

HISTORICAL PERSPECTIVES

The Fighting Behaviour of Marine Iguanas¹

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The Marine Iguana (*Amblyrhynchus cristatus*) is a species endemic to the Galapagos Islands. It lives in large aggregations along the rocky shorelines throughout the archipelago. It is the only iguanid specialized for feeding on marine algae, which they crop at low tide from the exposed rocks or even by diving down to the bottom of the sea.

The animals are extremely gregarious and sometimes hundreds of iguanas bask on the lava rocks in bodily contact with each other. Besides this mutual attraction, however, no specific forms of social interaction like grooming, mutual feeding rituals, etc. are to be observed. This is in striking contrast to the social behaviour of birds and mammals that use such patterns for bond formation. These bond-forming behaviour patterns are mainly derivatives of maternal behaviour, which seem to be preadapted for this purpose. Reptiles lack maternal behaviour and this may in part explain their inability to form a closer bond between adults.

During the breeding season the male Marine Iguanas become territorial. They defend a small area of lava rock against other males, whilst females are allowed to stay. If a male rival approaches the territory, its owner displays. He opens his mouth, nods with the head, and walks stiff-leggedly up and down in front of the rival, showing his lateral aspect. The dorsal crest is erected and the gular regions extended. If the rival answers by the same display, fighting is initiated. The opponents rush at each other. However, in spite of the biting intentions shown during the display, they never bite each other, but instead lower their head and butt. The hornlike scales on the roof of the head interlock and the animals try to push the other away. This can con-

¹ Adapted from the original publication in the *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, Vol. 251, No. 772, A Discussion on Ritualization of Behaviour in Animals and Man (29 December 1966), pp. 475–476.



The threat display of a Marine Iguana (*Amblyrhynchus cristatus*).

tinue for a while, with pauses in between, during which the opponents display frontally. The struggle ends when one of the rivals is pushed from the rock or when he gives up by assuming a submissive posture (lying flat on his belly). The winner then stops fighting and waits in threat display for the rival to leave. The fight is a highly ritualized tournament in the course of which the stronger wins, without hurting the loser.

Only if one introduces a male artificially into the territory of another male, can damaging fights be observed. Then the territory owner rushes at the introduced individual, which does not show the introductory ceremonies that normally release ritualized fighting. The introduced individual is bitten as a consequence.

Females fight in some places of the archipelago for the rare egg-laying sites. In contrast to the males, their fighting is far less ritualized. It begins with threat display and head-pushing, but soon they bite and shake each other viciously. They have less developed hornlike scales than the males.

Ritualized fighting is fairly widespread in animals that are capable of inflicting serious damage to conspecifics. Poisonous snakes never bite each other, but the rivals wrestle according to the fixed rules. Cichlid fishes have developed various forms of mouthfighting, and thus avoid mutual damage. In a number of

species (e.g., in wolves), fighting starts as a damaging fight, but ends by a submissive posture of the loser, which inhibits further aggression (Lorenz 1963). The existence of ritualized combats shows clearly that the killing of a conspecific is generally avoided in vertebrates. Only animals without weapons or animals that can easily retreat after the exchange of bites have no such social inhibitions. This is, for example, true for the hamster (*Cricetus cricetus*), where the loser has no difficulty in running away. The winner never follows far. In captivity, species of this type often kill each other. From the fact that ritualized fighting occurs, we can learn furthermore that strong selection favors aggression. Otherwise aggression would have been counterselected in species that can do damage to conspecifics. However, they developed the most complicated fighting techniques instead, in order to permit fighting, as a mechanism for spacing-out (Eibl-Eibesfeldt 1951, 1961).

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The Booming Lizard of Australia¹

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In July, 1913, I was hunting in the Cove's River Ranges with two companions—Andrew and John Duncan, of Megalong. We found a black-and-yellow banded monitor lizard about five feet long concealed in a crevice on the face of a wall. We had no intention of injuring him, but out of mischief Andrew Duncan suggested that we should make him yell. I was sceptical, but both men assured me that the lizard could, and would yell under persuasion. On condition that there should be no cruelty, I consented to a demonstration. They laughed at the idea of cruelty. Andrew picked up a stick and began poking the reptile in the ribs and tickling him under the arm. It stood it for a while, merely squirming closer down in the crevice, then, having had enough of it, blew himself out and emitted a most comically doleful bellow that could be heard several hundred yards away. This he did repeatedly until we had laughed ourselves tired. It was funny, on looking back after we had gone fifty yards, to see the lizard stick his head around the corner to make sure that we had really departed.

I have had for the last four years at my hunting-box on the Naltai River, a tame monitor whom I have called "Joseph" on account of his coat of many colors, and who is the interesting

companion of my solitude and incidentally keeps the snakes away. With the above in my mind, I experimented on him. I found him camped under the bench beneath the window, and irritated him with the end of a stick. He did as the other had done — filled himself with wind and then emitted it in a prolonged bellowing groan. By the way, our "bookbook owl" does much the same thing. He fills himself nearly to bursting in a succession of gasps, and then says "Hoo-hoo-hoo" till he has no more breath, then fills up again.



"Black-and-yellow banded monitors" (= Lace Monitors, *Varanus varius*) can be loudly vocal when disturbed.

¹ Originally published in *Science* 52: 273 (1920).