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# **A taxonomic revision of the Giant Long-necked Terrapin, *Chelodina expansa* Gray, 1857 species complex and related matters of taxonomy and nomenclature.**

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## **ABSTRACT**

Within Australian herpetological circles, the freshwater terrapins assigned to the species *Chelodina expansa* Gray, 1857 have for decades been regarded as comprising more than one species.

Morphological and molecular studies have largely resolved the issues regarding consistent differences between populations, as well as species boundaries in terms of geographical barriers.

The nominate form occurs in the Murray/Darling River system. Two other forms, one sufficiently divergent to be treated as a separate species, the other as a subspecies of *C. expansa* are found in South-east Queensland.

None of the regional forms have been taxonomically recognized to date.

Noting that the unnamed species and the unnamed subspecies both occur in south-east Queensland, a region of strong human population growth, massive ongoing environmental degradation and anti-wildlife governments, it is important that these two taxa be formally recognized as a first step towards ensuring the long-term protection of the relevant species and subspecies.

This paper formally names each of these taxa and also places the trio (*C. expansa*, *C. duboisi* sp. nov. and *C. expansa brisbaneensis* subsp. nov.) into a new subgenus *Supremechelys* subgen. nov..

In order to correct persistent nomenclatural errors recklessly created by pseudo-scientist Scott Thomson (formerly of Canberra, Australia), the following actions are made:

1/ *Chelodina canni* McCord and Thomson, 2002 is formally made synonymous with *Chelodina rankini* Wells and Wellington, 1985. This is on the basis that the claim by McCord and Thomson, 2002 that the Wells and Wellington name was *nomen nudem* is patently false. The falsity of the claim is demonstrated herein by simple cross-referencing of the text from the 1985 paper of Wells and Wellington with the current edition of the Zoological Code which defines *nomen nudem* and as a result shows this is not the case for the 1985 description.

2/ Likewise *Myuchelys* Thomson and Georges (2009) is an unethically coined name that is a junior synonym of *Wollumbinia* Wells, 2007.

**Keywords:** Terrapin; Tortoise; Turtle; Queensland; Australia; *Chelodina*; *Macrochelodina*; *Macrodiemys*; *Wollumbinia*; *Myuchelys*; *expansa*; *longicollis*; new subgenus; *Supremechelys*; new species; *duboisi*; new subspecies; *brisbaneensis*; Cann; Wells; Wellington; Kaiser; Wüster; Thomson; Georges; McCord; Dubois; *rankini*; *canni*; *nomen nudem*.

## **INTRODUCTION**

The description of living reptiles with shells in layman's language has been fraught with conflict.

Authors have used the terms turtle and tortoise almost interchangeably, with or without justification. The term terrapin has generally been consistently used to describe freshwater species that are mainly aquatic and have webbed feet.

As a matter of precision I prefer to divide all living reptiles (itself not a monophyletic group) within order Testudines, as follows:

Possession of flippers means a turtle.

Possession of webbed feet means a terrapin.

Possession of feet without webbing is a tortoise.

For those who do not recognize terrapin as a valid term (noting it has often been applied to one or two species only), the most common variant is to define anything with claws as a tortoise.

In light of the above, I therefore prefer to define all the Australian species with webbed feet and claws as terrapins.

The largest long-necked species of terrapin within Australia is

the well-known species from south-east Australia, first scientifically described as *Chelodina expansa* Gray, 1857.

The distribution of the taxon as generally recognized is the Murray/Darling river system, which occupies a huge area including most of the inland areas of Victoria, NSW, and southern Queensland and including a small part of south-east South Australia.

However specimens assigned to this species have been less commonly found in coastal regions of south-east Queensland as well.

As to exactly when herpetologists first became aware that the specimens from coastal Queensland were different to those from inland areas isn't known. However I first became aware of the fact in 1977.

That year (at age 15), I visited Peter Richardson, then owner of the Dreamtime Reptile Park on the edge of Bundaberg township, Queensland, Australia. He gave me the smallest of his three "*Chelodina expansa*" to take back to Sydney, New South Wales, where I kept it for many years.

Earlier that year, another herpetologist local to myself at St. Ives in New South Wales, Robert Croft, had shown me specimens of *C. expansa* he had found crossing roads near Moonee in south-west Queensland (Weir River system).

These animals, assumed to be the typical form of the species differed from the Bundaberg animals in having a broader, lighter coloured shell and different plastron colouration.

At the time I received my Burnett River (Bundaberg) animal from Peter Richardson, he mentioned to me that the coastal Queensland animals (from his area at least) were significantly different from the inland animals and it appeared to be common knowledge at the time.

In 1983 and again in 1985, Wells and Wellington (both of outer Sydney, NSW) published two major papers, the second of greatest significance, in combination describing numerous taxa of Australian freshwater terrapin, at both genus and species level (Wells and Wellington 1983, 1985).

Relying on significant data published by his colleague John Cann (also of Sydney) in his major book published in 1998 (Cann 1998), as well as his own extensive experience with relevant taxa, Wells (2007, 2009) named further terrapin taxa in the following decade.

Cann and others also described other Australian species in the twenty years to year 2014, meaning that most obvious species of Australian freshwater terrapin had in fact been properly named and assigned at both genus, subgenus and species level.

Throwing a spanner in the works was a renegade taxonomist Scott Thomson, perhaps better described as a pseudo-scientist who repeatedly sought to rename species and genera first named by Richard Wells and Ross Wellington.

This was in direct breach of the rules of the Zoological Code and in total contempt for the authority of the ICZN (Wells 2014a).

Thomson first sought to rename *Chelodina rankini* Wells and Wellington, 1985 with his own coined name in a paper he co-authored with Bill McCord in 2002. Then with friend Arthur Georges, (Thomson and Georges 2009) he recklessly renamed a number of Wells taxa, including the genus *Wollumbinia* Wells, 2007 by falsely alleging Wells' descriptions had not been published according to Article 8 of the Zoological Code (Ride *et al.* 1999), using a dishonest method later described by Eipper (2014) as the Kaiser veto.

The false claims against Wells and Wellington (1985) and Wells (2007) were repeated by Georges and Thomson (2010).

The nomenclature of Thomson and Georges and McCord and Thomson has been actively promoted by these men and others in the so-called Wüster gang (e.g. Kaiser 2012a, 2012b, 2013, 2014a, 2014b; Kaiser *et al.* 2013; Naish 2013), also identifying themselves as the "truth haters", resulting in a destabilizing dual

nomenclature for many species.

When McCord sought to distance himself from Thomson's unethical activities in the period preceding year 2012, McCord's works and names of taxa first proposed by him were added to the Wüster gang's hit list of names to be overwritten by the group (Kaiser 2012a, 2012b).

McCord took legal action against Kaiser personally in late 2012, the result being that the Wüster gang agreed to drop their attempts to overwrite his names and taxa.

Hence without explanation for their reversal, the Wüster gang deleted from the Kaiser *et al.* hit list as published in 2013 (Kaiser *et al.* 2013) all references to McCord and his names they had sought to over-write.

This effectively meant that as of mid 2014, the only known way to stop the unethical actions of the Wüster gang is via money and lawyers and not through any sensible scientific discourse.

Cogger (2014), sticking to the Zoological Code (Ride *et al.* 2014), condemned the reckless destabilizing actions of Scott Thomson and the rest of the Wüster gang, correctly using the Wells names (e.g. *Wollumbinia*).

However Cogger clearly made one nomenclatural error in his book by failing to check a claim made by McCord and Thomson (2002) with the primary literature, this being Wells and Wellington (1985) and Ride *et al.* (1999) (see below).

While both Thomson and Georges have done some valuable work on Australian freshwater terrapins in the period to 2009, all that work has been greatly overshadowed by their reckless misuse of and breach of the nomenclatural rules within the Zoological Code to try to steal the earlier work of Richard Wells.

I have worked with all known species of Australian testudines at one time or other and keep a number of them at my facility as of 2014. I first kept various species of Australian testudines more than 40 years prior and had hands on experience with them continuously ever since, as shown for example in Hoser (1989).

Notwithstanding this, my taxonomic interests have usually been elsewhere and I am only formally describing the species and subspecies within this paper simply because no one else has.

When I checked with all the people I thought likely to be interested in naming the relevant taxa, none said they intended doing so in the near future and all advised me to do so. Noting the conservation aspects in terms of the relevant species I have also made a judgement call to name these species sooner rather than later. Hence this paper!

I should also mention that most of my data and relevant material on the *Chelodina expansa* species complex was stolen from my facility in three unlawful raids by Australian police and wildlife officers, the first being on 8 May 1981 (see Hoser 1993 and 1996), the second on 14 February 1994 (see Hoser 1994, 1996, 1999a, 1999b) and the third on 17 August 2011.

Each were a direct result of myself disclosing corruption involving government officials here in Australia and their reprisals for this, the most recent raid being planned in response to the publication of Hoser (2010) and unlawful agitation by the Wüster gang and business rivals (e.g. Hunter *et al.* 2006).

The extreme damage to the science and conservation of Australian wildlife as a result of these actions has been immense and any deficiencies in papers postdating these raids is a direct result of this.

I note also that I have taken the preferable route of publishing in the face of these obstacles, rather than putting species at risk by doing nothing.

Cann (1998) in his definitive book on Australian testudines not only provided detailed information about the holotype specimen of *C. expansa*, clearly of the Murray/Darling form, but he also provided extensive information about the specimens from the coastal part of Queensland, including the form described herein as a new species.

Certainly he provided sufficient information within his book that

could easily be worked into a description not only of the relevant species named herein, but also the subgenus defined herein as well.

Prior to the publication of that book, I was fortunate enough to visit the facilities of Cann at La Peruse in Sydney's south (in New South Wales, Australia) and that of Craig Latta of Caringbah, southern Sydney, New South Wales, Australia, both of whom had extensive collections of terrapins, including *C. expansa sensu lato*, (and both eastern and western specimens at a single site) as well as the facilities of other enthusiasts such as Darren Green, then of Bendigo, rural Victoria (Australia), who between them had living specimens of all known regional variants of *C. expansa sensu lato*.

Numerous photos taken of relevant specimens, along with associated records, were stolen in the illegal armed raid of 17 August 2011, never returned and are therefore not available to be published herein.

Cann (1998) on page 81, also published excellent photos of the holotype specimen of *C. expansa* Gray, 1856 in the British Museum, which clearly shows the specimen as being of the Murray/Darling form.

I mention this because a number of correspondents, including Wüster via Yanega (2014) have made a lot of noise about myself not necessarily physically inspecting relevant holotypes prior to publishing some of my taxonomic works.

However what these people have failed to note is that if and when these specimens have been properly examined by others and good quality data on them is available, as seen in Cann (1998), the need for me to hold the specimen in my hot little hands in order to claim to have "inspected" them is in fact redundant.

Therefore, I make no apologies for not personally accessing the jar or polydrum with the holotype of *C. expansa* before publishing this paper.

In terms of the south-east Queensland animals (from coastal regions) the specimens within museums (notably the Queensland Museum in Brisbane, where relevant specimens were viewed briefly in 2001) in common with preserved specimens everywhere tend to be faded, discoloured, stiff and pose problems for a good methodical inspection.

Fortunately I have had good access to live specimens over many years from many people in various parts of Australia and some of these people who gave me unfettered access to their live specimens are acknowledged herein.

These are Robert Croft (formerly of St. Ives, NSW), Bill Saunderson (formerly of St. Ives, NSW), Peter Richardson (Bundaberg, NSW), John Cann (of La Peruse, NSW), Darren Green (formerly of Bendigo, Victoria) and Craig Latta (formerly of Caringbah, NSW).

Many others, especially within Victoria over the last 20 years have provided me with access to specimens of *C. expansa sensu lato* and other Australian terrapins, however they are too numerous to mention or even recall here.

I have also inspected live wild caught specimens at the following locations, Brisbane (Queensland) at various locations within a 50 km radius of the CBD, Moonie in south-west Queensland, Bourke, NSW, Tocumwal, Victoria, Swan Hill, Victoria, Mildura, Victoria, and a sizeable sample from 50 km south-east of Shepparton, Victoria (Goulburn River) at the Tabilk Winery, the majority from the preceding locations not actually being caught by myself.

*C. expansa sensu lato* has posed problems in terms of scientific study because of their relatively low population densities in the wild state and the general difficulty in finding and catching them, as compared to most other species of Australian freshwater terrapin.

The species is a bottom dweller of large water bodies such as big rivers and associated deep billabongs.

The species is typically an ambush predator, most commonly seen in muddy waters and hence doesn't lend itself to being caught by casual observers.

By way of example, in a ten year period, Peter Richardson had just three specimens brought to him at his Bundaberg Reptile Park, versus many dozens of each of the other locally occurring terrapin species.

Experienced collectors seeking the species have usually been able to obtain specimens by means of traps and nets, which I also found to be the best method of catching them in large slow-flowing watercourses.

In rare situations where they live in clear waters, such as on Fraser Island, Queensland, the species is best found by diving.

In early 2014, Hodges *et al.* published a paper that did a range-wide examination of the mitochondrial phylogeographical structure for *C. expansa sensu lato*.

Not surprisingly their results corroborated the physical data of Cann (1998).

I mention this in view of the fact that a lot of herpetologists at the current time (2014) seem to have this idea that in the absence of molecular data, one should not engage in reptile taxonomy of any form.

I reject this on the basis that more often than not, one can arrive at the same relevant position and conclusions by simply looking at the physical evidence. Molecular data does in fact usually merely reflect this.

The individuals within the species themselves know who is who in the zoo, so to speak and do not rely on molecular data before deciding who to breed with!

In summary, Hodges *et al.* (2014) merely confirmed what has already been known for decades.

However in the face of the molecular data presented by Hodges *et al.* and the physical data presented by Cann (1998) it is remiss not to taxonomically recognize the relevant taxa within the *C. expansa* species complex.

Hence within this paper, I merely state the obvious by formally defining and naming the relevant taxa.

In common with a number of aquatic species, *C. expansa sensu lato* appears to have struck a physical barrier in the form of the Conondale Range in south-east Queensland. The specimens found north of there (Mary River drainage and north) are substantially different to those from south of there, including both coastal and inland animals (those west of the Great Dividing Range).

It is those north of the Mary River drainage that are hereby assigned to a newly named species.

The specimens south of the Conondale Range (from coastal drainages of south-east Queensland) while similar to those from the Murray Darling basin, are sufficiently divergent as to warrant being recognized as a subspecies and these too are formally named for the first time.

Hodges *et al.* further provide a molecular basis for this action, finding the northern population to be divergent from the rest by 4.2 million years and the other two populations to have diverged from one another about 1.1 million years ago. Based on these numbers alone the correct designation for the two groups are as species (for the more divergent group) and as subspecies for each other in terms of the two remaining groups.

I also note that the (until now) unnamed species and an unnamed subspecies both occur in south-east Queensland, a region of strong human population growth, massive ongoing environmental degradation and anti-wildlife governments.

In line with Hoser (1991) and Engstrom *et al.* (2002), I note that it is therefore essential that these two taxa be formally recognized as a first step towards ensuring the long-term protection of the relevant species and subspecies.

Engstrom *et al.* (2002) wrote: "The documentation of this

diversity must be seen as an activity that is done not just for posterity but for immediate action and protection.”

This paper formally names each of these taxa and also places the trio (*C. expansa*, *C. duboisi* sp. nov. and *C. brisbaneensis* subsp. nov.) into a new subgenus *Supremechelys* subgen. nov. In terms of the subgenus formally named for the first time, an explanation is in order.

All Australian long-necked terrapins were until 1985 placed in a single genus *Chelodina*.

Wells and Wellington (1985) created *Macrochelodina* as a genus for the so-called “*Chelodina rugosa*” group (the wide-ranging northern species formerly known as *C. rugosa* has recently been shown to in fact be *C. oblonga* as noted by Cogger 2014).

In the 1980's and 1990's there was a strong and unscientific campaign to suppress and black-ban usage of all Wells and Wellington names, that is effectively no different to the campaign being waged by Kaiser *et al.* (2013) now.

This was by pseudo-scientists who sought to steal the works of other scientists and later coin their own names for the very same taxa.

Ultimately this campaign failed and zoologists revisited the original works of Wells and Wellington and used their names as appropriate.

There seems to be no doubt at all that *Macrochelodina* as defined by Wells and Wellington should be recognized as a separate genus (within the ambit of a tribe or similar), but until recently few if any authors used the name *Macrochelodina* in any context at all.

However the ultra-conservative Hal Cogger in Cogger (2014) used *Macrochelodina* as a subgenus to include *C. oblonga* (as now recognized) and others in this species group.

He also used the subgeneric name *Macrodiremys* McCord and Joseph-Ouni (2007), (proposed by the men as a genus in 2007) as intended by the pair for what they had thought at the time was *C. oblonga*, (but was in fact *C. colliei* Gray, 1856).

There is a genuine likelihood that the name *Macrodiremys* as proposed may therefore be a junior synonym of *Macrochelodina* by strict interpretation of the 1999 (starting year 2000) Zoological Code.

However it would not be ethical for me to rename the genus (or subgenus) with a view to scooping name rights of the original authors. This is especially in light of the fact that Cogger (2014) has used the name *Macrodiremys* as intended by the original authors.

As I have said many times in the past: It is not important who names the animals, but rather that the animals are named correctly.

Having said this, I strongly urge the authors McCord and Joseph-Ouni to publish a new paper sorting out nomenclatural issues in terms of their name *Macrodiremys* so as to properly remove any doubts as to the applicability of the name to the relevant taxon, not just for their sake, but for the benefit of taxonomists and users of the nomenclature in years to come.

There is also little doubt that the *Chelodina expansa* species complex is also closely associated with the type species of *Macrochelodina* as originally defined by Wells and Wellington in 1985, which clearly explains why the taxon has been placed in the genus or subgenus as variously defined ever since.

All species share a similar breeding biology in sharp contrast with the other two groups (*Chelodina* and *Macrodiremys* as variously defined) and are separated from the other groups by the fact that the carapace is approximately oval; the plastron is of moderate length and less than twice as long as wide when measured anterior to the bridge.

However it is clear that the *expansa* species complex is sufficiently divergent to the *C. oblonga* (formerly *rugosa*) species complex (see treatment by Cogger 2014) as to warrant taxonomic recognition at the subgenus level at least.

With species inside the *C. expansa* species complex having diverged at over 4 million years and the significant and consistent differences between these animals and all within the *C. oblonga* group, it is likely that the relevant groups diverged in excess of 10 million years ago.

However, in the absence of robust calibrated molecular data, such a conclusion cannot definitively be made.

Notwithstanding this uncertainty, the molecular data provided by Hodges *et al.* (2014) is sufficient to assign the *C. expansa* group to its own subgenus.

This is therefore done herein. The subgenus *Supremechelys* subgen. nov. is named such in recognition of the larger (superior) size of the species in this group, as opposed to the sizes of all other living Australasian *Chelodina* species.

The name is also assigned noting the names of the other subgenera includes both *Chelodina* and the larger *Macrochelodina*, this being a group that includes smaller species than *Supremechelys* subgen. nov.

#### OTHER ETYMOLOGIES AND NOMENCLATURAL MATTERS

John Cann has spent a lifetime working with Australian testudines and his contribution in this regard is unmatched. He is known as Australia's “turtle man”, although I note that in the 1970's he referred to these animals as “Freshwater Tortoises” (Cann 1978), later taking on the American name “Turtles” for the same animals in his 1998 book (Cann 1998).

In light of all this, my normal instinct would be to name the new species in his honour. However a number of Australian reptile species have already been named after him, including for example *Chelodina canni* McCord and Thomson, 2002.

Therefore to name yet another species in his honour, even by varying the patronym, would cause confusion and potential instability in terms of the application of the rules and recommendations of the code of zoological nomenclature.

Notwithstanding the preceding, I should note that *Chelodina canni* McCord and Thomson, 2002 (McCord and Thomson, 2002) is without doubt a junior synonym for *C. rankini* Wells and Wellington 1985.

McCord and Thomson (2002) and the same authors since have widely promulgated the false claim that the Wells and Wellington (1985) name is *nomen nudem* according to the Zoological Codes in force as of the time of the original 1985 paper was published and/or since.

However a reading of the hard copy original of the Wells and Wellington (1985) paper clearly shows the claim of McCord and Thomson to be false and usage of the name *Chelodina canni* McCord and Thomson 2002 by others including Cogger (2014) to be in error and in direct breach of the Zoological Code's rules.

*Nomen nudem* is defined in the 2000 Zoological Code (Ride *et al.* 1999) as:

“*nomen nudum* (pl. *nomina nuda*), n.

A Latin term referring to a name that, if published before 1931, fails to conform to Article 12; or, if published after 1930, fails to conform to Article 13. A *nomen nudum* is not an available name, and therefore the same name may be made available later for the same or a different concept; in such a case it would take authorship and date [Arts. 50, 21] from that act of establishment, not from any earlier publication as a *nomen nudum*.”

The relevant parts of Article 13 of the Zoological Code reads as follows:

“13.1. Requirements. To be available, every new name published after 1930 must satisfy the provisions of Article 11 and must

13.1.1. be accompanied by a description or definition that states in words characters that are purported to differentiate the taxon, or

13.1.2. be accompanied by a bibliographic reference to such a published statement, even if the statement is contained in a work published before 1758, or in one that is not consistently

binominal, or in one that has been suppressed by the Commission (unless the Commission has ruled that the work is to be treated as not having been published [Art. 8.7]).” In order to confirm the obvious fact that the Wells and Wellington description of *Chelodina rankini* is in fact code compliant and definitely not *nomen nudum*, I hereby copy the entire text of their description from page 8 of their 1985 paper below:

“*Chelodina rankini* sp. nov.

Holotype: British Museum (Nat. Hist.) 1908.2.25.1 from the Lower Burdekin River, north east Queensland.

Diagnosis: A comprehensive description of this species is found in Cann, (1978) where it is regarded as *Chelodina novaeguineae*. *Chelodina novaeguineae* is the closest relative of *Chelodina rankini* but the former is confined to the island of New Guinea. *Chelodina rankini* is distributed along the north-east coast of Australia from Cape York Peninsula to just south of Townsville, Qld. Cann (1978) gives an excellent account of the distribution and general biology of *Chelodina rankini* (as *Chelodina novaeguineae*) and provides colour illustrations (Plate 16) of a juvenile from Edith River, Cape York Peninsula, as well as a juvenile from Herbert River, Queensland (Plate 18), and an adult (Plate 19) from Greta Creek, Queensland. A juvenile *Chelodina novaeguineae* is figured by Cann (1978: Plate 17) also. This should be compared with Plate 69 of Cogger (1983) being of *Chelodina novaeguineae* and Plates 399-400 showing what is here regarded as *Chelodina rankini*. Whitaker, Whitaker and Mills (1982:10) figures a specimen of *C. novaeguineae*. Morphological data on *Chelodina rankini* (as *Chelodina novaeguineae*) is also provided by Cogger (1983:142). Goode (1967:32) provides morphological comparisons between *Chelodina novaeguineae* from Katow River, New Guinea and *Chelodina rankini* (cited as *Chelodina novaeguineae*) from the Lower Burdekin River, N. E. Queensland (Brit. Mus. No. 1908.2.25.1). Goode (1967: Plate 22) also published an illustration of what is herein regarded as *Chelodina rankini* from Townsville, Queensland. We also take this opportunity to designate as Lectotype of *Chelodina novaeguineae*, BMNH 1946.1.22.36, from Mawatta, Binaturi River (as Katow), Papua New Guinea.”

