TOXICOLOGY FOR AUSTRALIAN VETERINARIANS

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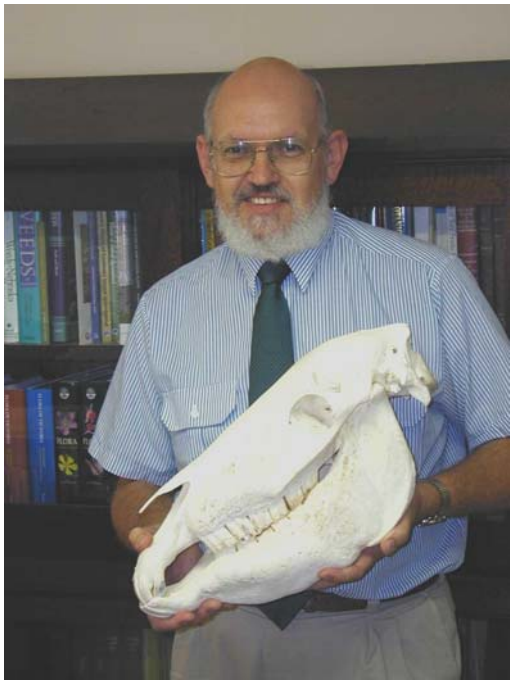

Dedication

To all my students, past and present, who helped me through their questions and comments to refine this work into something that may be useful

and

In memory of **Charles Darwin** (1809-1882),
naturalist, scientist and author of *On the Origin of Species by means of Natural Selection*, who first showed us the scientific way to understanding major biological phenomena

"It is interesting to contemplate an entangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependant on each other in so complex a manner, have all been produced by laws acting around us. These laws, taken in the largest sense, being Growth with Reproduction; inheritance which is almost implied by reproduction; Variability from the indirect and direct action of the external conditions of life, and from use and disuse; a Ratio of Increase so high as to lead to a Struggle for Life, and as a consequence to Natural Selection, entailing Divergence of Character and the Extinction of less-improved forms. Thus, from the war of nature, from famine and death, the most exalted object which we are capable of conceiving, namely, the production of the higher animals, directly follows. There is grandeur in this view of life, with its several powers, having been originally breathed into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed laws of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved." [Final paragraph from Charles Darwin (1859) *On the Origin of Species by means of Natural Selection or The Preservation of Favoured Races in the Struggle for Life.* John Murray, London.]

Nullius addictus jurare in verba magistri (I am not bound to swear allegiance to the words of any master) [*Epistles* I, i, 14. Horace (Quintus Horatius Flaccus) (65 - 8 BC)]

I beseech you, in the bowels of Christ, think it possible you may be mistaken. [Letter to the General Assembly of the Church of Scotland, 3 August 1650. Oliver Cromwell (1599 - 1658).]

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Introduction

I have written this work to support the learning of clinical toxicology by veterinary students and their subsequent practice of veterinary science in Australia. It grew from my teaching of toxicology to veterinary students at the University of Queensland School of Veterinary Science since 1994, from my curatorship of the Queensland Department of Primary Industries Natural Toxins Database since 1982 and from my ongoing interest in toxicology originating in the teaching of Alan Seawright and Selwyn Everist at the University of Queensland in 1970.

This is a "work in progress" and I am revising and expanding it as new data come to hand and as other commitments permit. In particular, I plan to include illustrations of the chemical structures of toxins and distribution maps of toxin sources in future editions. I do not claim this work to be error-free or comprehensive in coverage of topics, but I do strive to achieve these goals. If you find errors or omissions, I will be most grateful if you would inform me of them so that I may correct or improve the work for such further editions as may be produced. This edition retains the basic structure of lecture notes, and for the most part has the abbreviated nature of such notes. I have begun expanding these into conventional text, but the completion of this task must await future editions.

This edition does contain some information on envenomations, but lacks serious coverage of snake or *Ixodes* tick envenomations, as these major topics have so far fallen outside the scope of the course that I teach at UQ. I aim to include them in a future edition.

I have not provided an index. You can locate topics of interest quickly by using the search facilities of the software.

Emphasis is indicated within the text by the use of various devices, namely

- **Core data** ("need to know" information) are given at the head of each major topic to help focus readers' attention and students' study efforts.
- **Intoxications requiring emergency intervention by the attending veterinarian** are indicated by the symbol 💣.
- Major topics of importance in Australia are indicated by the symbol ☑.
- The plants, fungi or toxins whose names are given in **bold** type are those considered the most important
- Details of treatment protocols and dose rates are given in sections separate from the main text