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THERMAL RELATIONS

When in 1971 the opportunity came to work on crocodiles, I was particularly interested in doing a field study of their body temperatures and thermal relations. In my mind's eye I saw myself on a rocky escarpment overlooking a Northern Territory billabong watching C. porosus *cavort while I monitored body temperatures using implanted radio-transmitters. It was nearly 20 years before I got that opportunity. Ironically, the enjoyment was vicarious, because the opportunity came in 1989 while helping Frank Seebacher, then a post-graduate student, get set up for just such a study on 'freshies',* C. johnstoni, *at 'The Croc Hole' in the Lynd River in North Queensland. Subsequently, Frank, Lyn Beard and I finally got to look at* C. porosus *living in very naturalistic surroundings in the large breeding lagoon at the Edward River Crocodile Farm on Cape York, Queensland.*

The questions about crocodylian body temperatures and thermal relations that sprang to my mind in 1971 were to do with describing daily and seasonal patterns of body temperature and how much and how well crocs regulate that. I was also particularly interested in the effect of body size on body temperature. Large crocs, because of their greater thermal inertia, would obviously take a longer time to heat and cool than small crocs. Would this cause the core body temperature (Tb) of very large crocs to be high and stable like typical mammals and birds, though for a different reason? The question was particularly provocative because there has always been speculation about the body temperature of dinosaurs. Would crocs be a good model for thinking about dinosaur Tb? Were dinosaurs 'warm blooded'? If they were, could that pattern have accrued without the metabolic heat production typical of birds and mammals: that is, with only reptilian physiology and behaviour, simply as a consequence of being very large? Crocodylians grow to only 1–2 tonnes at most, much less than many of the dinosaurs, but they are the best living model we have. I thought it would be wonderfully interesting to get some data on daily and seasonal patterns of Tb in very large crocs and, in due course, we did.

Introduction: crocodylians are not like other reptiles

'During the four winter months they eat nothing; they are four footed, and live indifferently on land or in the water. The female lays and hatches her eggs ashore, passing the greater portion of the day on dry land, but at night retiring to the river, the water of which is warmer than the night-air and the dew. Of all known animals this is the one which from the smallest size grows to be the greatest, for the egg of the crocodile is but little bigger than that of a goose, and the young crocodile is in proportion to the

A group of American alligators, Alligator mississippiensis, *basking in the winter sun in Everglades National Park, Florida, USA. (Photo DSK)*