While no etymology is given, it is evident from other writings of Wells and Wellington, that the taxon was named in honour of Sydney, Australia based herpetologist Peter Rankin.

Of significance however in terms of the deliberate over-writing of the valid name *C. rankini* Wells and Wellington with *C. canni*, is that McCord and Thomson (2002) and by their actions since have acted in defiance and contempt of the rules of zoological nomenclature.

They have recklessly created ongoing instability and confusion by recklessly peddling their invalidly coined name and through their demonstrably false claims against the Wells and Wellington paper. That McCord and Thomson (2002) did this in order to steal the work of Wells and Wellington for their own self-gratification is without doubt.

What is even more disturbing is how in this age of internet, Wikipedia pages (regularly edited by Thomson and others in the Wüster gang) and other pseudo-experts, how easy it has become for lies that destabilize the zoological nomenclature to be peddled with a high degree of success via online and associated means.

Through the reckless determination of Scott Thomson in particular the junior synonym *C. canni* has moved into widespread usage and even among those aware of the Wells and Wellington name from 1985, most erroneously believe that the Wells and Wellington name was in fact a *nomen nudum*!

The reason?

None of these people bothered to consult the primary literature!

This says something about the scientific method employed by a number of so-called scientists, including in the case of Cogger

(2014), who appears to have accepted the statement of Thomson and McCord (2002) without bothering to check the primary literature.

In my case, I saw the (2002) claim the Wells and Wellington name was a *nomen nudum* and then rather than uncritically accepting and believing it, I checked the two relevant documents, these being the Wells and Wellington (1985) paper and the Zoological Code (Ride *et al.* 1999) as well as the two relevant earlier editions of the Zoological Code.

In doing so I found the claim false and it is an indictment of many (so called) herpetologists that few others have followed this simple scientific exercise!

In passing I must also mention that *Myuchelys* Thomson and Georges, 2009 is an unethically coined name by Thomson and Georges (2009) that is a junior synonym of *Wollumbinia* Wells, 2007. Thus the name *Myuchelys* should never be used, as it was recklessly coined in breach of the rules of the Zoological Code.

I note herein that Thomson has therefore repeatedly engaged in acts of “taxonomic vandalism”, this being defined herein as “the reckless creation of junior synonyms for established taxa in direct breach of the rules of the Zoological Code”.

The next two people whom I’d seek to honour by naming an Australian testudine in honour of would (not coincidentally) be Richard Wells and Cliff Ross Wellington. Both have been grossly underestimated by other herpetologists and while their works have not been perfect, they have been very unfairly maligned by the majority of supposedly professional herpetologists within Australia in the 20 years post dating their big papers of 1983 and 1985.

One need look no further than McCord and Thomson (2002) to get an idea of the sort of treatment Wells and Wellington have had from their “peers” in the decades following their 1985 publication.

Furthermore, I could cite many similar such cases of fraudulent claims and actions by others with respect to Wells and Wellington’s papers and names properly proposed by them (e.g. Reynolds *et al.* 2013a, 2013b, 2014).

However, I have already named numerous taxa in honour of both Wells and Wellington (and quite appropriately so I might add), and in recognition of (false) claims by the Wüster gang that I am using patronyms as some kind of uncritical acceptance of the work of these two men, I shall refrain from naming either of these taxa in their honour.

I should also mention that I regularly disagree with taxonomic views and publications of Wells and Wellington, but due to the agenda of Wüster *et al.*, these disagreements are rarely mentioned.

However where the rules of science dictate their names be used, I will not stoop to the level of Thomson, Reynolds *et al.* and others in the Wüster gang to steal their work for the purposes of taking “name rights” over taxa. Instead I treat the two men and their work no different to that of any other publishing taxon-naming scientists.

The species formally named in this paper is named in honour of Dr Alain Dubois, who in 2014 was working at Muséum National d’Histoire Naturelle, Department of Systematics and Evolution, in Paris, France.

This is in recognition for his defence of the zoological code (Ride *et al.* 1999) and previous versions of the same document from taxonomic vandalism by others who set to operate outside of the code and use their own coined names in favour of properly proposed scientific names.

Dubois publicly supported the works of Wells and Wellington (1983 and 1985) in the face of unwarranted attacks from others who sought to steal the work of these authors and put their own coined names on the taxa first scientifically described by Wells and Wellington (Dubois *et al.* 1988).

More recently, he defended the code from similar actions by others and highlighted improper actions within the ICZN secretariat by people who had apparently hijacked the organisation to further their own unscientific, code violating activities (Dubois 2005).

In 2014, Dubois came out in support of myself against the reckless and unwarranted attacks by the Wüster gang, as stated via the documents Kaiser (2012a, 2012b, 2013, 2014a, 2014b) and Kaiser *et al.* (2013), (Dubois 2014).

I have no hesitation in having etymologies for species in honour of people who have made significant and lasting contributions to science and in this case the actions of Alain Dubois are clearly worthy of such recognition.

Furthermore an etymology for the new species relying on physical traits of the animal will invariably lead to confusion with the better-known *C. expansa* and so I reject this idea for this taxon.

In terms of the subspecies from south-east Queensland, I have chosen to give the taxon a geographical-based name.

Within Australian species of terrapin, geographical-based names have been rarely used and so there is little prospect of confusion regarding this taxon. Furthermore, the subspecies has a very restricted distribution, being found exclusively within a few hours drive of Queensland's largest city, Brisbane, making the name *brisbaneensis* perfectly suited.

Furthermore, noting that the subspecies is easily the largest and most distinctive freshwater species from the Brisbane area, the name will be easily remembered by lay people and therefore be easier for them to identify and recognize from a conservation perspective.

#### **THEFT OF MATERIALS TO IMPEDE SCIENCE AND WILDLIFE CONSERVATION.**

I also note the following: In 2006 an online petition sponsored by a group of animal-hating pseudo-scientists including Wolfgang Wüster, Mark O'Shea, David John Williams, Bryan Fry and others posted at: <http://www.aussiereptileclassifieds.com/phpPETITION> (Hunter *et al.* 2006) called for my successful wildlife education business (Snakebusters®) and all my other herpetological activity to be shut down by the government of Victoria, Australia.

These men were successful in that after a ruthless five-year campaign, on 17 August 2011, 11 heavily armed police and wildlife officers conducted a highly illegal and violent raid on our family home and research facility. The raid was also a reprisal for several publications I had made that were highly critical of corruption involving the relevant people (e.g. Hoser 1993, 1996, 2010).

Myself, my wife and two vulnerable young daughters were arrested at gunpoint and held captive in the kitchen of the house for nine hours while the facility was ransacked. Besides the unspeakable acts of killing captive snakes and criminal damage to cages and household goods, the raiding officers illegally shut down our business and effectively placed myself under house arrest at gunpoint for some months after the raid.

An application by myself to the Supreme Court of Victoria led to the re-opening of our unlawfully shut down wildlife education business, although much of the damage to the business and our reputation built up over more than 4 decades was irreparable.

Of greater relevance here is that at the time of the raid, research files spanning more than 40 years were taken and never returned, including materials and records relevant to this paper.

Material taken included all the computers, disks, hard drives, backups, cameras, scientific literature and other forms of information and information storage at the facility. All were loaded into the back of a truck and trailer and carted off.

Faced with the dilemma of deciding whether to spend another forty years gathering data, by which time I may be dead from old age, being aged 52 as of 2014, or publishing the relevant paper/s with minimal data, I have opted to publish.

Underlying this motivation has been an increasing concern that a delay to formally identify and name undescribed biodiversity may lead to its extinction before another scientist gets around to the matter.

Engstrom *et al.* (2002) wrote: "The documentation of this diversity must be seen as an activity that is done not just for posterity but for immediate action and protection."

A number of authors including Kaiser (2012a, 2012b, 2013, 2014a and 2014b), Kaiser *et al.* (2013), Naish (2013) and Wüster *et al.* (2014), all part of the group of people effectively controlled by Wolfgang Wüster of Wales, UK, have been highly critical of the fact that I have assigned names to unnamed clades of snakes and more recently for other reptiles. Their unscientific and childish attacks, continued incessantly on social media such as Facebook and Twitter are rejected herein as destabilizing the nomenclature, impeding the progress of science and in some cases putting people's lives at risk.

Their ridiculous comments and false and defamatory statements are systematically rebutted by Hoser (2013), as well as Cogger (2013, 2014), Dubois (2014), Eipper (2013), Mutton (2014a, 2014b), Shea (2013a-d), Thorpe (2013, 2014a-c), Wellington (2013, 2014a, 2014b), Wells (2013, 2014a, 2014b), and many others, so this history is not reviewed here.

I also note that many taxa formally named by myself for the first time in earlier publications (e.g. Hoser 2000a, 2000b) are in fact threatened species.

Therefore I note the sensible remarks of Engstrom *et al.* (2002) as a perfectly reasonable explanation for the publishing of taxon descriptions for such unnamed groups. This remains the case even if a sizeable amount of my original research, files, photos and data have been stolen (more than once) and therefore cannot be relied upon and incorporated into these contemporary publications.

Other important references relevant to the *C. expansa* species complex, not yet cited herein include the following: Cann (1981), Chessman (1978), Fritz (1993), Gaffney (1977), Georges *et al.* (2002), Goode (1968, 1974), Goode and Russell (1968), Gray (1857a, 1857b), Hamann *et al.* (2008), Legler (1978), Winkler (2006) and sources cited therein.

#### **NOMENCLATURAL STATEMENT IN TERMS OF THE DESCRIPTIONS WITHIN THIS PAPER**

Unless mandated by the zoological code, no names proposed within this paper should be amended in any way for the purposes of correction, gender change or the like. In terms of priority of names in the event of conflict, where more than one newly named taxon is deemed conspecific or within a single taxon group by a later author, the priority to be taken is by page priority, this meaning the first taxon described in full is the one to take precedent.

However in potential contradiction of the preceding, the name *duboisii* should take priority over *brisbaneensis* in the event of conflict between the two.

#### **SUBGENUS SUPREMECHELYS SUBGEN. NOV.**

**Type species:** *Chelodina expansa* Gray, 1857.

**Diagnosis:** The subgenus *Supremechelys subgen. nov.* is separated from all other *Chelodina* (a genus found in the Australasian bioregion) by the following suite of characters:

The carapace is approximately oval; the plastron is of moderate length and less than twice as long as wide when measured anterior to the bridge (these unique traits also shared with the subgenus *Macrochelodina*); the second and third vertebrals are longer than wide (as opposed to the reverse in *Macrochelodina*) and the anterior lobe of the plastron is not beginning to taper immediately in front of the bridge (as opposed to doing so in *Macrochelodina*). In adult *Supremechelys subgen. nov.* the side marginals are inflected up, whereas this is not the case in *Macrochelodina*.

*Supremechelys subgen. nov.* are without doubt the largest

extant species of long-necked terrapin in Australia with large specimens having a carapace length of up to 50 cm.

**Distribution:** The Murray-Darling River system of south east inland South Australia, inland Victoria and New South Wales and southern inland Queensland, as well as nearby coastal parts of south-east Queensland, north to the vicinity of Rockhampton (Fitzroy River drainage), Australia.

**Content:** *Chelodina expansa* Gray, 1857 (type species); *C. duboisi* sp. nov.

**CHELODINA (SUPREMECHELYS) EXPANSA GRAY, 1857.**

**Syntype:** BMNH 1947.3.4.21

**Diagnosis:** The species *C. expansa* is readily separated from the newly described species *C. duboisi* sp. nov. described below by having a brownish carapace in adults (as opposed to black in *C. duboisi*), rear marginals that do not drop off sharply (as seen in *C. duboisi* sp. nov.) and a plastron that does not taper markedly on the front lobe (as opposed to doing so in *C. duboisi* sp. nov.).

Notwithstanding the above, specimens of *C. expansa* from coastal regions of south-east Queensland (*C. expansa brisbaneensis* subsp. nov.) are separated from both nominate *C. expansa* and *C. duboisi* by the fall off in the rear marginals. In the taxon *C. expansa brisbaneensis* subsp. nov. they do noticeably fall away (not seen in nominate *C. expansa*), but not with the extreme downward drop as seen in *C. duboisi* sp. nov.. In spite of claims that *C. duboisi* sp. nov. attains the same size as *C. expansa*, I have never seen extremely large specimens of *C. duboisi* sp. nov..

The largest *C. duboisi* sp. nov. I have seen was an adult from the Burnett River, Queensland, caught in the 1970's and measuring over 40 cm in carapace length.

The subgenus *Supremechelys* subgen. nov. for which this species is the type, is separated from all other *Chelodina* (a genus found in the Australasian bioregion) by the following suite of characters:

The carapace is approximately oval; the plastron is of moderate length and less than twice as long as wide when measured anterior to the bridge (these unique traits also shared with *Macrochelodina*); the second and third vertebrals are longer than wide (as opposed to the reverse in *Macrochelodina*) and the anterior lobe of the plastron is not beginning to taper immediately in front of the bridge (as opposed to doing so in *Macrochelodina*). In adult *Supremechelys* subgen. nov. the side marginals are inflected up, whereas this is not the case in *Macrochelodina*.

Taxa within *Supremechelys* subgen. nov. are without doubt the largest extant species of long-necked terrapin in Australia with large specimens having a carapace length of up to 50 cm.

**Distribution:** The nominate form of *C. expansa* is restricted to the Murray-Darling River system of south east South Australia, inland Victoria and New South Wales and southern inland Queensland. While this is a huge area and includes a large number of watercourses, this includes Australia's main food growing and agricultural region and the rivers within the region are often treated by people as open sewers and subject to extreme degradation with both agricultural and chemical wastes. *C. expansa brisbaneensis* subsp. nov. described below is found in rivers and large freshwater lakes in south-east Queensland south of the Conondale Range. This is one of the most rapidly urbanising parts of Australia and a region of strong human population growth.

**CHELODINA (SUPREMECHELYS) EXPANSA BRISBANEENSIS SUBSP. NOV.**

**Holotype:** A male preserved specimen held at the Queensland Museum, Brisbane, Queensland, Australia, specimen number: J16109 from Rochedale, Queensland, Australia. The Queensland Museum is a government-controlled facility that allows access to its holdings by scientists.

**Paratype:** A preserved specimen held at the Queensland Museum, Brisbane, Queensland, Australia, specimen number J23905 from Inala, Queensland, Australia. The Queensland Museum is a government-controlled facility that allows access to its holdings by scientists.

**Diagnosis:** The species *C. expansa* is readily separated from the newly described species *C. duboisi* sp. nov. described below by having a brownish carapace in adults (as opposed to black in *C. duboisi*), rear marginals that do not drop off sharply (as seen in *C. duboisi* sp. nov.) and a plastron that does not taper markedly on the front lobe (as opposed to doing so in *C. duboisi* sp. nov.).

Notwithstanding the above, specimens of *C. expansa* from coastal regions of south-east Queensland (*C. expansa brisbaneensis* subsp. nov.) are separated from both nominate *C. expansa* and *C. duboisi* by the fall off in the rear marginals. In the taxon *C. expansa brisbaneensis* subsp. nov. they do noticeably fall away (not seen in nominate *C. expansa*), but not with the extreme downward drop as seen in *C. duboisi* sp. nov..

*C. expansa brisbaneensis* subsp. nov. adults are characterised by a dark brown carapace as opposed to a mid to light brown carapace in most, but not all *C. expansa expansa*.

The subgenus *Supremechelys* subgen. nov. for which this species is the type, is separated from all other *Chelodina* (a genus found in the Australasian bioregion) by the following suite of characters:

The carapace is approximately oval; the plastron is of moderate length and less than twice as long as wide when measured anterior to the bridge (these unique traits also shared with *Macrochelodina*); the second and third vertebrals are longer than wide (as opposed to the reverse in *Macrochelodina*) and the anterior lobe of the plastron is not beginning to taper immediately in front of the bridge (as opposed to doing so in *Macrochelodina*). In adult *Supremechelys* subgen. nov. the side marginals are inflected up, whereas this is not the case in *Macrochelodina*.

*Supremechelys* subgen. nov. are without doubt the largest extant species of long-necked terrapin in Australia with large specimens having a carapace length of up to 50 cm.

It should be noted that the entire range of the subspecies *C. expansa brisbaneensis* subsp. nov. is within a highly urbanised or rapidly urbanising region. Even those parts currently quarantined from residential development are being carved up into ever smaller subdivisions, while parks and reserves are at best only relictual pockets of a far wider ecosystem.

Due to the increased trade and movement of reptiles and the regular escapes and deliberate releasing of specimens, particularly terrapins, there is no doubt that the entire population's genetic integrity is at risk from the release of Murray-Darling *C. expansa* into the region, as well as a slightly lower risk of release of *C. duboisi* into the same population.

On this basis it would make sense for a genetically pure captive stock of this subspecies to be maintained.

**Distribution:** *C. expansa brisbaneensis* subsp. nov. is found in rivers and large freshwater lakes in south-east Queensland south of the Conondale Range. This is one of the most rapidly urbanising parts of Australia and a region of strong human population growth.

**Etymology:** Named in reflection of the main city that is the centre of distribution for the taxon.

**CHELODINA (SUPREMECHELYS) DUBOISI SP. NOV.**

**Holotype:** A preserved specimen held at the Queensland Museum, Brisbane, Queensland, Australia, specimen number J83694 from the Burnett River, Bundaberg, Queensland, Australia. The Queensland Museum is a government-controlled facility that allows access to its holdings by scientists.

**Paratype:** A preserved specimen held at the Queensland Museum, Brisbane, Queensland, Australia, specimen number

J18360 from the Burnett River, Bundaberg, Queensland, Australia. The Queensland Museum is a government-controlled facility that allows access to its holdings by scientists.

**Diagnosis:** The species *C. duboisi* sp. nov. is readily separated from all *C. expansa* by the following suite of characters: Having a blackish carapace in adults, as opposed to dark or light brown in *C. expansa* (both subspecies); rear marginals that drop off very sharply to face downwards (as opposed to no significant drop off in *C. expansa expansa* or a minor deflection downwards in *C. expansa brisbaneensis* subsp. nov.); and a plastron that tapers off markedly on the front lobe (as opposed to not doing so in both forms of *C. expansa*).

In spite of claims that *C. duboisi* sp. nov. attains the same size as *C. expansa*, I have never seen extremely large specimens of *C. duboisi* sp. nov..

The largest *C. duboisi* sp. nov. I have seen was an adult from the Burnett River, Queensland, caught in the 1970's and measuring over 40 cm in carapace length.

The subgenus *Supremechelys* subgen. nov. for which this species is the type, is separated from all other *Chelodina* (a genus found in the Australasian bioregion) by the following suite of characters:

The carapace is approximately oval; the plastron is of moderate length and less than twice as long as wide when measured anterior to the bridge (three unique traits also shared with *Macrochelodina*); the second and third vertebrals are longer than wide (as opposed to the reverse in *Macrochelodina*) and the anterior lobe of the plastron is not beginning to taper immediately in front of the bridge (as opposed to doing so in *Macrochelodina*). In adult *Supremechelys* subgen. nov. the side marginals are inflected up, whereas this is not the case in *Macrochelodina*.

Taxa within *Supremechelys* subgen. nov. are without doubt the largest extant species of long-necked terrapin in Australia with large specimens having a carapace length of up to 50 cm.

**Distribution:** Coastal drainages and lakes from the Mary River System, Queensland in the south to the Fitzroy River System, central coastal Queensland in the north and including waterways on the northern half of Fraser Island, Queensland.

**Etymology:** The species is named in honour of Dr Alain Dubois, who in 2014 was working at Muséum National d'Histoire Naturelle, Department of Systematics and Evolution, in Paris, France, in recognition for his defence of the zoological code (Ride et al. 1999) and previous versions of the same document from taxonomic vandalism by others who set to operate outside of the code and use their own coined names in favour of properly proposed scientific names.

#### CONFLICT OF INTEREST

This author reports no conflict of interest in terms of any material within this paper.

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# **New Bluetongue Lizard and Sailfin Dragon Lizard taxa from Indonesia (Squamata:Sauria).**

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## **ABSTRACT**

The Indonesian Bluetongued Skinks (Genus *Tiliqua* Gray, 1825) and the Indonesian Sailfin Dragon Lizards (Genus *Hydrosaurus* Kaup, 1828) are common in captivity and have been subjected to extensive studies.

Notwithstanding the publication of several major taxonomic revisions of both groups, there has been ongoing taxonomic confusion spanning many years.

This has not been properly resolved by the most recent publications.

This paper seeks to remove ongoing taxonomic instability by formally naming obvious and yet unnamed taxa from Indonesia for the first time.

The urgency of these actions is underscored by the combined effects of habitat destruction and increased interest in these taxa by traders and collectors. In terms of the latter, it is important that regional lineages be maintained should there arise a need to reintroduce species into the wild at a later date.

**Keywords:** Taxonomy; Australasia; New Guinea; Indonesia; *Tiliqua*; *Hydrosaurus*; species; *gigas*; *Seram*; *Irian Jaya*; *Halmahera*; *Papua*; *New Guinea*; subspecies; *keyensis*; *evanescens*; new species; *alburyi*; new subspecies; *grantturneri*; *glennsheai*.

## **INTRODUCTION**

In spite of the global popularity of the Australasian Bluetongued Skinks (Genus *Tiliqua* Gray, 1825) and Sailfin Dragon Lizards (Genus *Hydrosaurus* Kaup, 1828) and relevant detailed taxonomic works in relation to both genera of lizards in recent years, there remain obvious unnamed taxa.

In view of the large number of specimens in both private herpetoculture and museum collections, this state of affairs is astounding.

In terms of the Bluetongued Skinks, the following is of relevance: Hitz *et al.* 2004, pages 177 to 189, in a chapter written by Glenn M. Shea provide an accurate and current account of the taxonomic history of the species (or species group) currently referred to the taxon *Tiliqua gigas* (Schneider, 1801).

As the book remains widely available in both English and German language editions, there is no major need for me to rehash the material within that publication here or present an exhaustive bibliography of relevant source material.

The species *T. gigas* (Schneider, 1801) as recognized to date is similar in many respects to the Australian *T. scincoides*, but is instead found in the region encompassed by island New Guinea and nearby islands to the west as well as immediately adjacent outliers.

Recognized by Shea and the other authors of Hitz *et al.* 2004 were three subspecies, namely *T. gigas gigas* (Schneider, 1801) from Ceram, based on Shea's recently assigned neotype, *T. gigas keyensis* Oudemans, 1894 from the Kei Islands and *T. gigas evanescens* Shea, 2000, with a holotype from Port

Moresby, Papua New Guinea, and believed to be distributed throughout the east of New Guinea, east of the Huon Peninsula, as well as across the drier parts of the southern half of the island, including eastern Irian Jaya in the region of Merauke.

Hitz *et al.* 2004 included specimens from Halmahera and northern New Guinea within the subspecies *T. gigas gigas* even though they recognized significant regional variation in specimens and indicated the likelihood that there may be one or more undescribed forms (see page 204).

