires singular stamina or a large team of observers to watch the behaviour of one individual around the clock, but radio-transmitter technology allowed us to measure activity patterns of more than 100 individuals continuously for weeks (Lesku et al. 2012). It is inconceivable for us to follow small birds as they disperse or migrate across the globe, but ~1-g geolocators revealed that Wheatears Oenanthe oenanthe travel more than 14,000 km from eastern Africa to northern Alaska in a period of less than two months (Bairlein et al. 2012), and that a male Red-necked Phalarope Phalaropus lobatus that bred in Scotland wintered somewhere between the Galapagos Islands and the South American coast (Smith et al. 2014).

Just as the discovery of ingenious bio-imaging techniques is Nobel-prize worthy because these tools disclose processes inside living cells, so is the new arsenal of monitoring equipment enthusiastically embraced by ornithologists because it allows us to ‘observe’ behaviour at an unprecedented scale and in unprecedented detail. For example, attaching geolocators with a leg-loop backpack harness to hundreds of Purple Martins Progne subis allowed the study of whether pair members had similar fall migration timing or destination, and whether wintering in closer proximity or in similar habitats was linked to more synchronous spring migration (Stutchbury et al. 2016a). The same technique also allowed an in-depth analysis of the causes and consequences of long-distance movements after individuals arrived in their tropical wintering grounds in northwestern Brazil and surrounding countries (referred to as intra-tropical migration; Stutchbury et al. 2016b). Another example is a recent study that used a combination of EEG sensors, a three-axis accelerometer and a GPS data logger to show that Great Frigatebirds Fregata minor sleep during their long (up to 10 days) foraging flights, although much less and less intensely than when they are sleeping on land (Rattenborg et al. 2016). The study also showed that these flying birds can sleep with both hemispheres simultaneously or unihemispherically, whereby the latter was linked to circling flight. Presumably the birds want to watch where they are going: the more awake side of the brain was opposite the direction of the turn, suggesting that the birds were keeping the eye towards the direction of the turn open.

With the abundance of birds being tagged, and in excited anticipation of the incoming data, are we forgetting the potential harmful effects of our enterprise? I think not. We learn how to carefully handle birds, we follow courses on animal experimentation