I note herein that Hitz *et al.* (2004) is in effect an English-language version of the same book published in year 2000, in German which carried Shea's original descriptions.

Combined with the known ecological barriers between the relevant described populations and others within each subspecies group and known divergence times based on established geological evidence (e.g. Dow, 1977 and Macey *et al.* 2000 and sources cited therein), it is clear that at least two more subspecies of *T. gigas* should be formally named.

This is done below according to the Zoological Code (Ride *et al.* 1999) for the populations from Halmahera and those found in the north-east of island New Guinea.

The genus *Hydrosaurus* Kaup, 1828, including the formal description of a new species according to the Zoological Code (Ride *et al.* 1999) is dealt with in this paper after the descriptions of the *Tiliqua* species.

In terms of the following descriptions, the following points should be noted. That is no changes to the names should be made unless mandated according to the Zoological Code, even if there

is apparent error in formation of names. Priority order in the event of conflict in names (assuming a later author seeks to merge taxa) should be in page priority here, that being the first printed (description) takes priority.

**TILIQUA GIGAS GLENSSHEAI SUBSP. NOV.**

**Holotype:** Reptile specimen number USNM 237426 at the United States National Museum, Washington, DC, USA, collected from Kampung Pasir Putih, Jailolo District, Halmahera Island, Moluccas, Indonesia.

The United States National Museum, Washington, DC, USA is a government-owned facility that allows scientists access to their collection.

**Paratype 1:** Reptile specimen number USNM 237427 at the United States National Museum, Washington, DC, USA, collected from Kampung Pasir Putih, Jailolo District, Halmahera Island, Moluccas, Indonesia.

The United States National Museum, Washington, DC, USA is a government-owned facility that allows scientists access to their collection.

**Paratype 2:** Reptile specimen number USNM 215904 at the United States National Museum, Washington, DC, USA, collected from Besa, near Loleba, Wasile District, Halmahera Island, Moluccas, Indonesia.

The United States National Museum, Washington, DC, USA is a government-owned facility that allows scientists access to their collection.

**Diagnosis:** *Tiliqua gigas glennsheai subsp. nov.* is separated from all other subspecies of *Tiliqua gigas* by the following suite of characters: A striped pattern on the venter, and three temporals behind the eye as opposed to two in all the other subspecies of *T. gigas*. The temporal configuration in *T. gigas glennsheai subsp. nov.* is caused by an expansion of the scales at the expense of size in the rear supralabials which are smaller, and also a division of the larger lower one as seen in other *T. gigas* into two in *T. gigas glennsheai subsp. nov.*.

*T. gigas glennsheai subsp. nov.* is the only subspecies where the fore-legs are totally black (with occasional light flecks) and with the black extending onto the body and forward to include a large band or streak running in an anterior direction. In other subspecies of *T. gigas*, the dark from the fore-legs is broken by a band of lighter scales from the anterior running streak.

*T. gigas glennsheai subsp. nov.* is also characterised by having a large adult size in excess of 270 mm S-V, versus under 260 mm S-V in all other subspecies. In contrast to *T. gigas gigas*, there are no parietals that are divided into an anterior and posterior scale (this trait typical for many but not all specimens in *T. gigas gigas*).

Both *T. gigas glennsheai subsp. nov.* and *T. gigas grantturneri subsp. nov.* are characterised by dark black colouration on the lower flanks, unbroken by patches of light pigment, interspersed with thinner bands of dark brown.

**Distribution:** Known only from Halmahera Island, Indonesia and immediately adjacent outliers, including Ternate.

**Etymology:** Named in honour of Sydney, NSW-based herpetologist, Dr. Glenn M. Shea in recognition of a lifetime's work with skinks of the genus *Tiliqua*.

**TILIQUA GIGAS GRANTTURNERI SUBSP. NOV.**

**Holotype:** Specimen number R12970 at the Australian Museum, Sydney, NSW, Australia, collected from Yapen Island, Indonesia. The Australian Museum, Sydney, NSW, Australia is a government-owned facility that allows scientists access to their collection.

**Paratype:** Specimen number R8884 at the Australian Museum, Sydney, NSW, Australia, collected from Eitape (=Aitape), West Sepik District, Papua New Guinea. The Australian Museum, Sydney, NSW, Australia is a government-owned facility that allows scientists access to their collection.

**Diagnosis:** *Tiliqua gigas grantturneri subsp. nov.* is separated from all other subspecies of *Tiliqua gigas* except for *T. gigas glennsheai subsp. nov.* by the fact that the fore and hind limbs are black and with distinct whitish yellow spots. In other *T. gigas*, the limbs are either black or dark with peppering as opposed to distinctive spots on the legs, or alternatively greyish white with black-etched scales.

Colouration and form of *T. gigas grantturneri subsp. nov.* is similar in most other respects to *T. gigas glennsheai subsp. nov.*, with some specimens also having a striped pattern on the venter. However in common with all other *T. gigas* (except *T. gigas glennsheai subsp. nov.*), the dark from the fore-legs is broken by a band of lighter scales from the anterior running streak.

Both *T. gigas glennsheai subsp. nov.* and *T. gigas grantturneri subsp. nov.* are characterised by dark black colouration on the lower flanks, unbroken by patches of light pigment, interspersed with thinner bands of dark brown.

*Tiliqua gigas glennsheai subsp. nov.* is separated from all other subspecies of *Tiliqua gigas* including *T. gigas grantturneri subsp. nov.* by the fact that there are three temporals behind the eye as opposed to two in all the other subspecies of *T. gigas*. The temporal configuration in *T. gigas glennsheai subsp. nov.* is caused by an expansion of the scales at the expense of size in the rear supralabials which are smaller, and also a division of the larger lower one as seen in other *T. gigas* into two in *T. gigas glennsheai subsp. nov.*.

**Distribution:** *Tiliqua gigas grantturneri subsp. nov.* is found on the northern margin of the island of New Guinea, west of the Huon Peninsula, including the eastern section of the island and immediately adjacent islands and outliers, but not including most other parts of Papua New Guinea and the drier parts of southern New Guinea, including the lower section of Irian Jaya in the region of Merauke, that area being occupied by the subspecies *T. gigas evanescens*.

**Etymology:** Named in honour of Dr. Grant Turner, formerly of Bundoora, (Melbourne) Victoria, Australia, and more recently of north Queensland, Australia in recognition of many years of captive breeding and research into Blotched Bluetongued Skinks (*Tiliqua nigrolutea*), and the publications he has created on this and other Australian reptiles.

**GENUS HYDROSAURUS KAUP 1828**

The iconic Sailfinned Lizards of the genus *Hydrosaurus* have been subject of considerable taxonomic changes in terms of the treatment of component species. This is seen in the contrasting treatments and comments within the relevant and significant publications of Duméril and Bibron (1837), Gray (1845), Peters (1872), Boulenger (1885), de Rooij (1915), Günther (1873), Colwell (1993), Werning (2002, 2004), Setiadi and Hamidy (2006) and most recently Siler *et al.* (2014).

Within the genus, different authors have recognized different taxa and species totals for the genus as a whole including in the recent post 2000 period.

Most recently in 2014 on the basis of robust molecular data, Siler *et al.* (2014) (fig. 2) found the genus to consist of four well defined species for which all had available names.

These were *Hydrosaurus pustulatus* (Eschscholtz, 1829), *H. amboinensis* (Schlosser, 1768), *H. weberi* Barbour, 1911 and *H. celebensis* (Peters, 1872).

However Siler *et al.* (2014) did not present any molecular analysis for the regional populations of the taxon *H. amboinensis* (Schlosser, 1768). For that taxon they only analysed a single pet trade specimen of unknown provenance.

In light of this, specimens attributed to this species were examined from known parts of the range of taxon.

It was almost immediately apparent that *Hydrosaurus* specimens from the mainland of northern New Guinea and large immediately adjacent outlier islands were significantly different

morphologically to those from elsewhere.

In the light of the known geological past of the range of the genus and known divergence times of land bridges based on established geological evidence (e.g. Dow, 1977 and Macey *et al.* 2000 and sources cited therein), combined with the molecular data obtained by Siler *et al.* (2014) for the non-New Guinea *Hydrosaurus* taxa, the New Guinea *Hydrosaurus* are formally described herein as a new species.

**HYDROSAURUS ALBURYI SP. NOV.**

**Holotype:** A specimen at the US National Museum (USNM), Washington DC, USA, specimen number: USNM 101095, in the Amphibians and Reptiles Collection, from the Van Rees Mountains, Edi Falls, in Mamberano River, Irian Jaya, Indonesia. The specimen is a juvenile that is preserved dry, with a flat skin and the skull. The United States National Museum, Washington, DC, USA is a government-owned facility that allows scientists access to their collection.

A deliberate decision was made not to sacrifice another live specimen from the wild for the purposes of taxonomy due to the following two factors, these being an inordinate amount of legal red-tape involved in legally acquiring the specimen to lodge in a Museum and the time and money being spent by myself as a diversion, caused by reckless ongoing litigation being conducted against myself and my family by corrupt and dishonest animal-hating Victorian government wildlife officers Ron Waters, Glenn Sharp and Emily Gibson.

**Diagnosis:** *Hydrosaurus alburyi sp. nov.* is similar in most respects to other *Hydrosaurus* species and until now has been regarded by most authors as a variant of *H. amboinensis* (Schlosser, 1768).

However in some traits including dorsal colouration this species is more similar to *H. weberi* than *H. amboinensis* and likewise including in terms of the configuration of the nuchal and dorsal crests not properly merging.

However, *Hydrosaurus alburyi sp. nov.* is most readily separated from *H. amboinensis* and *H. weberi* by the presence of markings on the tail which tend to form three distinct longitudinal lines on the thick part of the tail under the crest and then moderately distinct darker and lighter crossbands on the latter part of the tail, these being less distinct in juveniles than adults. No such markings in this combination are present in any of the four other described *Hydrosaurus* species.

*H. alburyi sp. nov.* is similar in pattern to *H. weberi*, in that its dorsal colouration consists of dark speckling on a lighter background, sometimes forming an indistinct pattern of blotches. Whereas this is of even consistency across the body in *H. weberi*, in *H. alburyi sp. nov.* on the upper part of the body the speckling clumps to form distinct darker blotches immediately beneath the spine. In life, adult *H. alburyi sp. nov.* presents as a greenish-yellow lizard.

Unlike *H. weberi* or any other *Hydrosaurus* species *H. alburyi sp. nov.* has a lower tail (that posterior to the crest) that is usually characterised by moderately distinct darker and lighter yellow and brown crossbands.

*H. alburyi sp. nov.* is separated from *H. celebensis* by the absence of melanism around the back legs. *H. alburyi sp. nov.* is separated from *H. pustulatus*, by the absence of prominent highlights around the mouth and upper dorsal sailfin (back of the neck) that are blue or purple and are seen in both sexes, this being diagnostic for the taxon *H. pustulatus*.

The five recognized species within the genus (including *H. alburyi sp. nov.*) are defined as follows: Tympanum distinct. Body compressed. A dorsal crest. Throat longitudinally plicate; a transverse gular fold. Toes covered inferiorly with small granular scales, with a lateral fringe of large united scales most developed on the outer side. Tail strongly compressed, in the adult with a very high crest supported by the enormously developed spinose processes of the caudal vertebrae. Femoral pores present. Head rather small; snout elongate, with a small

longitudinal crest of enlarged scales in the male; tympanum large; upper headscapes small, strongly keeled. Gular scales small, granular, of unequal size; a row of enlarged shields on each side, parallel with the infralabials, commencing from the very large mental. Dorsal and nuchal crests continuous, composed of compressed lanceolate spines. Dorsal scales small, imbricate, keeled, the keels directed upwards and backwards, intermixed with scattered, enlarged, roundish, shortly keeled scales, varying considerably in size. Ventral scales larger than dorsals, subquadrangular, smooth, forming transverse series; enlarged scales on the sides of the chest. Limbs long; the adpressed hind limb reaches the eye or between the latter and the tip of the snout; scales enlarged on anterior face of forelimb. Femoral pores seven to sixteen on each side. Tail covered with minute quadrangular keeled scales above and on the sides, with much larger ones inferiorly; caudal crest very high in the males, with feebly denticulated border, present only on the anterior part of the tail; length of tail more than twice that of head and body. Olive above, spotted or vermiculated with black; oblique fold in front of the shoulder is black.

The Philippine's Sailfin Lizard, *H. pustulatus*, begins life mostly as a brown lizard. Later, they develop prominent highlights around the mouth and upper dorsal sailfin (back of the neck) that are blue or purple and are seen in both sexes, this being diagnostic for the taxon.

*H. amboinensis* from Ceram and Ambon is diagnosed by having dorsal and nuchal crests continuous; tympanum is half the diameter of the orbit; tail more than twice the length of the head and body. The general colour is a dullish olive colour.

*H. weberi* from Halmahera, is defined by having the dorsal and nuchal crests separated by unraised tissues; tympanum one third the diameter of the orbit; tail is not quite twice the length of head and body. The body is of a generally greenish colour.

*H. celebensis* from Sulawesi, has until recently been viewed by most authors as a variant of *H. amboinensis*. It is readily identified by melanism towards the head and hind limbs area, not seen in any of *H. amboinensis* or *H. weberi*. *H. alburyi sp. nov.* does have melanism around the head, but in contrast to *H. celebensis* not at the rear body.

*H. celebensis* is also characterised by three broken rows of raised coloured (whitish, greyish, or blackish) scales across the body on an even speckled background of variable colour, but usually orangeish, brown or olive-green.

**Distribution:** *H. alburyi sp. nov.* is found in North-west Island New Guinea, in a region from the Mamberamo basin (Richards and Suryadi 2002) and west along the coast, to include nearby islands such as Waigeo. In both the lower and middle Mamberamo basin and Waigeo the species is commonly encountered. There are reports from other intervening areas on both north and south coasts, usually based on sightings only (e.g. Various authors 2003), but it should be noted that there are very few herpetological surveys completed in the area to date. There are no reliable records for the species *H. alburyi sp. nov.* or any other *Hydrosaurus* species from Papua New Guinea, in spite of literature records (e.g. Siler *et al.* 2014).

All five described and recognized species of *Hydrosaurus* have mutually allopatric distributions.

**Etymology:** Named in honour of Wayne Thomas Albury of Melbourne, Victoria, Australia. In 1988 and in the face of unlawful threats from the Victoria Police, Albury took a great personal risk and gave evidence in a court of law against a police-protected criminal named Phillipa O'Shannessy. Details of the case are in Hoser (1994).

**CONFLICT OF INTEREST**

This author reports no conflict of interest.

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# **The break up of *Odatria (Kimberleyvaranus) glebopalma* (Mitchell, 1955) into three obvious subspecies.**

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## **ABSTRACT**

Interest in the taxonomy and nomenclature of Australasian Monitors has had a resurgence in year 2014. This was precipitated by the publication of Hoser (2013) that produced a family-wide revision of the genus-level taxonomy, as well as description of new species and subspecies from Australasia. Maryan *et al.* (2014) has more recently divided the West Australian species *Odatria (Pilbaravaranus) pilbarensis* (Storr, 1980) into two on the basis of clear morphological and molecular evidence, formally naming the species found south of the Fortescue River.

This paper continues the dissection of the Australian varanids, with the division of the well-known and widespread species, *Odatria (Kimberleyvaranus) glebopalma* (Mitchell, 1955) into three formally described and named subspecies, two being named according to the Zoological Code (Ride *et al.* 1999) for the first time.

**Keywords:** Taxonomy; Australasia; Northern Territory, Western Australia; Queensland; Varanids; Monitors; *Varanus*; *Odatria*; *Kimberleyvaranus*; *glebopalma*; new subspecies; *funki*; *maderi*.

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## **INTRODUCTION**

Until now, most species within the family Varanidae have been treated by taxonomists as being within a single genus, namely *Varanus* Merrem, 1820. This is in effect a rehash of the family name that also accommodates all the same quite divergent species.

For many years, this was not particularly problematic, as the number of described species was relatively few.

However in the past 3 decades the number of recognized species has doubled to include well over 80 named and widely recognized species.

This number does not include further species awaiting scientific recognition and/or formal description.

In the face of the anomaly of all being wrongly placed in a single genus and the fact that this relatively ancient group of lizards distributed across a number of continents is clearly paraphyletic at the genus level, Hoser (2013) for the first time ever did a family-wide review of the group and identified obvious divisions at the tribe, genus and subgenus level.

The taxonomy and nomenclature of that paper is adopted herein on the basis that it is fully supported both on the basis of morphological and molecular evidence as cited in Hoser (2013).

At the species level, Hoser (2013) named several obviously distinct, but previously unnamed taxa, defining them variously as species and subspecies.

Because Hoser (2013) is widely available in both hard copy and on the internet, there is no need for me to repeat the information summarised within that paper and the published material that formed the basis of the content of that paper.

Where relevant here, this material is relied upon herein.

In 2014, Maryan *et al.* quite properly defined yet another species of monitor from the Pilbara, resulting from the division of *Odatria (Pilbaravaranus) pilbarensis* (Storr, 1980) into two on the basis of clear morphological and molecular evidence, formally naming the species found south of the Fortescue River.

I had intended naming this taxon myself, but was scooped by Maryan *et al.*

Respecting the rules of zoological nomenclature (Ride *et al.* 1999), I will not now attempt to engage in Kaiser *et al.* sanctioned taxonomic vandalism by overwriting validly proposed names that should be used according to the fundamental rule of priority (Kaiser 2012a, 2012b and Kaiser *et al.* 2013).

This is in spite of the fact that Maryan *et al.* published their paper in the PRINO (peer reviewed in name only) journal *Zootaxa*, leading some Kaiser *et al.* proponents to decree the paper "unscientific" and the name proposed within therefore being available to be overwritten in violation of the Zoological Code.

This paper continues the dissection of the Australian varanids, with the division of the well-known and widespread species, *Odatria (Kimberleyvaranus) glebopalma* (Mitchell, 1955) into three formally described and named subspecies, two being named according to the Zoological Code (Ride *et al.* 1999) for the first time.

## **ODATRIA (KIMBERLEYVARANUS) GLEBOPALMA (MITCHELL, 1955)**

The taxon *Odatria (Kimberleyvaranus) glebopalma* (Mitchell, 1955) as currently recognized is a widespread species, with a range extending from the Mount Isa region of Queensland, west

across the rocky areas of the tropical north of Australia to include the Kimberley Ranges of Western Australia.

The type locality for the species is the southern end of Lake Hubert on Groote Eylandt, Northern Territory and no other regional forms have been formally described and named.

As part of a wide-ranging audit of Australian monitors, it was found that the current distribution for *O. glebopalma* is not continuous as shown in most distribution maps in books such as Cogger (2014).

Within the known range of the species, it is clearly confined to saxicoline habitats and within three regional clusters.

These are the rocky region extending north from around Mount Isa in Queensland along the Northern Territory Coast to the far north and including Groote Eylandt and Nhulunbuy; the region encompassing the Arnhem Land Plateau and Kakadu National Park, as well as Litchfield National Park; and the region encompassing the Kimberley Ranges in northern Western Australia.

Morphologically, each population was found to be quite distinct from one another with them each requiring taxonomic recognition.

However in the absence of molecular data I have decided to take a conservative approach and formally name each as a new subspecies according to the Zoological Code (Ride *et al.* 1999).

Descriptions of the species *Odatria (Kimberleyvaranus) glebopalma* (Mitchell, 1955) and its habits in the literature to date include the following notable publications: Bennett (2003a, 2003b), Cogger (2000, 2014), De Lisle (1996), Eidenmüller (2007a, 2007b), Frydlova and Frynta (2010), Hörenberg and Koch (2013), Horn and Schürer (1978), Hoser (2013), Mertens (1958), Mitchell (1955), Pianka and King (2014), Sprackland (2001), Storr (1980), Swanson (1979), Wilson and Swan (2010), and relevant cited sources therein.

Most texts refer to the taxon under the better-known name "*Varanus glebopalma*".

The diagnosis for the species *Odatria (Kimberleyvaranus) glebopalma* (Mitchell, 1955) is as for the subgenus, because it is currently regarded as monotypic for the species.

The diagnosis for the subgenus, taken from Hoser (2013) is given below, before the formal descriptions of each of the three subspecies.

#### **SUBGENUS KIMBERLEYVARANUS SUBGEN. NOV.**

**Type species:** *Varanus (Odatria) glebopalma* Mitchell, 1955.

**Diagnosis:** The subgenus *Kimberleyvaranus subgen. nov.* within the genus *Odatria* is separated from all other living varanids by the following suite of characters: supraocular scales are subequal; the keels of the caudal scales are sometimes very strong, but never spinose; the tail is either round in section or somewhat dorsoventrally compressed, or at the very most, very slightly laterally compressed in the last half; there is no obvious median double keel dorsally along the tail; the scales on the top of the head are smooth; the tail is longer than the head and body, being well over twice as long as the head and body (unbroken and intact tail); tail pattern if present, is transversely aligned distally; the last half of the tail is a distinctive creamy white to yellow in colour; the tubercles on the lower surfaces of the feet are large and glossy being a very dark brown or black in colour.

The subgenus *Kimberleyvaranus subgen. nov.* is further defined as follows: Colouration is dorsally black with individually fawn coloured scales which form a reticulum on the flanks (where they predominate over the black) or alternatively small black centred ocelli on the midline (where black predominates). The top of the head and upper surfaces of the limbs are black with small cream or fawn flecks and spots, clustering to form larger spots on the limbs. The anterior half of the tail is mostly black above and the posterior half is a distinct creamy white to yellow in colour. The throat is white with a broad reticulum of light

purplish fawn extending on to the sides of the throat, but forming bars on the lower lips. The belly and chest are white with indistinct transverse bars of light purplish fawn. The tail and limbs are creamy yellow below. Palms and soles have rounded shiny, very dark brown or black scales. The head scales are smooth, irregular and very small. The nostrils are much nearer to the tip of the snout than the eye and lateral in position. 130-170 scales around the middle of the body. Caudal scales are smooth or with low keels.

**Distribution:** Rocky habitats in tropical Australia from far western Queensland across to the West Kimberley in Western Australia and including larger rocky immediately adjacent offshore islands.

**Etymology:** Named in reference to where the monotypic subgenus is best known from and the centre of its present distribution.

**Content:** *Odatria (Kimberleyvaranus) glebopalma* (Mitchell, 1955) (monotypic).

#### **ODATRIA (KIMBERLEYVARANUS) GLEBOPALMA GLEBOPALMA (MITCHELL, 1955)**

**Holotype:** A specimen at the South Australian Museum, specimen number: SAMA R3222 from the south end of Lake Hubert, Groote Eylandt, NT, Australia.

**Diagnosis:** The nominate subspecies is separated from both the other subspecies on the basis of colouration.

In this subspecies, there is a generally speckled pattern dorsally and little if any black anterior to the eye.

No reticulated pattern or banding is on the neck and upper body and if markings are present on the body, they tend towards neither a reticulated pattern or banding. Hatchlings may have a very faint reticulated pattern at the head and fore-body, and this is as opposed to being very distinct and well-marked in hatchlings in the Arnhem land form namely *Odatria (Kimberleyvaranus) glebopalma funki subsp. nov.*

Otherwise the diagnosis for this subspecies is as for the subgenus *Kimberleyvaranus* Hoser, 2013.

**Distribution:** The region from Mount Isa Queensland, generally north along the east Northern Territory (NT) coast and including Groote Eylandt (the type locality), Nhulunbuy and Marchinbar Island, Northern Territory, Australia.

#### **ODATRIA (KIMBERLEYVARANUS) GLEBOPALMA FUNKI SUBSP. NOV.**

**Holotype:** A specimen held at the Northern Territory Museum, Australia, specimen number: R.34420 collected from the Stuart Highway NT, Lat 13.48, Long 131.18.

The Northern Territory Museum in Darwin, NT, Australia is a government-controlled facility that allows access to specimens by scientists.

**Paratype:** A specimen number R51900 collected from Mount Carr, Adelaide River Township, Northern Territory, Australia, held at the Australian Museum in Sydney, Australia.

The Australian Museum in Sydney, Australia is a government-controlled facility that allows access to specimens by scientists.

**Diagnosis:** *Odatria (Kimberleyvaranus) glebopalma funki subsp. nov.* is readily separated from both other subspecies of *O. glebopalma* by the obvious dorsal patterning including an obvious and distinct reticulated pattern at the head and fore-body, which is not seen in either other two subspecies.

Otherwise the diagnosis for this subspecies is as for the subgenus *Kimberleyvaranus* Hoser, 2013.

**Distribution:** The region encompassing the Arnhem Land Plateau and Kakadu National Park, as well as Litchfield National Park all within the Northern Territory.

**Etymology:** Named in honour of Mesa, Arizona, USA, herpetologist and veterinary surgeon, Dr. Richard Funk, in recognition of many years of contributions to herpetology.



Top image: *Odatria* (*Kimberleyvaranus*) *glebopalma funki* subsp. nov. holotype (larger specimen on right) and a specimen of *Odatria* (*Kimberleyvaranus*) *glebopalma maderi* subsp. nov. (not the holotype).

Right and below: *Odatria* (*Kimberleyvaranus*) *glebopalma funki* subsp. nov. holotype.



**ODATRIA (KIMBERLEYVARANUS) GLEBOPALMA MADERI SUBSP. NOV.**

**Holotype:** A specimen at the Australian Museum in Sydney, NSW, Australia, specimen number: R.136112 from Surveyors Pool on a Tributary of Mitchell River, Mitchell Plateau, Western Australia, Australia.

The Australian Museum in Sydney, Australia is a government-controlled facility that allows access to specimens by scientists.

**Paratype 1.** A specimen at the Western Australian Museum, Perth, Australia, specimen number: R43121 collected from Surveyors Pool on a Tributary of Mitchell River, Mitchell Plateau, Western Australia, Australia.

**Paratype 2.** A specimen at the Western Australian Museum, Perth, Australia, specimen number: R60668 collected from Camp Creek, Mitchell Plateau, Western Australia, Australia.

The Western Australian Museum in Perth, Australia is a government-controlled facility that allows access to specimens by scientists.

**Diagnosis:** The subspecies *Odatria (Kimberleyvaranus) glebopalma maderi subsp. nov.* is separated from the other two subspecies of *O. glebopalma* as follows:

It is diagnosed as for the nominate subspecies but separated from it by the presence of a distinct dark stripe or similar, anterior to the eye and running to it. No reticulated pattern is present on the fore-body or if there is one, it is tending towards indistinct bands (peaking near the hind limbs where ocelli form into bands). This tending towards bands is most notable in juveniles, which have a colouration consisting of moderately obvious darker and lighter cross-bands. These bands are discernible in all specimens, though less distinct with age. Some specimens have a distinct pattern of oversized brownish ocelli across the entire dorsal body, not forming any kind of reticulation pattern as seen in *Odatria (Kimberleyvaranus) glebopalma funki subsp. nov.*

The reticulation pattern as seen in *Odatria (Kimberleyvaranus) glebopalma funki subsp. nov.* separates that taxon from *Odatria (Kimberleyvaranus) glebopalma maderi subsp. nov.*

Otherwise the diagnosis for this subspecies (*Odatria (Kimberleyvaranus) glebopalma maderi subsp. nov.*) is as for the subgenus *Kimberleyvaranus* Hoser, 2013.

**Distribution:** The region encompassing the Kimberley Ranges in northern Western Australia and immediately adjacent parts of far western Northern Territory.

**Etymology:** Named in honour of USA-based, herpetologist and veterinary surgeon, Dr. Douglas Mader, in recognition of many years of contributions to herpetology including through his numerous books and publications in the herpetological literature.

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# **A logical new genus-level taxonomy for the Xenosauridae, Anniellidae, Diploglossidae and Anguidae (Squamata:Sauria).**

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## **ABSTRACT.**

A number of recent molecular studies have highlighted divergences between currently recognized genera of lizards within the four closely associated lizard families Xenosauridae, Anniellidae, Diploglossidae and Anguidae, which share the same clade as *Heloderma*, reviewed by Hoser (2013a) and more distantly Varanidae reviewed by Hoser (2013b)

Combining the results of recent cited molecular and morphological studies the following genera as presently recognized by most herpetologists in 2014 are split:

*Xenosaurus* Peters, 1861 is divided into two, with the erection of *Eastmansaurus gen. nov.* to accommodate four species found north of the Mexican transvolcanic belt. The remaining species are in turn divided into two subgenera, the new group being *Rosanolansaurus subgen. nov.*

*Anniella* Gray, 1852 is divided into two with the erection of *Kendslider gen. nov.* to accommodate one species.

For the Diploglossidae, *Celestus* Gray, 1839 is divided three ways, using *Celestus* for the Hispaniolan group, *Siderolamprus* Cope, 1860 for the mainland species and the erection of a new genus *Toscanosaurus gen. nov.* for seven divergent species from Jamaica. *Siderolamprus* (from mainland middle America) is divided into four subgenera, including *Garyallensaurus subgen. nov.*, *Conningsaurus subgen. nov.* and *Dannybrownsaurus subgen. nov.*

*Diploglossus* Wiegmann, 1834 is divided four ways with three new genera being erected to accommodate Antilles species, namely *Artusbrevis gen. nov.*, *Masonnicolasaurus gen. nov.* and *Laurielevysaurus gen. nov.*

*Ophiodes* Wagler, 1830 is unchanged from other recent works and *Sauresia* Gray, 1852 is also recognized as valid.

The Diploglossidae are divided into two tribes, namely Diploglossiini *tribe nov.* and Toscanosauriini *tribe nov.*

For the Anguidae the following changes are made:

Within Anguinae *Ophisaurus* Daudin, 1803 is divided into four, with the resurrection of *Hyalosaurus* Günther, 1873 for the African species and the erection of *Binghamsaurus gen. nov.* and *Smythsaurus gen. nov.* to accommodate various North American species.

*Dopasia* Gray, 1853 is divided into two with the erection of *Richardsonsaurus gen. nov.* to accommodate the Chinese "harti" species group.

The Anguinae is also divided into two tribes both formally named.

Within Gerrhonotinae *Elgaria* Gray, 1838 is divided into two with the erection of *Pitmansaurus gen. nov.* to accommodate the divergent taxon *Elgaria coerulea* (Wiegmann, 1828) with both genera placed in a new tribe Pitmansauriini *tribe nov.* and all other genera in the subfamily placed in Gerrhontiini *tribe nov.*

*Gerrhonotus* Wiegmann, 1828 is divided into two with the erection of *Lindholtsaurus gen. nov.* to accommodate the divergent species *Gerrhonotus parvus* Knight and Scudday, 1985 and two others.

*Mesaspis* Cope, 1878 is divided into two with the erection of *Rentonsaurus gen. nov.* to accommodate the divergent taxon *Mesaspis gadovii* (Boulenger, 1913). For the remainder, two species are placed in the subgenus *Rayplattsaurus subgen. nov.*

*Abronia* Gray, 1838 is herein regarded as paraphyletic with the adoption of all subgenera formally proposed by Campbell and Frost, 1993, (being *Abronia*, *Abaculabronia*, *Aenigmabronia*, *Auriculabronia*, *Lissabronia*, *Scopaeabronia*). In addition three new subgenera, *Elliottsaura subgen. nov.*, *Assangesaurus subgen. nov.* and *Lanisaurea subgen. nov.* are erected for species not properly accommodated within the existing divisions.

The divergent taxon, *Abronia mixteca* Bogert and Porter, 1967 is placed in its own monotypic genus, *Snowdonsaurus gen. nov.*

Noting that living Shinisauridae and Lanthanotidae are both monotypic, this paper in effect completes a thorough review of the living Varanoidea at the generic level.

**Keywords:** Taxonomy; nomenclature; genera; Xenosauridae; Anniellidae; Anguidae; Helodermatidae; *Heloderma*; *Xenosaurus*; *Anniella*; *Kendslider*; *Celestus*; *Siderolamprus*; *Sauresia*; *Wetmorena*; *Diploglossus*; *Ophisaurus*; *Dopasia*; *Hyalosaurus*; *Elgaria*; *Gerrhonotus*; *Mesaspis*; *Abronia*; *Abaculabronia*; *Aenigmabronia*; *Auriculabronia*; *Lissabronia*; *Scopaeabronia*; new tribes; Diploglossiini; Toscanosauriini; Anguini; Ophisauriini; Pitmansauriini; Gerrhonotiini; new genera; *Eastmansaurus*; *Toscanosaurus*; *Artusbrevis*; *Masonnicolasaurus*; *Laurielevysaurus*; *Binghamsaurus*; *Smythsaurus*; *Richardsonsaurus*; *Pitmansaurus*; *Lindholtsaurus*; *Snowdonsaurus*; New subgenera; *Rosanolansaurus*; *Dannybrownsaurus*; *Garyallensaurus*; *Conningsaurus*; *Rayplattsaurus*; *Elliottsaura*; *Lanisaurea*; *Assangesaurus*.

## INTRODUCTION.

The basis of this paper is to complete a genus level review of the totality of the extant Varanoidea in order to present a workable and consistent taxonomy for other scientists.

The basis of this review is by the drawing together of recent molecular studies as well as known morphological data from earlier published literature as well as examination of specimens as required.

It represents the culmination of some decades working with relevant reptile taxa and travels to various parts of the world as needed.

Hoser (2013a) corrected a long-standing anomaly in the generic arrangement of the living Helodermatidae, dividing the genus *Heloderma* Wiegmann, 1829 into two, erecting *Maxhosersaurus* Hoser, 2013 for the species *Heloderma suspectum* Cope 1869, with all other species remaining in the original genus *Heloderma*. This division was done on the basis of well-defined molecular and morphological evidence. I should also add that the division itself was in no way surprising or unexpected in hindsight. The only thing unexpected in terms of the paper (Hoser 2013a) was that no one had made this division earlier.

The only logical conclusion reached by myself has been that the few taxonomists who delved into the issue of relationships between living members of Helodermatidae inadvertently confused levels of division required at both family and genus level.

Hoser (2013b) also used molecular and morphological evidence to create a new taxonomy for living varanids.

While there were numerous new divisions within the living varanids as compared to other earlier classifications in use, these are not out of line with the relevant divergences as compared to other groups of living reptiles such as skinks, venomous snakes and the like.

The placement of all widely divergent species of living varanid into the single genus *Varanus* has been known to be ridiculous for many years.

The sooner the use of the name "*Varanus*" by taxonomists and others to define each and every extant varanid is jettisoned, the better!

The two families Shinisauridae and Lanthanotidae are both monotypic, and so there is no need or basis with which to divide the genera as they stand.

Furthermore recent molecular and morphological studies of the relatively limited populations of the living species have shown them to be very similar morphologically and genetically similar as well, meaning that there is no real prospect of either being recognized as more than one species in the near future, let alone different genera!

Relevant publications in terms of Shinisauridae include: Ahl (1930), Akeret (2011), Bobrov and Semenov (2008), Conrad (2004, 2006), Good *et al.* (1993), Grychta (1993), Haas (1960), Hecht and Costelli (1969), Hecht *et al.* (2013), Hu *et al.* (1984), Li *et al.* (2012), Lu *et al.* (2003), Macey *et al.* (1999), Mägdefrau (1987), Mägdefrau and Schildger (1993), Pyron *et al.* (2013), Sang *et al.* (2009), Shen and Li (1982), Sprackland (1996b), Visser (1989), Wilke (1985), Wölfel (2003), Zhao and Adler (1993), Zhenchang (2002), Ziegler *et al.* (2008), Zollweg (2010, 2011), Zollweg and Kühne (2013) and sources cited therein.

Relevant publications in terms of Lanthanotidae include: Auliya (2006), Boulenger (1885, 1899b), Das (2004), Das and Yaakob (2007), de Rooij (1915), Manthey and Grossmann (1997), McDowell (1967), McDowell and Bogert (1954), Mertens (1961), Miller (1966), Sprackland (1976), Steindachner (1877, 1878), Underwood (1957), Yaap *et al.* (2012) and sources cited therein.

So as inferred already, the purpose of this paper is to in effect

complete a thorough review of the living Varanoidea at the generic level.

In line with this review, I note that a number of recent molecular studies have highlighted divergences between currently recognized genera of lizards within the four closely associated lizard families Xenosauridae, Anniellidae, Diploglossidae and Anguidae, which share the same clade as *Heloderma*.

These divergences are corroborated by well-defined morphological differences.

Combined they make a strong case for the division of a number of genera.

Molecular, taxonomic and other studies relevant to the phylogeny of the Xenosauridae, Anniellidae, Diploglossidae and Anguidae include the following: Ast (2001), Böhme and Ziegler (2009), Bryson (2011), Gómez-Tuena *et al.* (2007), Macey *et al.* (1999), McDowell and Bogert (1954), Pyron *et al.* (2013), Vidal and Hedges (2005, 2009), Underwood (1957), Vidal *et al.* (2012) and sources cited therein.

Key references in terms of the Xenosauridae include the following: Ballinger *et al.* (2000a, 2000b), Barrows and Smith (1947), Bhullar (2011), Boulenger (1885), Camarillo (1998), Camarillo and José (1990), Canseco-Marquez *et al.* (2000), Cope (1867), Gray (1856), Günther (1885), Haas (1960), King and Thompson (1968), Köhler (2000), Lara-Tufiño *et al.* (2013), Lemos-Espinal and Smith (2005), Lemos-Espinal *et al.* (1996, 1998, 2000a, 2000b, 2004a), Lynch and Smith (1965), Martin (1958), Molina-Zuluaga *et al.* (2013), Nieto-Montes de Oca and Smith (2001), Nieto-Montes de Oca *et al.* (2013), Pérez Ramos *et al.* (2000), Peters (1861), Phillips (2003), Pianka and Vitt (2003), Pyron *et al.* (2013), Smith and Iverson (1993), Smith *et al.* (2000), Stuart (1941), Taylor (1949), Werler and Shannon (1961), Wilson *et al.* (2013), Woolrich-Piña and Smith (2012), Woolrich-Piña *et al.* (2012) and sources cited therein.

Key references in terms of the Anniellidae, a group recently thought (by most herpetologists) to only include two living species, includes the following: Baur (1894), Bertolotto *et al.* (2004), Bettelheim (2005), Bezy and Weight (1971), Bezy *et al.* (1977), Bhullar and Bell (2008), Boulenger (1885, 1887b), Collins and Taggart (2009), Conrad and Norell (2008), Fischer (1886a, 1886b), Gorman (1957), Gray (1852a, 1852b), Grinnell and Camp (1917), Hallermann (1998), Hunt (1983, 2008a, 2008b), Jennings *et al.* (1992), Klauber (1932, 1940), Limer (2007), Parham and Papenfuss (2009), Papenfuss and Parham (2013), Pearse and Pogson (2000), Pianka and Vitt (2003), Sanchez-Pacheco and Mellink (2001), Pyron *et al.* (2013), Shaw (1940, 1953), Smith and Taylor (1950), Sprackland (1996a), Stebbins (1985), Van Denburgh (1905b), Wermuth (1969), Zweifel (1958) and sources cited therein.

Key references in terms of the Diploglossidae include the following: Avila *et al.* (2013), Avila-Pires (1995), Barbour (1909, 1910, 1919), Barbour and Ramsden (1919), Barbour and Schreie (1937), Blackburn (1999), Borges-Nojosa and Caramaschi (2003), Brongersma (1946), Bauer *et al.* (1995), Bérnils *et al.* (2001), Bocourt (1873, 1874, 1881), Böhme and Fischer (1998), Borges-Nojosa and Caramaschi (2003), Boulenger (1885, 1886, 1887a, 1894, 1895, 1898, 1913a), Caldeira Costa *et al.* (2009), Campbell and Camarillo (1994), Campos-Rodríguez and López-Vidal (2007), Canseco-Marquez *et al.* (2000), Castro-Herrera and Vargas-Salinas (2008), Cei (1993), Cochran (1927, 1939, 1941), Coleman (1997), Cope (1861, 1862, 1863, 1867, 1868a, 1879, 1885a, 1894), Cocteau and Bibron (1838), Cousens (1956), Dirksen and De la Riva (1999), Dirksen *et al.* (1995), Duellman (1963), Duméril and Bibron (1839), Fischer (1886a, 1886b, 1886c, 1888), Fugler (1989), Gallardo (1966), Garman (1887, 1888), Genise (1983), Good (1992), Good *et al.* (1993), Grant (1940a, 1940b, 1951), Gray (1831, 1839, 1845, 1852a, 1852b), Günther (1885), Hallermann and Böhme (2002), Hallowell (1856a), Hamdan *et*

*al.* (2013), Henderson (1988a, 1988b, 1988c), Henderson and Schwartz (1984), Hidalgo (1982), Inchaustegui *et al.* (1985), Joseph-Ouni (2005), Kahl (1981), Köhler (2000, 2008), Köhler *et al.* (2004, 2005, 2013), Lee (1996, 2000), Liner (1994), Kronauer (1999), Lotzkat *et al.* (2010), Myers (1973), McCranie and Wilson (1996), Mertens (1939), Montanelli and Chebez (1997), Montero *et al.* (1995), Oliveira Lula Salles *et al.* (2010), O'Shaughnessy (1874a, 1874b), Parker (1924), Peracca (1890, 1891), Pérez-Higareda *et al.* (2002), Peters (1874, 1878), Peters and Donoso-Barros (1970), Pianka and Vitt (2003), Powell (1999), Powell and Henderson (2003), Powell and Inchaustegui (2009), Powell *et al.* (1996, 1999), Prigioni *et al.* (2011), Pyron *et al.* (2013), Reuss (1834), Ribeiro *et al.* (2012), Rivero (1978), Rodrigues (2003), Rodríguez Schettino *et al.* (2013), Savage and Lips (1993), Savage *et al.* (2008), Schmidt (2011), Schmidt (1928, 1933), Schmidt and Inger (1951), Schwartz (1964, 1965, 1970, 1971), Schwartz and Henderson (1985, 1991), Schwartz and Inchaustegui (1976), Schwartz and Jacobs (1989), Schwartz *et al.* (1979), Shaw (1802), Sferco and Haro (1991), Silva-Soares *et al.* (2011), Sites *et al.* (2011), Slevin (1928), Smith (1942), Smith and Taylor (1950), Spix (1825), Stejneger (1904), Strahm and Schwartz (1977), Taylor (1956), Thomas (1971), Thomas and Hedges (1989, 1998), Tittel (2013), Townsend *et al.* (2005), Underwood (1959, 1964), Vanzolini (1958), Villa and Occhipinti (1988), Villa and Wilson (1988), Vitt (1985), Vrcibradic *et al.* (2011), Wagler (1828), Weinland (1863), Werler and Campbell (2004), Werner (1901, 1910), White and Powell (1996), Wiegmann (1834), Wiens and Slingluff (2001), Wilson and McCranie (2001, 2002), Wilson and Vogel (2000) Wilson *et al.* (1986), and sources cited therein.

Within the Gerrhonotidae there are two main divisions, these being the Anguinae and the Gerrhonotinae.

Key references in terms of the Anguinae include the following: Ahmed *et al.* (2009), Alfermann and Völkl (2004), Ali (1950), Allen (1932), Al-Quran (2009), Anderson (1999), Arakelyan *et al.* (2011), Arnold (2002), Bain and Truong (2002), Bar and Haimovitch (2012), Baran *et al.* (1988), Bartlett and Bartlett (1999), Bauer (2007), Berroneau *et al.* (2010), Berthold (1840), Beshkov and Nanev (2006), Best (1965), Bird (1936), Bischoff (2002), Bischoff and Bischoff (1980), Blair (1950, 1961), Blyth (1854), Bobrov (1995), Bobrov and Semenov (2008), Bogosian *et al.* (2012), Born (1883), Boulenger (1887a, 1885, 1891, 1899a), Broggi (1978), Brygoo (1988), Bryson and Graham (2010), Burt (1935), Campbell and Frost (1993), Campbell *et al.* (1998), Campden-Main (1970), Canova and Marchesi (2007), Capula and Luiselli (1993), Capula *et al.* (1993, 1999), Ceirans (2004), Cevik (1999), Clark (1994), Clark and Clark (1970), Cogălniceanu *et al.* (2013), Collins and Taggart (2009), Conant and Collins (1991), Conrad and Norell (2008), Conrad *et al.* (2011), Cope (1880, 1900), Covaciu-Marcov *et al.* (2007, 2008, 2009), Coues (1871), Cox *et al.* (1998), Crother *et al.* (2012), Darevsky and Sang (1983), Das (2004), Das and Yaakob (2007), Davies (1967), de Rooij (1915), Disi *et al.* (2001), Dixon (2000), Dossenbach and Ganz (1977), Dujsebayaeva (2010), Duméril and Bibron (1839), Dundee and Rossman (1989), Elmerg (1995), Enge (1994a, 1994b), Engelmann *et al.* (1993), Escoriza and del Mar Comas (2011), Esser (2011), Evans (1905), Fitch (1989), Forcart (1950), Fouquette and Delahoussaye (1966), Franklin (2005), Frazer (1949), Frick (1997), Fritz (2011), Frynta *et al.* (1997), Girolla (1996), Gollmann and Gollmann (2008), Gravenhorst (1851), Gray (1845, 1853), Grillitsch and Cabela (1990), Günther (1873, 1885), Gvođiik *et al.* (2010, 2013), Hallowell (1956b, 1956c), Hartweg and Tihen (1946), Henle (1985), Holman (1965, 1966, 1971a, 1971b, 1971c, 1971d, 1971e, 1971f), Hraoui-Bloquet *et al.* (2002), Inger *et al.* (1990), Jablonski (2011), Jablonski and Meduna (2010), Johnson and LaDuc (1994), Kasapidis *et al.* (1996), Kasperek (1990), Ka'stler *et al.* (2013), Keskin *et al.*

(2013), Kishida (1930), Klembara (1979), Kovatscheff (1903), Kumlutas *et al.* (2004), Kwet (2010, 2013), Lalremsanga *et al.* (2010), Langerwerf (1980), Lantermann and Lantermann (2010), Laufer *et al.* (2007), Lenz (2012), Leptien (2010), Leviton *et al.* (1992), Leydig (1886), Lidth De Juede (1905), Lin *et al.* (2003), Liner (2007), Linné [= Linnaeus, C.] (1758, 1766), Liu-Yu (1970), Lönnberg (1894), Luiselli (1992), Luiselli *et al.* (1994), Macey *et al.* (1999), Malkmus (1982, 1995a, 1995b), Malkmus *et al.* (2002), Manthey (1983), Manthey and Grossmann (1997), Mateo *et al.* (1998), Mayer *et al.* (1991), McConkey (1952, 1955, 1957), Mellado and Mateo (1992), Mertens (1959), Milto (2010), Mitchell (1994), Mitchell and Reay (1999), Mocquard (1905a, 1905b), Musters and In den Bosch (1982), Necas *et al.* (1997), Neill (1949), Nguyen *et al.* (2011), Nikolsky (1897), Noble and Mason (1933), Nöllert *et al.* (1986), Obst (1980), Ochsenein (2013), Pallas (1775), Palmer (1968, 1987, 1988, 1992), Palmer and Braswell (1995), Pawlowski and Krämer (2009), Petrov *et al.* (2006), Petzold (1971), Pianka and Vitt (2003), Plessas (2002), Pollini (1818), Polovic and Cadenovic (2014), Pottier *et al.* (2008), Pous *et al.* (2011), Pyron *et al.* (2013), Rastegar-Pouyani *et al.* (2008), Rifai *et al.* (2005), Risso (1826), Roitberg *et al.* (2000), Rutschke *et al.* (2005), Saikia *et al.* (2007), Sang *et al.* (2009), Schleich *et al.* (2006), Schlüter (2005a, 2005b), Schmidt (1953), Schneider (1986), Schultschik and Steinfartz (1996), Schwartz and Henderson (1991), Sehnaal and Schuster (1999), Shaw and Nodder (1800), Shoop and Ruckdeschel (1997), Sindaco and Jeremcenko (2008), Sindaco *et al.* (2000), Smith (1935, 1951), Smith and Leonard (1934), Sos (2007, 2008), Sos and Herczeg (2010), Stains (1954), Stejneger (1910, 1919), Stèpànek (1937), Strugariu *et al.* (2008, 2009), Stumpel and Bert van der Werf (2012), Szabo and Vörös (2014), Szczerbak (2003), Teran-Juarez (2008), Thanou *et al.* (2014), Tonge (1986), Tóth *et al.* (2002), Trapp (2005, 2007), Venugopal (2010), Vervust *et al.* (2009), Wall (1908), Wallin (2001), Wermuth (1969), Werner (1894, 1931), Werner (1988), Wiens and Slingluff (2001), Wilgers *et al.* (2006), Wirth (2011a, 2011b), Wütschert (1984), Yang (1984), \*agar *et al.* (2014), Zhong (1993) and sources cited therein.

Key references in terms of the Gerrhonotinae include the following: Akeret (2006), Alvarez (1982), Ariano-Sanchez and Melendez (2014), Asams *et al.* (1999), Baird (1859), Baird and Girard (1852), Banta *et al.* (1996), Bauer *et al.* (1995), Beolens *et al.* (2011), Bille (2001), Blackburn (1994), Blainville (1835), Blair (1950), Blatchley (1893), Bocourt (1872, 1873a, 1873b), Bogert and Porter (1967), Boulenger (1885, 1887c, 1913b), Bradley and Deacon (1966), Brodie and Savage (1993), Bryson and Graham (2010), Bryson and Lazcano (2005), Bryson *et al.* (2005), Burt (1933), Campbell (1982, 1984), Campbell and Brodie (1999), Campbell and Frost (1993), Campbell and Vannini (1989), Campbell *et al.* (1998), Castiglia *et al.* (2010), Chiszar *et al.* (2004), Conant and Collins (1991), Collins and Taggart (2009), Conroy *et al.* (2005), Contreras-Arquieta (1989), Cope (1866, 1864, 1867, 1868b, 1878, 1885a, 1885b, 1900), Crother (2012), Davis and Dixon (1961), Degenhardt *et al.* (1996), del Campo (1939), Dixon (2000), Dixon and Lemos-Espinal (2010), Dugés (1893), Duméril and Bibron (1839), Dunn (1936), Dunn and Emlen (1932), Espinoza *et al.* (1999), Fitch (1934, 1936, 1938, 1973), Flesch *et al.* (2010), Flores-Villela and Canseco-Marquez (2004), Flores-Villela and Sanchez-H (2003), Flury (1949), Franzen and Haft (1999), Fugler and Webb (1956), García-Bastida *et al.* (2013), Gebhart (2010), Gehlbach and Collette (1957), Gloyd and Smith (1942), Good (1994, 1988, 1995), Good and Schwenk (1985), Good and Wiedenfeld (1995), Good *et al.* (1993), Gray (1838, 1845), Grinnell and Camp (1917), Grismer (1988, 2001), Grismer and Hollingsworth (2001), Günther (1885), Gutsche (2012), Hammerson (2007), Hartweg and Tihen (1946), Hidalgo (1983), Jones and Lovich (2009), Karges and Wright (1987), Kahl *et al.*

(1980), Kerster and Smith (1955), Knight and Scudday (1985), Köhler (2000), Langner (2014), Lais (1976a, 1976b, 1976c), Lambertz and Graba (2011), Langerwerf (1979), Langner (2007, 2013a, 2013b, 2014), Lemos-Espinal *et al.* (2004b), Leoza-Corichi and Flores-Villela (1995), Liner (1994, 2007), Liner *et al.* (1973), Martin (1958), McCoy (1970), McCranie and Wilson (1999, 2001), McDiarmid *et al.* (1976), Medica (1965), Mertens (1952), Murphy and Smith (2013), Nussbaum *et al.* (1983), O'Shaughnessy (1873), Otvos (1977), Pachmann (2012), Painter and Jennings (1998), Pérez-Higareda *et al.* (2002), Peters (1876), Peters and Donoso-Barros (1970), Peterson *et al.* (2004), Pianka (2012), Pianka and Vitt (2003), Pyron *et al.* (2013), Quintero-Díaz *et al.* (1999), Ramirez-Bautista *et al.* (1998a, 1998b), Rochester *et al.* (2010), Sanchez-Herrera and López-Forment (1980), Savage and Villa (1986), Schmidt (1991, 1992), Schmidt and Shannon (1947), Schlüter (2007), Siebenrock (1892, 1895), Skilton (1849), Smith (1942, 1946, 1986), Smith and Alvarez Del Toro (1963), Smith and Smith (1981), Smith and Taylor (1950), Smith *et al.* (2002, 2003), Stebbins (1958, 1985), Stejneger (1893, 1890, 1902, 1907), Sunyer and Köhler (2007), Taylor (1953, 1956), Tihen (1944, 1948, 1949a, 1949b, 1954), Trapp (2012), Valdez-Lares *et al.* (2013), Van Denburgh (1895, 1898, 1905a), Vazquez Diaz and Quintero Díaz (2005), Vesely and Köhler (2001), Vindum and Arnold (1997), Waddick and Smith (1974), Wagler (1833), Webb (1970, 1984), Webb and Hensley (1959), Werler and Shannon (1961), Werning (2012, 2013), Wiegmann (1828, 1834), Wilson and McCranie (2003), Wilson *et al.* (2013), Woodbury (1945), Zaldivar-Riveron and Nieto-Montes de Oca (2001, 2002), Zaldivar-Riveron *et al.* (2005), Zweifel (1954, 1958) and sources cited therein.

As a result of the above, the following genera as presently recognized by most herpetologists in 2014 are split according to the rules of the Zoological Code (Ride *et al.* 1999).

These are as follows:

*Xenosaurus* Peters, 1861 is divided into two, with the erection of *Eastmansaurus gen. nov.* to accommodate four species found north of the Mexican transvolcanic belt. The species from the Atlantic versant of Mexico remain in the genus as do those from the Pacific coast region of the Sierra Madre del Sur in Guerrero and Oaxaca, although the latter group are placed in a newly named and defined subgenus *Rossnolansaurus subgen. nov.*

*Anniella* Gray, 1852 is divided into two with the erection of *Kendslider gen. nov.* to accommodate one species.

For the Diploglossidae the following changes are made.

*Celestus* Gray, 1839 is divided three ways, using *Celestus* for the Hispaniolan group, *Siderolamprus* Cope, 1860 for the mainland species and the erection of a new genus *Toscanosaurus gen. nov.* for divergent species from Jamaica. *Siderolamprus* (from mainland Middle America) is divided into four subgenera, including *Garyallensaurus subgen. nov.*, *Conningsaurus subgen. nov.* and *Dannybrownsaurus subgen. nov.*

*Diploglossus* Wiegmann, 1834 is divided four ways with three new genera being erected to accommodate Antillean species, namely *Artusbrevis gen. nov.*, *Masonnicolasaurus gen. nov.* and *Laurielevysaurus gen. nov.*

*Ophiodes* Wagler, 1830 is also recognized unchanged from other recent works.

*Sauresia* Gray, 1852 is also recognized as valid.

The Diploglossidae are also placed into two new tribes, namely Diploglossiini *tribe nov.* and Toscanosauriini *tribe nov.* both formally named herein according to the Zoological Code (Ride *et al.* 1999).

For the Anguinae the following changes are made:

Within Anguinae *Ophisaurus* Daudin, 1803 is divided into four,

with the resurrection of *Hyalosaurus* Günther, 1873 for the African species and the erection of *Binghamsaurus gen. nov.* and *Smythsaurus gen. nov.* to accommodate North American species.

*Dopasia* Gray, 1853 is divided into two with the erection of *Richardsonsaurus gen. nov.* to accommodate the Chinese "harti" species group.

The Anguinae is also divided into two tribes.

Within Gerrhonotinae *Elgaria* Gray, 1838 is divided into two with the erection of *Pitmansaurus gen. nov.* to accommodate the divergent taxon *Elgaria coerulea* (Wiegmann, 1828) with both genera placed in a new tribe Pitmansauriini *tribe nov.* and all others in the subfamily placed in the newly named and defined nominate tribe.

*Gerrhonotus* Wiegmann, 1828 is divided into two with the erection of *Lindholtsaurus gen. nov.* to accommodate the divergent species *Gerrhonotus parvus* Knight and Scudday, 1985 and two others.

*Mesaspis* Cope, 1878 is divided into two with the erection of *Rentonsaurus gen. nov.* to accommodate the divergent taxon *Mesaspis gadovii* (Boulenger, 1913). For the remainder, two species are placed in the subgenus *Rayplattsaurus subgen. nov.*

*Abronia* Gray, 1838 is herein regarded as paraphyletic with the adoption of all subgenera formally proposed by Campbell and Frost, 1993, (being *Abronia*, *Abaculabronia*, *Aenigmabronia*, *Auriculabronia*, *Lissabronia*, *Scopaeabronia*). In addition three new subgenera, *Assangesaurus subgen. nov.*, *Elliottsaura subgen. nov.* and *Lanisaurea subgen. nov.* are erected for species not properly accommodated within the existing divisions.

The divergent taxon, *Abronia mixteca* Bogert and Porter, 1967 is placed in its own monotypic genus, *Snowdonsaurus gen. nov.*

#### UNLAWFUL THEFT OF MATERIALS AND DATA.

I also note the following: In 2006 an online petition sponsored by a group of animal-hating pseudoscientists including Wolfgang Wüster, Mark O'Shea, David John Williams, Bryan Fry and others posted at: <http://www.aussiereptileclassifieds.com/phpPETITION> (Hunter *et al.* 2006) called for my successful wildlife education business (Snakebusters®) and all my other herpetological activity to be shut down by the government of Victoria, Australia. These men were successful in that after a ruthless five-year campaign, on 17 August 2011, 11 heavily armed police and wildlife officers conducted a highly illegal and violent raid on our family home and research facility. Myself, my wife and two young daughters were criminally assaulted without provocation, arrested at gunpoint and held captive in the kitchen of the house during the nine hour raid. This was while the facility was ransacked. Besides the unspeakable acts of deliberately killing captive snakes and criminal damage to cages and household goods, the raiding officers illegally shut down our business and effectively placed myself under house arrest at gunpoint for some months after the raid.

An application by myself to the Supreme Court of Victoria led to the re-opening of our unlawfully shut down wildlife education business although the long term damage to the enterprise was irreparable.

Of greater relevance here is that at the time of the raid, research files spanning more than 40 years were taken and never returned, including materials and records relevant to this and other scientific papers.

Material taken included all the computers, disks, hard drives, backups, cameras, books, scientific literature and other forms of information storage at the facility. All were loaded into the back of a truck and trailer and carted off.

Faced with the dilemma of deciding whether to spend another forty years gathering data, by which time I may be dead from old age, being aged 52 as of 2014, or publishing the relevant paper/s with minimal available data, I have opted to publish. Underlying this motivation has been an increasing concern that a delay to formally identify and name undescribed biodiversity may lead to its extinction before another scientist gets around to the matter.

I concur with the statements of Engstrom *et al.* (2002) who wrote: "The documentation of this diversity must be seen as an activity that is done not just for posterity but for immediate action and protection."

A number of authors including Kaiser (2012a, 2012b, 2013 and 2014), Kaiser *et al.* (2013), Naish (2013) and Wüster *et al.* (2014a, 2014b), all part of the group of people effectively controlled by Wüster, have been highly critical of the fact that I have assigned names to unnamed clades of snakes. Their unscientific and childish attacks, continued incessantly on social media such as Facebook and Twitter are rejected herein as destabilizing the nomenclature, impeding the progress of science and putting the very existence of species at risk.

Their ridiculous comments and false and defamatory statements are systematically rebutted by Hoser (2013b).

I also note that many taxa formally named by myself for the first time in earlier publications (e.g. Hoser 2000a, 2000b) are in fact threatened species.

Therefore I note the sensible remarks of Engstrom *et al.* (2002) as a perfectly reasonable explanation for the publishing of taxon descriptions for such unnamed groups. This remains the case even if a sizeable amount of my original research, files, photos and data have been stolen and therefore cannot be relied upon and incorporated into these contemporary publications.

While speaking about thefts, the following authors, namely Wallach *et al.* (2009), Baig *et al.* 2012., Bates *et al.* (2013), Reynolds *et al.* (2013a, 2013b and 2014), Hedges *et al.* (2014), Thomas *et al.* (2014), Schleip (2014), Pyron and Wallach (2014) and Pyron *et al.* (2014) all close associates of serial criminal Wolfgang Wüster, (based on Wales, UK) have all engaged in an attempted theft of my own research spanning some decades by publishing so-called papers that knowingly and deliberately step outside the zoological code to rename species and genera previously named by myself using the scientific method.

The deliberate creation of junior synonyms and promoting them as valid is a breach of numerous sections of the rules as spelt out in Ride *et al.* (1999), and both unscientific and unethical. It is also criminal activity in law and therefore subject to both criminal and civil sanctions.

#### NOTES ON TAXA NAMED HEREIN.

In the event a later author seeks to merge one or more taxon described within this paper, the order of priority should be by page priority in terms of this paper; that is the first name listed is the first to be used. Gender, spellings and the like of names or other perceived errors should not be altered in any way unless mandated by the Zoological Code, even if apparently wrong in the original descriptions herein, including by derivation or gender.

#### XENOSAURUS PETERS, 1861.

The genus as known to date, monotypic for the extant (living) Xenosauridae has long been known to fit within two phylogenetic groups. These are found on either side of the Mexican transvolcanic belt (Bhullar, 2011).

The differences between the two species groups are significant both morphologically and in terms of molecular divergence and so it is a no-brainer that they should be split into two genera within the family Xenosauridae.

This is especially noting that based on geological evidence the two groups split somewhere between 10-19 MYA (Gómez-Tuena *et al.* 2007).

The new unnamed genus for species north of the Mexican transvolcanic belt is herein described as *Eastmansaurus gen. nov.* and it accommodates the four species found north of the Mexican transvolcanic belt.

Species found south of the Mexican transvolcanic belt were also found by Bhullar (2011) to split into two major clades, although less divergent from one another, than that group from the north. One of these is described herein as a new subgenus on the basis it clearly diverged from the other group more than 5 MYA, and most likely about 7-8 MYA.

The species from the Sierra Madre del Sur in Guerrero and Oaxaca form a distinctive morphological and phylogenetic group as does the group from the Atlantic versant of Mexico. The Atlantic group forms the nominate subgenus, whereas the other group is herein defined as the subgenus *Rossnolansaurus subgen. nov.*

*Xenosaurus* is defined by Peters, 1861 and again by Boulenger, 1885 (the more detailed of the two descriptions), the Boulenger diagnosis being for the family Xenosauridae.

Therefore the genus is not formally redefined herein, but if need be can be defined by a process of elimination of species from *Eastmansaurus gen. nov.*

The same applies in terms of the nominate subgenus *Xenosaurus*, which can be defined by eliminating species within *Rossnolansaurus subgen. nov.*

As already inferred, species not within *Eastmansaurus gen. nov.* and the *Xenosaurus* subgenus *Rossnolansaurus subgen. nov.* remain within *Xenosaurus* and the nominate subgenus. Those species (as currently recognized) are *Xenosaurus grandis* (Gray 1856) (type species), *X. arboreus* Lynch and Smith, 1965 and *X. rackhami* Stuart, 1941.

Some species identified within this paper within the genera *Xenosaurus* and *Eastmansaurus gen. nov.* are in fact composite.

#### GENUS EASTMANSAURUS GEN. NOV.

**Type species:** *Xenosaurus platyceps* King and Thompson, 1968.

**Diagnosis:** *Eastmansaurus gen. nov.* are separated from *Xenosaurus* Peters, 1861 as defined by Boulenger (1885), p. 250 under the heading Xenosauridae, by the following two combinations of characters:

*Eastmansaurus gen. nov.* are separated from all *Xenosaurus* except *X. agrenon*, in that the largest supraoculars are not, or only slightly, wider than long (largest supraoculars distinctly wider than long in the other taxa), and in usually having 2 postrostral scales on each side of the midline (1 medial and 2-3 lateral postrostral scales between the medial postrostral and nasal scales on each side in the other taxa). Secondly, *Eastmansaurus gen. nov.* differs from *X. agrenon*, *X. grandis*, *X. penai* and *X. rackhami* by having a venter that is immaculate or with only diffuse, scattered dark specks on the sides (usually distinct, dark scattered scales and crossbars on the venter in the other taxa) and the postorbital region rounded, lacking a canthus temporalis demarcated by enlarged or well-defined scales. In the other taxa, the canthus temporalis varies from weak (yet distinct) to well developed, and consists of a longitudinal postorbital series of enlarged scales distinctly set off from the smaller granular temporal scales.

*Eastmansaurus gen. nov.* may be further distinguished from *X. phalaroanthereon* and *X. rectocollaris* by having the postorbital and zygomatic ridges widely separated from each other by an intervening row of scales (postorbital and zygomatic ridges usually in contact [in most *X. phalaroanthereon*; in all *X. rectocollaris*]) and by having more lamellae under the fourth toe

(23-26,  $\bar{x}$  = 24.3,  $n$  = 25; 19-22,  $\bar{x}$  = 19.4,  $n$  = 16, in *X. phalaroanthereon*; 20-22,  $\bar{x}$  = 20.5,  $n$  = 11, in *X. rectocollaris*). *Xenosaurus* are separated from *Eastmansaurus gen. nov.* by having only one small, lateral postrostral scale between the enlarged, medial postrostral and the nasal scale (lateral postrostral absent or medial and lateral postrostrals undivided on one or both sides in most specimens) and largest supraoculars hexagonal, distinctly wider than long. In *Eastmansaurus gen. nov.*, there are 2-3 small lateral postrostrals between the medial postrostral and the nasal scale, and the largest supraoculars are rounded, only slightly wider than long.

**Distribution:** A small region north of the Mexican transvolcanic belt, Mexico.

**Etymology:** Named in honour of David Harold Eastman (born 29 September 1945), a well known Australian corruption whistleblower.

He was a former public servant from Canberra, Australia who first came to the attention of authorities when he alleged police involvement in the illegal drugs trade in Canberra.

Subsequent to this in 1995 he was convicted of the murder of Australian Federal Police Assistant Commissioner Colin Winchester and was sentenced to life imprisonment without parole.

Eastman was found guilty by a Canberra court of shooting Winchester twice in the head at point blank range in the driveway of Winchester's home in Deakin, Australian Capital Territory on 10 January 1989. The evidence against Eastman was described at the time as circumstantial at best.

Winchester and other Federal Police had been actively involved in the illegal drug trade, including growing large marijuana crops in southern New South Wales, Australia (Hoser 1999).

Evidence suggests that Winchester was wrongly charged and convicted. Notable is that for a sizeable part of his 85 day criminal trial, he was effectively denied legal representation (Hoser 1999).

In part as an upshot of the publication of a book called *Victoria Police Corruption* (Hoser 1999) a new inquiry relating to Eastman's wrongful conviction was announced in August 2012.

In 2014, the inquiry, headed by Justice Brian Ross Martin, confirmed the contents of the books *Victoria Police Corruption* (1 and 2) were correct. He found that there had been "a substantial miscarriage of justice", Eastman "did not receive a fair trial", the forensic evidence on which the conviction was based was "deeply flawed" and recommended the conviction be quashed.

This did in fact happen on 22 August 2014 and on that date he was formally released from jail.

However that Winchester had not been guilty of the murder was first revealed by Hoser (1999).

In that book, there was a long section detailing the framing of Eastman and circumstances surrounding the event. Part of it read as follows:

"Although senior public servant David Eastman was eventually convicted of Winchester's murder, there is little doubt that he was not the actual murderer. Rather he was just framed by Police to fit the part. To convict him the AFP spent over a million dollars in surveillance on him, falsified a series of other charges against him and by all objective accounts had trouble building much of a case against him. The AFP had Eastman under 24 hour surveillance from 13 January, 1989 to 7 August 1990, several periods in 1992 and at other times. Some of the tapping of his phones was illegal, including that of Eastman's private conversations with his lawyers. Police harassment of his lawyers forced them to stop acting for him, leaving him unrepresented at critical times, thereby assisting Police in

eventually convicting him. A number of Canberra-based journalists who have attempted to investigate the Winchester/Eastman matter have been warned off by Police and others from looking too closely, while there have been allegations of harassment against those who have attempted to pursue the matter.

It is widely thought that other corrupt elements within the AFP or associates conspired to have Winchester murdered, for reasons that even now are not clear. For example during the inquest into Winchester's death, AFP Detective Commander Ric Ninness made a number of false and unsubstantiated comments about Eastman in a crude attempt to paint him as a man of bad character. Ninness stated that Eastman broke the law whenever he wanted to, was violent and had driven neighbors from their homes, assaulted court staff and other matters. All allegations, many of which were repeatedly reported by so-called investigative journalists in the media were later found to be false and baseless. Shortly after Winchester's murder, Ninness even took upon himself to call Eastman and tell him that the AFP was after him and no one else, even though the media had speculated organized crime was behind the Winchester murder. It has since been alleged that Ninness decided to fit Eastman with the crime after the two had a falling out after Eastman was charged by Federal Police with assault. Eastman had said the allegation was false and was seeking to have the charge dropped at the time of the Winchester murder.

In 1989, a senior Federal Police officer admitted that there were five other good lines of investigation other than Eastman, although it later transpired that all were deliberately played down. One line of investigation not pursued was evidence from other Federal Police that Mafia interests had fallen out with him and that a contract had been put on his life some months earlier. This information was known to the AFP some time before Winchester's murder, but was not acted on. Noel Sharp told the inquest that in November 1988, he was told by an Italian crime figure that Winchester was going to be butchered. John Doohan backed up Sharp's allegations."

Noting that an Eastman had been a law-abiding man acting in the public interest and had his life destroyed by a wrongful murder conviction, it is only fair and reasonable that he be honoured via a patronym name for a magnificent lizard genus, so that others may be made aware of the Eastman story and hopefully become more vigilant against corruption in police and other arms of government.

**Content:** *Eastmansaurus platyceps* (King and Thompson, 1968) (type species); *E. mendozai* (De Oca, Garcia-Vazquez, Zuniga-Vega and Schmidt-Ballardo, 2013); *E. newmanorum* (Taylor, 1949); *E. tzacualtipantecus* (Woolrich-Pina and Smith, 2012).

#### **SUBGENUS ROSSNOLANSAURUS SUBGEN. NOV.**

**Type species:** *Xenosaurus agrenon* King and Thompson, 1968.

**Diagnosis:** *Rossnolansaurus subgen. nov.* is a subgenus within *Xenosaurus* Peters, 1861.

*Rossnolansaurus subgen. nov.* are separated from all other *Eastmansaurus gen. nov.* and *Xenosaurus* Peters, 1861 by the following suite of characters:

It is a relatively small and stocky Xenosaurid lizard with a head that is broadly thick and triangular. Head is approximately 0.87 times as wide as long; 0.55 times as wide as high and .025 times the snout-vent length. Canthus temporalis is weak, consisting of a longitudinal postorbital series of slightly enlarged scales distinctly set off from smaller granular temporal scales. Dorsal head scales are rugose, not forming a distinct pattern. The rostral is about equal to or slightly less than the width of the mental. The nostril is confined to a single large scale. Supralabials 11-13 on each side, totalling 23-26 scales, convex and moderately keeled in the orbital region. Infralabials 9-11 on

each side totalling 18-21, flat sided, becoming strongly keeled posteriorly. Supraorbital semicircles consist of a series of rugose, strongly keeled scales, that may be in contact mid dorsally or separated by a single row of scales. Superciliaries and suboculars terminate at the anterior corner of the orbit. A longitudinal series of 3-4 enlarged hexagonal, wider than long supraoculars are present. Suboculars are separated from the supralabials by a longitudinal series of scales that originate in the loreal region and terminate behind the orbits, or may curve up to the canthus temporalis. Temporal region with large, rounded conical tubercles separated from each other and the canthus temporalis by 1-4 rows of minute granules. Tympanum is covered with a thick membrane with small, granular scales. Mental followed by two large chinshields posteriorly, each in contact with one or two infralabials on each side, followed posteriorly by two rows of enlarged scales that lie over the mandibles. The throat and gular region are covered with small elongate granular scales that are arranged in oblique longitudinal rows. Gular fold is well developed. An additional weak fold extends from the retroarticular region of the jaw to the scapular region. The chest is covered with flat, relatively large scales arranged in an oblique transverse series, but not separated midventrally. There are 32-38 transverse rows of scales between the axilla and groin and 19-22 scales per row at the widest part of the belly. The preanal scales are slightly enlarged, separated from the ventrals by 2-3 rows of smaller scales. A well-developed fold extends from the axilla to the groin. The tubercles above the lateral fold are primarily arranged in oblique longitudinal rows, and secondarily in transverse rows. Paravertebral rows of tubercles are also present. The enlarged tubercles on the dorsal surface of the arm are separated from each other by 1-2 rows of minute granules. Tubercles on the dorsal surface of the legs are about equal to those on the arms, but more widely spread. The tail is an average of 0.87 times the snout-vent length.

Total length is up to about 186 mm, with a snout vent length to about 99 mm, head length to 25.3 mm, head width to 22.7 mm, and head depth to 12.1 mm.

Dorsal ground colour is medium to dark brown; transverse light bands are usually present, but may be reduced to a row of spots; dark nape-spot is W-shaped and rounded posteriorly; the venter usually has dark bars present, but these may be reduced or absent.

The ground colour of the head is dark brown. The ventral edge of the posterior supralabials is black. A light brown subocular stripe extends caudal to the neck where it swings toward the midline and usually fuses with the one on the opposite side. The light subocular stripe is bordered above by a dark brown to black subcanthus temporalis stripe that ends abruptly above the tympanum. The dark brown to black W-shaped mark on the neck is bordered cranially by the subocular stripe and caudally by a sharp ill-defined light brown chevron. The trunk ground colour is medium to dark brown. The trunk pattern consists of three to four black edged medium brown crossbands between the axilla and the groin, which may be continuous across the midline or broken into blotches. In some specimens the dark edges to the crossbands are broken into diffuse spots which are fused into a crude reticulate pattern. Sometimes the dark edges of the crossbands and the derived black reticulatum are so broad and dense that only remnants of the light crossbands remain as light blotches. The tubercles within these light blotches are light brown to white. The tail is alternately banded with light brown and dark brown to black crossbands. Ventrally the dark bands usually have light centers or contain a primary light spot. There are usually more than six ventral dark bars, but these are sometimes faded, obscure or even absent.

**Distribution:** Mexico in the vicinity of the Sierra Madre del Sur in Guerrero and Oaxaca, as in the region of the Pacific drainages south of the Mexican transvolcanic belt

**Etymology:** Named in honour of Ross Nolan of Ringwood, Victoria, Australia in recognition of his civic ethics in being a whistleblower of corruption. He exposed corruption in the Victorian Liberal Party and their private army, including heavily armed and highly corrupt Victorian Police Officers and a totally corrupt judiciary appointed by the politicians. They follow orders given to them to railroad innocent people and ensure that police protected thugs and criminals remain untouched by the law.

As a result of his blowing the whistle on the corruption, Liberal Party luminaries in Melbourne organised a campaign to discredit him via the Murdoch-controlled "hate press" (known best for the illegal phone hacking scandal in the UK) the end result being a total destruction of Nolan's life and distinguished career as an aviation engineer. Nolan's speciality was the development of "Flying Cars". Notable is that the first commercially available flying car for sale in the United States was announced in 2014 for a sale price of about \$150K Australian. A different model by another company, the Terrafugia Transition selling at roughly \$300K Australian was set to be sold in March 2015 after several launch delays.

**Content:** *Xenosaurus* (*Rossnolansaurus*) *agrenon* King and Thompson, 1968 (type species); *X.* (*Rossnolansaurus*) *penai* Perez-Ramos, De La Riva and Campbell, 2000; *X.* (*Rossnolansaurus*) *phalaroanthereon* Nieto-Monties De Oca, Campbell and Flores-Villela, 2001; *X.* (*Rossnolansaurus*) *rectocollaris* Smith and Iverson, 1993.

#### **ANNIELLA GRAY, 1852.**

Until now, the genus *Anniella* Gray, 1852 has been treated as monotypic for the living members of the family Anniellidae.

With just two recognized species within the genus, namely *Anniella pulchra* Gray, 1852 and *A. geronimensis* Shaw, 1940, both of which are morphologically similar, there was little reason to consider splitting the genus.

However Parham and Papenfuss (2009) published a molecular phylogeny for *Anniella* Gray, 1852 which showed that the species *Anniella pulchra* Gray, 1852 was in fact composite. This was followed by a paper by the same authors in 2013 (Papenfuss and Parham 2013), which formally named four new species, all created by the five-way division of *A. pulchra*.

The species *A. geronimensis* Shaw, 1940 is however significantly divergent from the other five (see for example Bezy *et al.* 1977 for details) and is therefore herein placed in a new monotypic genus that is formally described below.

Of relevance however is that the familial arrangement of the relevant species (now placed in two genera) remains unchanged.

*Anniella* Gray, 1852 therefore contains five species, namely: *Anniella pulchra* Gray, 1852 (type species); *A. alexandrae* Papenfuss and Parham, 2013; *A. campi* Papenfuss and Parham, 2013; *A. grinnelli* Papenfuss and Parham, 2013 and *A. stebbinsi* Papenfuss and Parham, 2013.

The new genus *Kendslider* *gen. nov.* contains just one species, namely that which was originally described as *Anniella geronimensis* Shaw, 1940.

#### **GENUS KENDSLIDER GEN. NOV.**

**Type species:** *Anniella geronimensis* Shaw, 1940.

**Diagnosis:** Living Anniellidae, including both genera *Anniella* Gray, 1852 and *Kendslider* *gen. nov.* are diagnosed and separated from all other lizard genera as follows: Tongue villose, smooth and bifid anteriorly. Teeth large, few, fang-like, with short swollen base. Palate toothless. Skull approaching the ophidian type, i. e. lacking the praesphenoidal vacuity and consequently the interorbital septum, and the bones which constitute the brain-case firmly united; no columella cranii, no squamosals; postorbital arch ligamentous; pterygoids in contact with sphenoid; an infraorbital fossa; praemaxillary single; nasal

and frontal divided; parietal single; prae- and postorbital in contact, separating the frontal from the border of the orbit. Body vermiform. Eyes and ears concealed. Scales soft, cycloid-hexagonal and strongly imbricate.

The genera *Anniella* and *Kendslider gen. nov.* are further defined as follows: Head much depressed, snout cuneiform; eyes concealed under several small scales resembling lids; rostral large, in contact with the nasal, separated from the frontal by a pair of praefrontals; frontal large, heptagonal, broader than long, its posterior border forming a suture with a nearly equally large interparietal, the posterior border of which is emarginated to receive a small occipital; parietals are very small; a larger anterior and two smaller posterior supraoculars; nostril pierced in a large nasal resembling an anterior labial; five upper labials, first very small, situated below the nasal, on the lower surface of the snout; second in contact with the prefrontal, second with a loreal, third with the oculars, fourth small; mental pentagonal, followed by a pair of large postmentals; six lower labials. Scales smooth, hexagonal, twenty-four (or twenty-six) round the middle of the body, No enlarged anal scales. Tail ending obtusely, when intact measuring one third (or two fifths) of the total length. Silvery, the scales edged with brown; a narrow brown vertebral line.

Adult snout vent length is usually about 130 mm with a 60 mm tail (entire).

*Kendslider gen. nov.* are differentiated from *Anniella* by having a frontal region that steeply slopes downwards in lateral profile, giving rise to a sharply pointed rostrum (versus a frontal region shallowly sloping downwards in lateral profile, giving rise to an acutely rounded rostrum in *Anniella*); fourth supralabial is largest (versus the second in *Anniella*); 24-26 rows of scales around the mid-body (versus 28-30 in *Anniella*); 4-6 rows between the upper lateral stripes (versus 10-12 in *Anniella*); tail length 29-37% of the total length (versus 34-42% in *Anniella*); 72-86 dorsal caudal scales (versus 80-94 in *Anniella*).

In colouration specimens of *Kendslider gen. nov.* are as follows: it is a light copper to silvery grey dorsally with a grayish head and darkly mottled. There are 7-8 brown to black lateral stripes running the length of the body along the scale margins, often reduced to 6 or 7 stripes on the tail. The dorsum is generally immaculate except for the dark vertebral stripe extending the length of the body and tail. Lighter paravertebral lines are sometimes present. Ventral scales are greyish with darkened edges. Preanal scales are immaculate.

**Distribution:** The species (and genus) is found along the coastal Aeolian dune regions of north-western Baja, California from about 6 km north of Colonia Guerrero, south to just south of Punta Baja at the northern edge of Bahia Rosario, Baja California. It is also known from the immediately adjacent Pacific Islands of San Geronimo within Baha Rosario and San Martin.

**Etymology:** Named in honour of Brian Kend, of Palos Verdes Estates in Los Angeles County, California, United States of America in recognition of his efforts in herpetology. This is most notably when writing and publishing a book on Australian pythons in the 1990's. This was at a time, predating widespread use of the internet and when there was very little widely available information available in books or elsewhere on the diagnostics and captive husbandry for most species (Kend 1997).

The slider part of the genus name reflects the movement habits of the species on open sand.

**Content:** *Kendslider geronimensis* (Shaw, 1940) (monotypic).

#### DIPLOGLOSSIDAE BOUCOURT, 1873.

Diploglossids are often treated as a subfamily of the Anguinae, with which they share many traits.

Using the diagnosis for Anguinae in Boulenger (1895) as a co-

diagnosis for this family (he included these species in the family), the Diploglossids are identified as those species within the greater Anguinae with one or other of the following three suites of characters:

1/ No lateral fold and four pentadactyle limbs.

2/ No lateral fold and four mono or didactyle limbs.

3/ No lateral fold and external rudiments of the hind limbs only; lateral teeth conical.

Diploglossids differ from Anguinae in particular by the following combination of features:

Skink-like in habitus; limbs present but variously reduced; body covered by cycloid scales that are underlain by osteoderms having a distinctive, peaked, gliding surface (the basal non-sculptured surface); a thin, pointed, "quill pen-shaped" anterior end of surangular; frontal bones paired; frontal and maxillary bones in contact; and lacking palatine and pterygoid teeth and any evidence of a lateral fold.

Based on the molecular and morphological studies cited already, the Family Diploglossidae is accorded the following taxonomic arrangement:

*Celestus* Gray, 1839 is divided three ways, using *Celestus* for the Hispaniolan group, *Siderolamprus* Cope, 1860 for the mainland species and the erection of a new genus *Toscanosaurus gen. nov.* for divergent species from Jamaica. *Siderolamprus* (from mainland Middle America) is divided into four subgenera, including *Garyallensaurus subgen. nov.*, *Conningsaurus subgen. nov.* and *Dannybrownsaurus subgen. nov.*

*Diploglossus* Wiegmann, 1834 is divided four ways with three new genera being erected to accommodate Antilles species, namely *Artusbrevis gen. nov.*, *Masonnicolasaurus gen. nov.* and *Laurielevysaurus gen. nov.*

*Sauresia* Gray, 1852 is also recognized as valid.

*Ophiodes* Wagler, 1830 is also recognized unchanged from other recent works.

Because, excluding the newly defined genera, all above-named genera have been defined previously, there is no need to redefine them here. However in the absence of a proper diagnosis, the genus *Siderolamprus* is formally redescribed here. The other (previously named and recognized) genera are also in effect defined several times in this paper, as part of other formal descriptions. The new genera are also formally defined below.

Divided genera are also in effect defined in the diagnoses for the new genera and/or subgenera.

The Diploglossidae are also placed into two new tribes, namely Diploglossiini *tribe nov.* and Toscanosauriini *tribe nov.* both formally named herein according to the Zoological Code (Ride *et al.* 1999).

#### GENUS *SIDEROLAMPRUS* COPE, 1860.

**Type species:** *Siderolamprus enneagrammus* Cope, 1860.

**Diagnosis:** Species assigned to the Diploglossidae including those of this genus are defined as having the following unique suite of characters:

No lateral fold. Scales roundish-rhomboidal, arranged quincuncially on the back, forming more or less regular vertical series on the flanks. Limbs may be well developed or not so, ranging from pentadactyle to didactyle. Teeth in the other genera are with conical or subspherical crowns. Palate toothless. Exceptional to this within the family is the genus *Ophiodes* Wagler, 1828 where there are external rudiments of the hind limbs only and the lateral teeth are conical, but other characteristics are as for the family.

Further diagnostic information for the Diploglossidae within a broad definition of the Anguinae, treated as including this family is in Boulenger (1885), pages 265-266.

Diploglossids differ from Anguids in particular by the following combination of features:

Skink-like in habitus; limbs present but variously reduced; body covered by cycloid scales that are underlain by osteoderms having a distinctive, peaked, gliding surface (the basal non-sculptured surface); a thin, pointed, "quill pen-shaped" anterior end of surangular; frontal bones paired; frontal and maxillary bones in contact; and lacking palatine and pterygoid teeth and any evidence of a lateral fold.

Species included within the genus *Celestus* Gray, 1839 as defined by Savage and Lips (1993) are separated from other Diploglossidae by having four limbs and claws present; claws exposed for most of their length; 5 fingers and toes; an auricular opening. This includes species within *Toscanosaurus gen. nov.* and *Siderolamprus* Cope, 1860 (both treated by Savage and Lips (1993) as being within the same genus.

*Toscanosaurus gen. nov.* (described below) are separated from all other Diploglossidae by the following suite of characters: claw sheaths are absent; frontal anteriorly in contact with a single shield; fore limb as least as long as the skull; two pairs of shields between the rostral and the azygos praefrontal; interparietal smaller than parietals; caudal scales not keeled or only feebly keeled; canthus rostralis obtuse; 46 to 56 scales round the body; occipital either larger or not larger than the interparietal; ear opening at least as large as eye-opening; tail compressed. Some specimens also have dorsals with a cross elevation and marginal depression, making rows of pits.

All the Hispaniolan species of *Celestus* have a pair of dark paramedian stripes from the nape onto the anterior trunk (absent or weakly expressed in some populations); even *C. marcanoii* (Schwartz and Inchaustegui, 1976) has lines on the neck. However no Jamaican species of *Toscanosaurus gen. nov.* has this pattern and this readily separates the genus.

*Siderolamprus* Cope, 1860 are separated from *Celestus* Gray, 1839 by having 31-33 rows of scales around the body versus 36-42 in *Celestus* and 46-56 in *Toscanosaurus gen. nov.*

*Siderolamprus* Cope, 1860, *Celestus* Gray, 1839 and *Toscanosaurus gen. nov.* are all separated from *Diploglossus* Wiegmann, 1834 by having no nasal-rostral contact, as opposed to there being nasal-rostral contact in *Diploglossus*.

**Distribution:** Middle America.

**Content:** *Siderolamprus enneagrammus* Cope, 1860 (type species); *S. adercus* (Savage, Lips and Ibanez, 2008); *S. atitlanensis* (Smith, 1950); *S. bivittatus* (Boulenger, 1895), *S. cyanochloris* (Cope, 1894); *S. hylaius* (Savage and Lips, 1993); *S. ingridae* (Werler and Campbell, 2004); *S. legnotus* (Campbell and Camarillo, 1994); *S. montanus* (Schmidt, 1933); *S. orobius* (Savage and Lips, 1993); *S. rozellae* (Smith, 1942); *S. scansorius* (McCranie and Wilson, 1996).

#### **SUBGENUS GARYALLENSAURUS SUBGEN. NOV.**

**Type species:** *Diploglossus montanus* Schmidt, 1933.

**Diagnosis:** *Garyallensaurus subgen. nov.* are separated from all other *Siderolamprus* Cope, 1860 by the following suite of characters: Frontal shield bordered anteriorly by three plates (two prefrontals and a frontonasal); small dark spots on dorsum and flanks, sometimes with large, dark-outlined, lime-green light spots on flanks.

All other mainland *Siderolamprus* are diagnosed by having the frontal shield bordered anteriorly by a single large plate (fused prefrontals and frontoparietal).

Species within the nominate subgenus *Siderolamprus* are separated from congeners (excluding *Garyallensaurus subgen. nov.*) by having 14-18 lamellae under 4th toe as opposed to 20-27 in all other species.

Species within the nominate subgenus *Siderolamprus* are also characterized by a pattern of a pair of distinct dorsolateral light stripes or alternatively a dorsum that is light brown, sharply

contrasting with darker flanks that may either be uniform or marked with large light spots.

Species within the subgenus *Conningsaurus subgen. nov.* (described below) are separated from the subgenus *Dannybrownsaurus subgen. nov.* (described below) by having 78 or more transverse rows of ventral scales; 73-81 transverse rows of dorsal scales: the caudal scales lack a distinct median keel.

By contrast *Dannybrownsaurus subgen. nov.* are characterized by having 77 or fewer transverse rows of ventral scales; 65-73 transverse rows of dorsal scales; the caudal scales have a distinct median keel.

*Conningsaurus subgen. nov.* are found only in humid lowland forests of the Atlantic slope below 500 m in altitude, versus uplands above the 1200 m contour, and usually in isolated areas, for all other species of *Siderolamprus*.

Species assigned to the Diploglossidae including those of this subgenus (*Garyallensaurus subgen. nov.*) are defined as having the following unique suite of characters:

No lateral fold. Scales roundish-rhomboidal, arranged quincuncially on the back, forming more or less regular vertical series on the flanks. Limbs may be well developed or not so, ranging from pentadactyle to didactyle. Teeth in the other genera are with conical or subspherical crowns. Palate toothless. Exceptional to this within the family is the genus *Ophiodes* Wagler, 1828 where there are external rudiments of the hind limbs only and the lateral teeth are conical, but other characteristics are as for the family.

Further diagnostic information for the Diploglossidae within a broad definition of the Anguidae, treated as including this family is in Boulenger (1885), pages 265-266.

Diploglossids differ from Anguids in particular by the following combination of features:

Skink-like in habitus; limbs present but variously reduced; body covered by cycloid scales that are underlain by osteoderms having a distinctive, peaked, gliding surface (the basal non-sculptured surface); a thin, pointed, "quill pen-shaped" anterior end of surangular; frontal bones paired; frontal and maxillary bones in contact; and lacking palatine and pterygoid teeth and any evidence of a lateral fold.

Species included within the genus *Celestus* Gray, 1839 as defined by Savage and Lips (1993) are separated from other Diploglossidae by having four limbs and claws present; claws exposed for most of their length; 5 fingers and toes; an auricular opening. This includes species within *Toscanosaurus gen. nov.* and *Siderolamprus* Cope, 1860 (both treated by Savage and Lips (1993) as being within the same genus.

*Toscanosaurus gen. nov.* (described below) are separated from all other Diploglossidae by the following suite of characters: claw sheaths are absent; frontal anteriorly in contact with a single shield; fore limb as least as long as the skull; two pairs of shields between the rostral and the azygos praefrontal; interparietal smaller than parietals; caudal scales not keeled or only feebly keeled; canthus rostralis obtuse; 46 to 56 scales round the body; occipital either larger or not larger than the interparietal; ear opening at least as large as eye-opening; tail compressed. Some specimens also have dorsals with a cross elevation and marginal depression, making rows of pits.

All the Hispaniolan species of *Celestus* have a pair of dark paramedian stripes from the nape onto the anterior trunk (absent or weakly expressed in some populations); even *C. marcanoii* (Schwartz and Inchaustegui, 1976) has lines on the neck. However no Jamaican species of *Toscanosaurus gen. nov.* has this pattern and this readily separates the genus.

*Siderolamprus* Cope, 1860 are separated from *Celestus* Gray, 1839 in having 31-33 rows of scales around the body versus 36-42 in *Celestus* and 46-56 in *Toscanosaurus gen. nov.*

*Siderolamprus* Cope, 1860, *Celestus* Gray, 1839 and *Toscanosaurus* gen. nov. are usually also separated from *Diploglossus* Wiegmann, 1834 by having no nasal-rostral contact, as opposed to there being nasal-rostral contact in *Diploglossus*.

**Distribution:** West Honduras in a zone of 915-1370 m elevation.

**Etymology:** Named in honour of Gary Allen, book distributor, based in Western Sydney, NSW, Australia. In the face of illegal threats to his business from corrupt government officials within the NSW National Parks and Wildlife Service (NPWS), he distributed and sold many thousands of copies of the first three books published by myself (Hoser, 1989, 1991, 1993), which in combination caused public outrage at the corrupt practices within the NPWS. This led to wildlife laws and procedures being radically changed in all parts of Australia and with dramatically improved conservation outcomes.

Included in this was the legal right (for the first time in 20 years) of private individuals to be able to keep live reptiles as pets without fear of imprisonment.

This is a legacy that as of 2014 continues and would not have happened without the bravery of Gary Allen and importantly others involved in fighting for what was right. This notably included Fia Cumming, of Canberra, perhaps the best investigative journalist in Australia at the time and Charles Pierson the brave (some would say foolish) publisher, who dared to publish the three books, in particular the third of the trio, (Hoser, 1993).

What is not widely known is that it was Pierson who approached myself to write and publish the book *Smuggled: The Underground Trade in Australia's Wildlife* in 1993; not the other way around. Therefore herpetologists and wildlife conservationists worldwide should be ever grateful for the immense personal sacrifices made by Charles Pierson, Gary Allen and Fia Cumming.

It is therefore also fitting that prominent reptile taxa be named in honour of the trio.

**Content:** *Siderolamprus* (*Garyallensaurus*) *montanus* (Schmidt, 1933) (monotypic).

#### **SUBGENUS CONNINGSAURUS SUBGEN. NOV.**

**Type species:** *Diploglossus rozellae* Smith, 1942.

**Diagnosis:** *Garyallensaurus* subgen. nov. (described above) are separated from all other *Siderolamprus* Cope, 1860 by the following suite of characters: Frontal shield bordered anteriorly by three plates (two prefrontals and a frontonasal); small dark spots on dorsum and flanks, sometimes with large, dark-outlined, lime-green light spots on flanks.

All other mainland *Siderolamprus* are diagnosed by having the frontal shield bordered anteriorly by a single large plate (fused prefrontals and frontoparietal).

Species within the nominate subgenus *Siderolamprus* are separated from congeners (excluding *Garyallensaurus* subgen. nov.) by having 14-18 lamellae under 4th toe as opposed to 20-27 in all other species.

Species within the nominate subgenus *Siderolamprus* are also characterized by a pattern of a pair of distinct dorsolateral light stripes or alternatively a dorsum that is light brown, sharply contrasting with darker flanks that may either be uniform or marked with large light spots.

Species within the subgenus *Conningsaurus* subgen. nov. (described here) are separated from the subgenus *Dannybrownsaurus* subgen. nov. (described below) by having 78 or more transverse rows of ventral scales; 73-81 transverse rows of dorsal scales: the caudal scales lack a distinct median keel.

By contrast *Dannybrownsaurus* subgen. nov. are characterized by having 77 or fewer transverse rows of ventral scales; 65-73

transverse rows of dorsal scales; the caudal scales have a distinct median keel.

*Conningsaurus* subgen. nov. are found only in humid lowland forests of the Atlantic slope below 500 m in altitude, versus uplands above the 1200 m contour, and usually in isolated areas, for all other species of *Siderolamprus*.

Species assigned to the Diploglossidae including those of this subgenus (*Garyallensaurus* subgen. nov.) are defined as having the following unique suite of characters:

No lateral fold. Scales roundish-rhomboidal, arranged quincuncially on the back, forming more or less regular vertical series on the flanks. Limbs may be well developed or not so, ranging from pentadactyle to didactyle. Teeth in the other genera are with conical or subspherical crowns. Palate toothless. Exceptional to this within the family is the genus *Ophiodes* Wagler, 1828 where there are external rudiments of the hind limbs only and the lateral teeth are conical, but other characteristics are as for the family.

Further diagnostic information for the Diploglossidae within a broad definition of the Anguinae, treated as including this family is in Boulenger (1885), pages 265-266.

Diploglossids differ from Anguinae in particular by the following combination of features:

Skink-like in habitus; limbs present but variously reduced; body covered by cycloid scales that are underlain by osteoderms having a distinctive, peaked, gliding surface (the basal non-sculptured surface); a thin, pointed, "quill pen-shaped" anterior end of surangular; frontal bones paired; frontal and maxillary bones in contact; and lacking palatine and pterygoid teeth and any evidence of a lateral fold.

Species included within the genus *Celestus* Gray, 1839 as defined by Savage and Lips (1993) are separated from other Diploglossidae by having four limbs and claws present; claws exposed for most of their length; 5 fingers and toes; an auricular opening. This includes species within *Toscanosaurus* gen. nov. and *Siderolamprus* Cope, 1860 (both treated by Savage and Lips (1993) as being within the same genus.

*Toscanosaurus* gen. nov. (described below) are separated from all other Diploglossidae by the following suite of characters: claw sheaths are absent; frontal anteriorly in contact with a single shield; fore limb as least as long as the skull; two pairs of shields between the rostral and the azygos praefrontal; interparietal smaller than parietals; caudal scales not keeled or only feebly keeled; canthus rostralis obtuse; 46 to 56 scales round the body; occipital either larger or not larger than the interparietal; earopening at least as large as eye-opening; tail compressed. Some specimens also have dorsals with a cross elevation and marginal depression, making rows of pits.

All the Hispaniolan species of *Celestus* have a pair of dark paramedian stripes from the nape onto the anterior trunk (absent or weakly expressed in some populations); even *C. marcanoii* (Schwartz and Inchaustegui, 1976) has lines on the neck. However no Jamaican species of *Toscanosaurus* gen. nov. has this pattern and this readily separates the genus.

*Siderolamprus* Cope, 1860 are separated from *Celestus* Gray, 1839 by having 31-33 rows of scales around the body versus 36-42 in *Celestus* and 46-56 in *Toscanosaurus* gen. nov..

*Siderolamprus* Cope, 1860, *Celestus* Gray, 1839 and *Toscanosaurus* gen. nov. are usually also separated from *Diploglossus* Wiegmann, 1834 by having no nasal-rostral contact, as opposed to there being nasal-rostral contact in *Diploglossus*.

**Distribution:** Middle America.

**Etymology:** Named in honour of Neil Conning of Melbourne, Victoria, Australia. In the late 1980's and early 1990's he ran a typesetting business in North Melbourne called Bookset. At the time, which predated desktop publishing, typesetting was an

essential part of the tedious pre-publication process of books. Conning did an excellent job in terms of the books published by Charles Pierson (see above).

Typesetters were the unsung heroes of book publishing, never receiving the accolades and kudos of authors or publishers and yet they were an essential part of the whole process.

It is fitting therefore that the essential contribution to herpetology and wildlife conservation in general by Conning be recognized herein.

**Content:** *Siderolamprus (Conningsaurus) rozellae* (Smith, 1942) (type species); *S. (Conningsaurus) hylaius* Savage and Lips, 1993.

**SUBGENUS DANNYBROWNSAURUS SUBGEN. NOV.**

**Type species:** *Celestus cyanochloris* Cope, 1894.

**Diagnosis:** *Garyallensaurus subgen. nov.* are separated from all other *Siderolamprus* Cope, 1860 by the following suite of characters: Frontal shield bordered anteriorly by three plates (two prefrontals and a frontonasal); small dark spots on dorsum and flanks, sometimes with large, dark-outlined, lime-green light spots on flanks.

All other mainland *Siderolamprus* are diagnosed by having the frontal shield bordered anteriorly by a single large plate (fused prefrontals and frontoparietal).

Species within the nominate subgenus *Siderolamprus* are separated from congeners (excluding *Garyallensaurus subgen. nov.*) by having 14-18 lamellae under 4th toe as opposed to 20-27 in all other species.

Species within the nominate subgenus *Siderolamprus* are also characterized by a pattern of a pair of distinct dorsolateral light stripes or alternatively a dorsum that is light brown, sharply contrasting with darker flanks that may either be uniform or marked with large light spots.

Species within the subgenus *Conningsaurus subgen. nov.* (described above) are separated from the subgenus *Dannybrownsaurus subgen. nov.* (described here) by having 78 or more transverse rows of ventral scales; 73-81 transverse rows of dorsal scales; the caudal scales lack a distinct median keel.

By contrast *Dannybrownsaurus subgen. nov.* are characterized by having 77 or fewer transverse rows of ventral scales; 65-73 transverse rows of dorsal scales; the caudal scales have a distinct median keel.

*Conningsaurus subgen. nov.* are found only in humid lowland forests of the Atlantic slope below 500 m in altitude, versus uplands above the 1200 m contour, and usually in isolated areas, for all other species of *Siderolamprus*.

Species assigned to the Diploglossidae including those of this subgenus (*Garyallensaurus subgen. nov.*) are defined as having the following unique suite of characters:

No lateral fold. Scales roundish-rhomboidal, arranged quincuncially on the back, forming more or less regular vertical series on the flanks. Limbs may be well developed or not so, ranging from pentadactyle to didactyle. Teeth in the other genera are with conical or subspherical crowns. Palate toothless. Exceptional to this within the family is the genus *Ophiodes* Wagler, 1828 where there are external rudiments of the hind limbs only and the lateral teeth are conical, but other characteristics are as for the family.

Further diagnostic information for the Diploglossidae within a broad definition of the Anguillidae, treated as including this family is in Boulenger (1885), pages 265-266.

Diploglossids differ from Anguillids in particular by the following combination of features:

Skink-like in habitus; limbs present but variously reduced; body covered by cycloid scales that are underlain by osteoderms having a distinctive, peaked, gliding surface (the basal non-

sculptured surface); a thin, pointed, "quill pen-shaped" anterior end of surangular; frontal bones paired; frontal and maxillary bones in contact; and lacking palatine and pterygoid teeth and any evidence of a lateral fold.

Species included within the genus *Celestus* Gray, 1839 as defined by Savage and Lips (1993) are separated from other Diploglossidae by having four limbs and claws present; claws exposed for most of their length; 5 fingers and toes; an auricular opening. This includes species within *Toscanosaurus gen. nov.* and *Siderolamprus* Cope, 1860 (both treated by Savage and Lips (1993) as being within the same genus.

*Toscanosaurus gen. nov.* (described below) are separated from all other Diploglossidae by the following suite of characters: claw sheaths are absent; frontal anteriorly in contact with a single shield; fore limb as least as long as the skull; two pairs of shields between the rostral and the azygos praefrontal; interparietal smaller than parietals; caudal scales not keeled or only feebly keeled; canthus rostralis obtuse; 46 to 56 scales round the body; occipital either larger or not larger than the interparietal; ear opening at least as large as eye-opening; tail compressed. Some specimens also have dorsals with a cross elevation and marginal depression, making rows of pits.

All the Hispaniolan species of *Celestus* have a pair of dark paramedian stripes from the nape onto the anterior trunk (absent or weakly expressed in some populations); even *C. marcanoii* (Schwartz and Inchaustegui, 1976) has lines on the neck. However no Jamaican species of *Toscanosaurus gen. nov.* has this pattern and this readily separates the genus.

*Siderolamprus* Cope, 1860 are separated from *Celestus* Gray, 1839 by having 31-33 rows of scales around the body versus 36-42 in *Celestus* and 46-56 in *Toscanosaurus gen. nov.*

*Siderolamprus* Cope, 1860, *Celestus* Gray, 1839 and *Toscanosaurus gen. nov.* are usually also separated from *Diploglossus* Wiegmann, 1834 by having no nasal-rostral contact, as opposed to there being nasal-rostral contact in *Diploglossus*.

**Distribution:** Middle America.

**Etymology:** Named in honour of Dr. Danny Brown of Deception Bay, Queensland, a qualified veterinary surgeon in recognition of his long and distinguished career as a book publishing herpetologist. His many books, published by Tweed Heads publishers, Australian Birdkeeper Publications are generally landmark publications of unmatched quality in terms of production and detailed accurate information. For reptile keepers in Australia and elsewhere, they are "must-have" books. There is no doubt that many captive reptiles have had better lives as a result of the accurate education given by Brown's books to fellow reptile keepers.

**Content:** *Celestus (Dannybrownsaurus) cyanochloris* Cope, 1894 (type species); *C. (Dannybrownsaurus) orobius* Savage and Lips, 1993; *C. (Dannybrownsaurus) adercus* Savage, Lips and Ibanez, 2008.

**SUBGENUS SIDEROLAMPRUS COPE, 1860.**

**Type species:** *Siderolamprus enneagrammus* Cope, 1860.

**Diagnosis:** The subgenus is effectively defined as a part of the diagnosis for the subgenus *Garyallensaurus subgen. nov.* (within this paper) and is relied upon here.

**Distribution:** Middle America.

**Content:** *Siderolamprus (Siderolamprus) enneagrammus* Cope, 1860 (type species); *S. atitlanensis* (Smith, 1950); *S. (Siderolamprus) bivittatus* (Boulenger, 1895); *S. ingridae* (Werler and Campbell, 2004); *S. legnotus* (Campbell and Camarillo, 1994); *S. scansorius* (McCranie and Wilson, 1996).

**GENUS TOSCANOSAURUS GEN. NOV.**

**Type species:** *Celestus hewardii* Gray, 1845.

**Diagnosis:** Species assigned to the Diploglossidae including

those of this genus are defined as having the following unique suite of characters:

No lateral fold. Scales roundish-rhomboidal, arranged quincuncially on the back, forming more or less regular vertical series on the flanks. Limbs may be well developed or not so, ranging from pentadactyle to didactyle. Teeth in the other genera are with conical or subspherical crowns. Palate toothless. Exceptional to this within the family is the genus *Ophiodes* Wagler, 1828 where there are external rudiments of the hind limbs only and the lateral teeth are conical, but other characteristics are as for the family.

Further diagnostic information for the Diploglossidae within a broad definition of the Anguillidae, treated as including this family is in Boulenger (1885), pages 265-266.

Diploglossids differ from Anguillids in particular by the following combination of features:

Skink-like in habitus; limbs present but variously reduced; body covered by cycloid scales that are underlain by osteoderms having a distinctive, peaked, gliding surface (the basal non-sculptured surface); a thin, pointed, "quill pen-shaped" anterior end of surangular; frontal bones paired; frontal and maxillary bones in contact; and lacking palatine and pterygoid teeth and any evidence of a lateral fold.

Species included within the genus *Celestus* Gray, 1839 as defined by Savage and Lips (1993) are separated from other Diploglossidae by having four limbs and claws present; claws exposed for most of their length; 5 fingers and toes; an auricular opening. This includes species within *Toscanosaurus gen. nov.* and *Siderolamprus* Cope, 1860 (both treated by Savage and Lips (1993) as being within the same genus.

*Toscanosaurus gen. nov.* are separated from all other Diploglossidae by the following suite of characters: claw sheaths are absent; frontal anteriorly in contact with a single shield; fore limb as least as long as the skull; two pairs of shields between the rostral and the azygos praefrontal; interparietal smaller than parietals; caudal scales not keeled or only feebly keeled; canthus rostralis obtuse; 40 to 56 scales round the body; occipital either larger or not larger than the interparietal; ear opening at least as large as eye-opening; tail compressed.

All the Hispaniolan species of *Celestus* have a pair of dark paramedian stripes from the nape onto the anterior trunk (absent or weakly expressed in some populations); even *C. marcanoi* (Schwartz and Inchaustegui, 1976) has lines on the neck. However no Jamaican species of *Toscanosaurus gen. nov.* has this pattern and this readily separates the genus.

*Siderolamprus* Cope, 1860 are separated from *Celestus* Gray, 1839 by having 31-33 rows of scales around the body versus 36-42 in *Celestus* and 46-56 in *Toscanosaurus gen. nov.*

*Siderolamprus* Cope, 1860, *Celestus* Gray, 1839 and *Toscanosaurus gen. nov.* are all separated from *Diploglossus* Wiegmann, 1834 by having no nasal-rostral contact, as opposed to there being nasal-rostral contact in *Diploglossus*.

**Distribution:** Jamaica and immediately adjacent outliers.

**Etymology:** Named in honour of Dr. Joseph Toscano of Melbourne, Victoria, Australia. He is a dedicated medical practitioner who graduated from the University of Queensland and got his doctorate from the University of Melbourne. Born in 1952, Toscano has spent most of his adult life as a true human-rights activist and editor of *Anarchist Age Weekly Review*. In that publication he regularly reviews events in Australia and highlights the different rules being applied to different people and notably how those in positions of power in Australia regularly exempt themselves from complying with the laws of the land, or other basic human ethics, to commit crimes on a regular basis.

**Content:** *Toscanosaurus hewardii* (Gray, 1845) (type species);

*T. barbouri* (Grant, 1940); *T. cruscus* (Garman, 1887); *T. duquesneyi* (Grant, 1940); *T. fowleri* (Schwartz, 1971); *T. microblepharis* (Underwood, 1959); *T. occiduus* (Shaw, 1802).

#### A DIVISION OF *DIPOGLOSSUS* WIEGMANN, 1834.

Species included within the genus *Celestus* Gray, 1839 as defined by Savage and Lips (1993) are separated from other Diploglossidae by having four limbs and claws present; claws exposed for most of their length; 5 fingers and toes; an auricular opening. This includes species within *Toscanosaurus gen. nov.* and *Siderolamprus* Cope, 1860 (both treated by Savage and Lips (1993) as being within the same genus, both formally described or re-described above).

Traditionally the genus *Diploglossus* Wiegmann, 1834 has been separated from all other Diploglossidae by having four limbs with five fingers and toes and an auricular opening.

However recent herpetological works have incorporated the genera *Ophiodes* Wagler, 1828, *Sauresia* Gray, 1854 and *Wetmorena* Cochran, 1928 within a clade including some *Diploglossus* species and other *Celestus* species as traditionally defined (e.g. Pyron *et al.* 2013).

However divergences are sufficiently deep that more genera than those traditionally recognized should be erected, although some of the available names fall within previously named clades.

In terms of the relevant species groups, *Sauresia* Gray, 1854 and *Wetmorena* Cochran, 1928 are herein treated as being one and the same genus (as indicated by Pyron *et al.* 2013) and are separated from *Diploglossus* Wiegmann, 1834 (as defined in this paper) by having four fingers and toes as opposed to having five.

Traditionally *Sauresia* Gray, 1854 was separated from *Wetmorena* Cochran, 1928 by having an auricular opening (versus absence), however this difference is herein regarded as being subgeneric only, meaning that *Wetmorena* Cochran, 1928 is now treated as a valid subgenus within *Sauresia*.

*Ophiodes* Wagler, 1828 are separated from *Diploglossus* by lacking forelimbs, hindlimbs being reduced to flaps, no claws; a small auricular opening hidden under scales just behind the angle of the jaw.

While *Ophiodes* shares a clade with species traditionally associated with Antilles species usually placed in *Diploglossus*, the divergences are sufficient to warrant recognition as separate genera.

Savage *et al.* (2008) and others cited by them viewed the three species *Diploglossus delasagra* (Cocteau, 1838), *Diploglossus pleii* Duméril and Bibron, 1839 and *Diploglossus montisserrati* Underwood, 1964 as forming a distinct clade, separate from all other *Diploglossus* and *Celestus* as presently recognized.

However it is clear that all are quite morphologically distinct from one another and not particularly close. This fact is affirmed by the geological histories of their island locations with respect to one another and the unlikely event of over-water migration between them.

Those species are therefore placed in three associated, but separate genera below based on known divergence times of the relevant populations based on the geological evidence cited by Hoser (2013a).

The species *Diploglossus delasagra* (Cocteau, 1838) as most widely known is herein regarded as a composite of three species-level taxa. Names are available for each and used herein.

#### GENUS *ARTUSBREVIS* GEN. NOV.

**Type species:** *Seincus* [sic] (*Diploglossus*) *de la sagra* Cocteau, 1838.

Currently better known as *Diploglossus delasagra* (Cocteau, 1838).

**Diagnosis:** In summary this genus includes all three Cuban species formerly assigned to the genus *Diploglossus* Wiegmann, 1834, as listed below, these being, *Artusbrevis delasagra* (Cocteau, 1838) (the type species), *A. garridoi* (Thomas and Hedges, 1998) and *A. nigropunctatus* (Barbour and Shreve, 1937).

The genera *Artusbrevis gen. nov.*, *Masonnicolasaurus gen. nov.* and *Laurielevisaurus gen. nov.* are all separated from *Diploglossus* Wiegmann, 1834 by having the forelimb shorter than the skull (as opposed to being longer than the skull in *Diploglossus*).

*Artusbrevis gen. nov.* are separated from *Masonnicolasaurus gen. nov.* by having 31 scales round the body and parietals separated from the frontals by the frontoparietals, versus 37 scales round the body and no frontoparietals.

*Laurielevisaurus gen. nov.* are separated from both other genera by having 41 or 43 scales round the body (versus 31 in *Artusbrevis gen. nov.* and 37 in *Masonnicolasaurus gen. nov.*).

*Masonnicolasaurus gen. nov.* is separated from both *Artusbrevis gen. nov.* and *Laurielevisaurus gen. nov.* by the absence of frontoparietals.

Underwood (1964) gives a detailed description of the only species within the genus *Laurielevisaurus gen. nov.*, described by him as *Diploglossus montisserrati* Underwood, 1964.

Boulenger (1885), pages 293-294 gives a detailed description of the genera *Artusbrevis gen. nov.* and *Masonnicolasaurus gen. nov.* under the headings for the best known (and first described species in each genus), identified by him as *Diploglossus sagra* (Cocteau, 1838) and *Diploglossus pleii* Duméril and Bibron, 1839.

**Distribution:** Cuba and immediately adjacent outliers.

**Etymology:** Named reflection of the small frame of these lizards.

**Content:** *Artusbrevis delasagra* (Cocteau, 1838) (type species); *A. garridoi* (Thomas and Hedges, 1998); *A. nigropunctatus* (Barbour and Shreve, 1937).

#### GENUS MASONNICOLASAUROS GEN. NOV.

**Type species:** *Diploglossus pleii* Duméril and Bibron, 1839.

**Diagnosis:** In summary the genus *Masonnicolasaurus gen. nov.* includes the single species from Puerto Rico formerly assigned to the genus *Diploglossus* Wiegmann, 1834, this being the type species.

The genera *Artusbrevis gen. nov.*, *Masonnicolasaurus gen. nov.* and *Laurielevisaurus gen. nov.* are all separated from *Diploglossus* Wiegmann, 1834 by having the forelimb shorter than the skull (as opposed to being longer than the skull in *Diploglossus*).

*Artusbrevis gen. nov.* are separated from *Masonnicolasaurus gen. nov.* by having 31 scales round the body and parietals separated from the frontals by the frontoparietals, versus 37 scales round the body and no frontoparietals.

*Laurielevisaurus gen. nov.* are separated from both other genera by having 41 or 43 scales round the body (versus 31 in *Artusbrevis gen. nov.* and 37 in *Masonnicolasaurus gen. nov.*).

*Masonnicolasaurus gen. nov.* is separated from both *Artusbrevis gen. nov.* and *Laurielevisaurus gen. nov.* by the absence of frontoparietals.

Underwood (1964) gives a detailed description of the only species within the genus *Laurielevisaurus gen. nov.*, described by him as *Diploglossus montisserrati* Underwood, 1964. This includes all other relevant diagnostic features for this genus. Boulenger (1885), pages 293-294 gives a detailed description of the genera *Artusbrevis gen. nov.* and *Masonnicolasaurus gen. nov.* under the headings for the best known (and first described species in each genus), identified by him as *Diploglossus sagra* (Cocteau, 1838) (treated herein as

*Artusbrevis delasagra*) and *Diploglossus pleii* Duméril and Bibron, 1839.

**Distribution:** Puerto Rico.

**Etymology:** Named in honour of Mason Nicola of Melbourne, Victoria, Australia for his many contributions to herpetology in Australia via his efforts in assisting with the logistical efforts of Snakebusters, Australia's best reptile displays. His role in assisting members of the public with regards to the successful care and keeping of native reptiles at his place of employment, Amazing Amazon, Springvale Road, Glen Waverley, Victoria, Australia is not unrecognized.

**Content:** *Masonnicolasaurus pleii* (Duméril and Bibron, 1839) (monotypic).

#### GENUS LAURIELEVISAURUS GEN. NOV.

**Type species:** *Diploglossus montisserrati* Underwood, 1964.

**Diagnosis:** In summary this genus includes the sole species formerly assigned to the genus *Diploglossus* Wiegmann, 1834 from Montserrat Island, part of the chain of islands known as the Lesser Antilles, in the West Indies.

The genera *Artusbrevis gen. nov.*, *Masonnicolasaurus gen. nov.* and *Laurielevisaurus gen. nov.* are all separated from *Diploglossus* Wiegmann, 1834 by having the forelimb shorter than the skull (as opposed to being longer than the skull in *Diploglossus*).

*Artusbrevis gen. nov.* are separated from *Masonnicolasaurus gen. nov.* by having 31 scales round the body and parietals separated from the frontals by the frontoparietals, versus 37 scales round the body and no frontoparietals.

*Laurielevisaurus gen. nov.* are separated from both other genera by having 41 or 43 scales round the body (versus 31 in *Artusbrevis gen. nov.* and 37 in *Masonnicolasaurus gen. nov.*).

*Masonnicolasaurus gen. nov.* is separated from both *Artusbrevis gen. nov.* and *Laurielevisaurus gen. nov.* by the absence of frontoparietals.

Underwood (1964) gives a detailed description of the only species within the genus *Laurielevisaurus gen. nov.*, described by him as *Diploglossus montisserrati* Underwood, 1964. This includes all other important diagnostic features of this genus, including comparisons with South American and Central American species of *Diploglossus*.

Boulenger (1885), pages 293-294 gives a detailed description of the genera *Artusbrevis gen. nov.* and *Masonnicolasaurus gen. nov.* under the headings for the best known (and first described species in each genus), identified by him as *Diploglossus sagra* (Cocteau, 1838) and *Diploglossus pleii* Duméril and Bibron, 1839.

**Distribution:** Known only from the type locality, Woodlands Spring, elevation 600 ft., Montserrat Island.

**Etymology:** Named in honour of Laurie Levy, of Melbourne, Victoria, Australia. He is best known as the Campaign Director at the Coalition Against Duck Shooting and is regularly painted by the Murdoch hate press as some sort of environmentalist come fundamentalist. In fact he is a dedicated wildlife conservationist who not only opposes wanton destruction of the environment, but also government sanctioned acts of extreme animal cruelty.

Levy has for decades exposed serious and endemic corruption involving senior management in the Victorian government wildlife bureaucracy, the department known in 2014 as Department of Environment and Primary Industries (DEPI), formerly known as the Department of Sustainability and Environment (DSE) and more than a dozen other bureaucratic names in the recent past (refer to Hoser 1993 for many further examples).

As a result of his public interest work, Levy has been harassed and demonized by the DEPI and predecessors, including being held up for public hatred by false and misleading departmental

media releases and improperly laid criminal charges against him.

As a result of endemic corruption in the legal system of Victoria, Levi now has a lengthy charge sheet including charges and fines, and associated "criminal record", all wrongly and illegally imposed against him.

I note herein that a prosecution head at DEPI, formerly worked in the Magistrate's Court system and is able to telephone the courts and predetermine outcomes of charges and cases, before any evidence is even heard!

Considering Levy has devoted a lifetime to wildlife conservation, it is only appropriate that a genus of lizard be named in his honour.

**Content:** *Laurielevysaurus montisserrati* (Underwood, 1964) (monotypic).

#### TRIBE DIPLOGLOSSIINI TRIBE NOV.

(Terminal taxon: *Tiliqua fasciatus* Gray, 1831)

Currently best known as *Diploglossus fasciatus* (Gray, 1831).

**Diagnosis:** Species assigned to the Diploglossidae including those of this tribe and tribe *Toscanosauriini* *tribe nov.* are defined as having the following unique suite of characters:

No lateral fold. Scales roundish-rhomboidal, arranged quincuncially on the back, forming more or less regular vertical series on the flanks. Limbs may be well developed or not so, ranging from pentadactyle to didactyle. Teeth in the other genera are with conical or subspherical crowns. Palate toothless. Exceptional to this within the Diploglossidae is the genus *Ophiodes* Wagler, 1828 in the tribe *Toscanosauriini* *tribe nov.* where there are external rudiments of the hind limbs only and the lateral teeth are conical, but other characteristics are as for the family.

Further diagnostic information for the Diploglossidae within a broad definition of the Anguidae, treated as including this family is in Boulenger (1885), pages 265-266.

Diploglossids differ from Anguids in particular by the following combination of features:

Skink-like in habitus; limbs present but variously reduced; body covered by cycloid scales that are underlain by osteoderms having a distinctive, peaked, gliding surface (the basal non-sculptured surface); a thin, pointed, "quill pen-shaped" anterior end of surangular; frontal bones paired; frontal and maxillary bones in contact; and lacking palatine and pterygoid teeth and any evidence of a lateral fold.

The tribe *Diploglossiini* *tribe nov.* is best defined by defining each of the two component genera, these being one or other of:

1 - *Diploglossus* Wiegmann, 1834.

Traditionally the genus *Diploglossus* Wiegmann, 1834 has been separated from all other Diploglossidae by having four limbs with five fingers and toes and an auricular opening.

This diagnosis remains true except for the following:

The genera *Artusbrevis* *gen. nov.*, *Masonnicolasaurus* *gen. nov.* and *Laurielevysaurus* *gen. nov.* all formerly treated as being in *Diploglossus* and now within the tribe are *Toscanosaurus* *gen. nov.* are all separated from *Diploglossus* Wiegmann, 1834 by having the forelimb shorter than the skull (as opposed to being longer than the skull in *Diploglossus*).

2 - Genus *Siderolamprus* Cope, 1860.

Species included within the genus *Celestus* Gray, 1839 (of tribe *Toscanosauriini* *tribe nov.*) as defined by Savage and Lips (1993) are separated from other Diploglossidae by having four limbs and claws present; claws exposed for most of their length; 5 fingers and toes; an auricular opening. This includes species within *Toscanosaurus* *gen. nov.* (tribe *Toscanosauriini* *tribe nov.*) and *Siderolamprus* Cope, 1860 (both treated by Savage and Lips (1993) as being within the same genus).

*Siderolamprus* Cope, 1860 is one genus within this tribe (*Diploglossiini* *tribe nov.*).

However *Toscanosaurus* *gen. nov.* (described in this paper) are separated from all other Diploglossidae by the following suite of characters: claw sheaths are absent; frontal anteriorly in contact with a single shield; fore limb as least as long as the skull; two pairs of shields between the rostral and the azygos praefrontal; interparietal smaller than parietals; caudal scales not keeled or only feebly keeled; canthus rostralis obtuse; 46 to 56 scales round the body; occipital either larger or not larger than the interparietal; ear opening at least as large as eye-opening; tail compressed. Some specimens also have dorsals with a cross elevation and marginal depression, making rows of pits.

All the Hispaniolan species of *Celestus* have a pair of dark paramedian stripes from the nape onto the anterior trunk (absent or weakly expressed in some populations); even *C. marcanoi* (Schwartz and Inchaustegui, 1976) has lines on the neck. However no Jamaican species of *Toscanosaurus* *gen. nov.* has this pattern and this readily separates the genus.

*Siderolamprus* Cope, 1860 (this tribe) are separated from *Celestus* Gray, 1839 (*Toscanosauriini* *tribe nov.*) by having 31-33 rows of scales around the body versus 36-42 in *Celestus* and 46-56 in *Toscanosaurus* *gen. nov.*

*Siderolamprus* Cope, 1860, *Celestus* Gray, 1839 and *Toscanosaurus* *gen. nov.* are all usually separated from *Diploglossus* Wiegmann, 1834 by having no nasal-rostral contact, as opposed to there being nasal-rostral contact in *Diploglossus*.

**Distribution:** Mainland South and Middle America.

**Content:** *Diploglossus* Wiegmann, 1834 (type genus); *Siderolamprus* Cope, 1860.

#### TRIBE TOSCANOSAURIINI TRIBE NOV.

(Terminal taxon *Celestus hewardii* Gray, 1845)

**Diagnosis:** Species assigned to the Diploglossidae including those of both tribes are defined as having the following unique suite of characters:

No lateral fold. Scales roundish-rhomboidal, arranged quincuncially on the back, forming more or less regular vertical series on the flanks. Limbs may be well developed or not so, ranging from pentadactyle to didactyle. Teeth in the other genera are with conical or subspherical crowns. Palate toothless. Exceptional to this within the Diploglossidae is the genus *Ophiodes* Wagler, 1828 in the tribe *Toscanosauriini* *tribe nov.* where there are external rudiments of the hind limbs only and the lateral teeth are conical, but other characteristics are as for the family.

This is also diagnostic for the genus *Ophiodes* Wagler, 1828. Further diagnostic information for the Diploglossidae within a broad definition of the Anguidae, treated as including this family is in Boulenger (1885), pages 265-266.

Diploglossids differ from Anguids in particular by the following combination of features:

Skink-like in habitus; limbs present but variously reduced; body covered by cycloid scales that are underlain by osteoderms having a distinctive, peaked, gliding surface (the basal non-sculptured surface); a thin, pointed, "quill pen-shaped" anterior end of surangular; frontal bones paired; frontal and maxillary bones in contact; and lacking palatine and pterygoid teeth and any evidence of a lateral fold.

The tribe *Toscanosauriini* *tribe nov.* is best defined by defining each the seven component genera, these being one or other of:

1 - *Celestus* Gray, 1838.

Species included within the genus *Celestus* Gray, 1839 (of tribe *Toscanosauriini* *tribe nov.*) as defined by Savage and Lips

(1993) are separated from other Diploglossidae by having four limbs and claws present; claws exposed for most of their length; 5 fingers and toes; an auricular opening. This includes species within *Toscanosaurus gen. nov.* (tribe Toscanosauriini *tribe nov.*) and *Siderolamprus* Cope, 1860 (both treated by Savage and Lips (1993) as being within the same genus.

*Siderolamprus* Cope, 1860 is one genus within the tribe Diploglossiini *tribe nov.*

However *Toscanosaurus gen. nov.* (described in this paper) are separated from all other Diploglossidae by the following suite of characters: claw sheaths are absent; frontal anteriorly in contact with a single shield; fore limb as least as long as the skull; two pairs of shields between the rostral and the azygos praefrontal; interparietal smaller than parietals; caudal scales not keeled or only feebly keeled; canthus rostralis obtuse; 46 to 56 scales round the body; occipital either larger or not larger than the interparietal; ear opening at least as large as eye-opening; tail compressed. Some specimens also have dorsals with a cross elevation and marginal depression, making rows of pits.

All the Hispaniolan species of *Celestus* have a pair of dark paramedian stripes from the nape onto the anterior trunk (absent or weakly expressed in some populations); even *C. marcanoi* (Schwartz and Inchaustegui, 1976) has lines on the neck. However no Jamaican species of *Toscanosaurus gen. nov.* has this pattern and this readily separates the genus.

*Siderolamprus* Cope, 1860 (tribe Diploglossiini *tribe nov.*) are separated from *Celestus* Gray, 1839 (Toscanosauriini *tribe nov.*) by having 31-33 rows of scales around the body versus 36-42 in *Celestus* and 46-56 in *Toscanosaurus gen. nov.*

*Siderolamprus* Cope, 1860, *Celestus* Gray, 1839 and *Toscanosaurus gen. nov.* are all usually separated from *Diploglossus* Wiegmann, 1834 by having no nasal-rostral contact, as opposed to there being nasal-rostral contact in *Diploglossus*.

#### 2 - *Toscanosaurus gen. nov.*

*Toscanosaurus gen. nov.* (described in this paper) are separated from all other Diploglossidae by the following suite of characters: claw sheaths are absent; frontal anteriorly in contact with a single shield; fore limb as least as long as the skull; two pairs of shields between the rostral and the azygos praefrontal; interparietal smaller than parietals; caudal scales not keeled or only feebly keeled; canthus rostralis obtuse; 46 to 56 scales round the body; occipital either larger or not larger than the interparietal; ear opening at least as large as eye-opening; tail compressed. Some specimens also have dorsals with a cross elevation and marginal depression, making rows of pits.

#### 3 - *Ophiodes* Wagler, 1828.

*Ophiodes* are separated from all other Diploglossidae by having the following character suite: No lateral fold. Scales roundish-rhomboidal, arranged quincuncially on the back, forming vertical series on the sides. No forelimbs; styliform rudiments of hind limbs. Lateral teeth conical. Palate is toothless.

#### 4 - *Sauresia* Gray, 1852.

*Sauresia* and the allied genus *Wetmorena* Cochran, 1928 (treated herein as a subgenus only)

are separated from *Diploglossus* Wiegmann, 1834 (as defined in this paper) by having four fingers and toes as opposed to having five. Traditionally *Sauresia* Gray, 1854 was separated from *Wetmorena* Cochran, 1928 by having an auricular opening (versus absence), however this difference is herein regarded as being subgeneric only, meaning that *Wetmorena* Cochran, 1928 is now treated as a valid subgenus within *Sauresia*.

5-7 - *Artusbrevis gen. nov.*; *Masonnicolasaurus gen. nov.*; *Laurielevysaurus gen. nov.*

The genera *Artusbrevis gen. nov.*, *Masonnicolasaurus gen. nov.* and *Laurielevysaurus gen. nov.* are all separated from *Diploglossus* Wiegmann, 1834 by having the forelimb shorter than the skull (as opposed to being longer than the skull in *Diploglossus*).

In further detail:

*Artusbrevis gen. nov.* are separated from *Masonnicolasaurus gen. nov.* by having 31 scales round the body and parietals separated from the frontals by the frontoparietals, versus 37 scales round the body and no frontoparietals.

*Laurielevysaurus gen. nov.* are separated from both other genera by having 41 or 43 scales round the body (versus 31 in *Artusbrevis gen. nov.* and 37 in *Masonnicolasaurus gen. nov.*).

*Masonnicolasaurus gen. nov.* is separated from both *Artusbrevis gen. nov.* and *Laurielevysaurus gen. nov.* by the absence of frontoparietals.

Underwood (1964) gives a detailed description of the only species within the genus *Laurielevysaurus gen. nov.*, described him as *Diploglossus montiserrati* Underwood, 1964. This includes all other important diagnostic features of this genus, including comparisons with South American and Central American species of *Diploglossus*.

Boulenger (1885), pages 293-294 gives a detailed description of the genera *Artusbrevis gen. nov.* and *Masonnicolasaurus gen. nov.* under the headings for the best known (and first described species in each genus), identified by him as *Diploglossus sagra* (Cocteau, 1838) and *Diploglossus pleii* Duméril and Bibron, 1839.

**Distribution:** South America and Caribbean islands.

**Content:** *Toscanosaurus gen. nov.* (type genus); *Artusbrevis gen. nov.*; *Celestus* Gray, 1838; *Masonnicolasaurus gen. nov.*; *Laurielevysaurus gen. nov.*; *Ophiodes* Wagler, 1828; *Sauresia* Gray, 1852.

#### SUBFAMILY ANGUINAE AND THE GENUS *OPHISAURUS* DAUDIN, 1803

The family Anguinae are defined in detail by Boulenger 1885, pages 255-266.

The genus *Ophisaurus* Daudin, 1803 within the nominate subfamily as traditionally defined morphologically has been defined as those Anguine lizards with the following suite of characters: A lateral fold. Scales squarish-rhomboidal, forming straight longitudinal and transverse series. Limbs absent externally, or reduced to a rudiment of the hind pair. Teeth with conical or subspherical crowns. Pterygoid teeth; palatine and vomerine teeth may be present or absent.

However it has long been known that the African species, readily separated from the rest by a concealed ear opening (as opposed to obvious in the other species) is not at all closely related to the North American ones. Furthermore, it has been known for some time that within North America the recognized species are of widely divergent groups. This has been confirmed by several molecular studies, among the more recent ones being Conrad and Norell (2008), with similar results synthesized in a supermatrix published by Pyron *et al.* (2013).

*Ophisaurus* Daudin, 1803 is thus herein divided into four, with the resurrection of *Hyalosaurus* Günther, 1873 (redefined herein) for the African species originally described as *Hyalosaurus koellikeri* Günther 1873 and the erection of *Binghamsaurus gen. nov.* and *Smythsaurus gen. nov.* to accommodate divergent clades of North American species also formally described.

*Ophosaurus* is redescribed to accommodate the changes.

*Dopasia* Gray, 1853 is divided into two with the erection of *Richardsonsaurus gen. nov.* to accommodate the Chinese "harti" species group.

*Anguis* Linnaeus, 1758 (comprising five recognized species)

and *Pseudophus* Merrem, 1820 (one species) are both recognized in their commonly accepted forms, except for the species originally described as *Ophisaurus incomptus* McConkey, 1955, which is transferred from the genus *Anguis* as erroneously placed by authors including Teran-Juarez (2008) and Bryson and Graham (2010) back to the more appropriate *Ophisaurus*.

Anguinae is also divided into two tribes, these consisting of the tribe *Ophisauriini* *tribe* *nov.* monotypic for the genus *Ophisaurus*, and *Anguiini* *tribe* *nov.* for all other Anguinae.

#### GENUS OPHISAURUS DAUDIN, 1803.

**Type species:** *Anguis ventralis* Linnaeus, 1766.

**Diagnosis:** The genus *Ophisaurus* Daudin, 1803 as traditionally defined morphologically has been defined as those Anguid lizards with the following suite of characters: A lateral fold. Scales squarish-rhomboidal, forming straight longitudinal and transverse series. Limbs absent externally, or reduced to a rudiment of the hind pair. Teeth with conical or subspherical crowns. Pterygoid teeth; palatine and vomerine teeth may be present or absent.

*Hyalosaurus* Günther, 1873, monotypic for the species *Hyalosaurus koellikeri* Günther, 1873 is readily separated from *Ophisaurus* by a concealed ear opening as opposed to obvious in *Ophisaurus*.

Otherwise the preceding diagnosis can be used to define *Hyalosaurus* as well.

*Ophisaurus* is separated from the other two morphologically similar North American genera *Binghamsaurus* *gen. nov.* and *Smythsaurus* *gen. nov.* by the following:

*Binghamsaurus* *gen. nov.* has 97 or less scales along the lateral fold, versus 98 or more in *Ophisaurus* and *Smythsaurus* *gen. nov.*

*Binghamsaurus* *gen. nov.* is also separated from the other North American genera *Ophisaurus* and *Smythsaurus* *gen. nov.* by having one or more upper labials on each side that are not separated from the orbit by lorilabials. About 80% of *Binghamsaurus* *gen. nov.* have two frontonasals rather than one, as seen in *Ophisaurus* and *Smythsaurus* *gen. nov.*

*Binghamsaurus* *gen. nov.* is also further separated from the other North American genera *Ophisaurus* and *Smythsaurus* *gen. nov.* by its hemipenial structure which is unique in that it has two ridges, one on either side of the sulcus, that run the entire length of the organ. These ridges are spinose on top and rugose laterally. The remainder of the hemipenis is plicate and fleshy, except for a few small spines at the base of the ridges.

*Smythsaurus* *gen. nov.* is readily separated from *Ophisaurus* by having dark stripes or dark pigmentation below the lateral fold, a condition not seen in *Ophisaurus*.

*Smythsaurus* *gen. nov.* is further separated from *Ophisaurus* by white markings occurring in the middle of the scales, often forming smooth stripes, (versus occurring on the posterior corners of the scales, but never primarily in the middle in *Ophisaurus*; or in the case of young *Ophisaurus*, absent); a distinct mid-dorsal stripe, usually present in adults and always in young specimens and juveniles as well as dark stripes present on scale rows one or two on the venter, (versus no distinct mid-dorsal stripe present and no dark stripes present on the venter in *Ophisaurus*).

*Ophisaurus*, *Binghamsaurus* *gen. nov.* and *Smythsaurus* *gen. nov.* are readily separated from *Pseudopus* Merrem, 1820 by the absence of external rudiments of hind limbs, as seen in the latter genus.

*Anguis* Linnaeus, 1758 is readily separated from the other genera by having no trace of limbs externally and fang-like lateral teeth.

*Dopasia* Gray, 1853 and *Richardsonsaurus* *gen. nov.* are both separated from all other Anguid genera by the following suite of

characters: Ear-opening not larger than the nostril; 14 longitudinal rows of dorsal plates and three shields on a line from the nasal to the azygos praefrontal.

*Dopasia* Gray, 1853 is separated from the similar *Richardsonsaurus* *gen. nov.* by having a dark ventrolateral stripe present; nasal separated from frontonasal by three scales and vertebrae from atlas to remnants of hind leg bones (VPS) 47-52, versus there being no dark ventrolateral stripe present; nasal separated from frontonasal by two scales and vertebrae from atlas to remnants of hind leg bones (VPS) 50-50 in *Richardsonsaurus* *gen. nov.*

**Distribution:** *Ophisaurus* are found in the USA and Mexico.

**Content:** *Ophisaurus ventralis* (Linnaeus, 1766) (type species); *O. ceroni* Holman, 1965; *O. incomptus* McConkey, 1955.

#### GENUS BINGHAMSAURUS GEN. NOV.

**Type species:** *Ophisaurus compressus* Cope, 1900.

**Diagnosis:** *Binghamsaurus* *gen. nov.* was until now treated as a member of the better known genus *Ophisaurus* Daudin, 1803.

As traditionally defined morphologically, *Ophisaurus* has been defined as those Anguid lizards with the following suite of characters: A lateral fold. Scales squarish-rhomboidal, forming straight longitudinal and transverse series. Limbs absent externally, or reduced to a rudiment of the hind pair. Teeth with conical or subspherical crowns. Pterygoid teeth; palatine and vomerine teeth may be present or absent.

*Hyalosaurus* Günther, 1873, monotypic for the species *Hyalosaurus koellikeri* Günther, 1873 is readily separated from *Ophisaurus* by a concealed ear opening as opposed to obvious in *Ophisaurus*.

Otherwise the preceding diagnosis can be used to define *Hyalosaurus* as well.

*Ophisaurus* herein confined to North America, is separated from the other two morphologically similar North American genera *Binghamsaurus* *gen. nov.* (described herein) and *Smythsaurus* *gen. nov.* (described below) by the following:

*Binghamsaurus* *gen. nov.* has 97 or less scales along the lateral fold, versus 98 or more in *Ophisaurus* and *Smythsaurus* *gen. nov.*

*Binghamsaurus* *gen. nov.* is also separated from the other North American genera *Ophisaurus* and *Smythsaurus* *gen. nov.* by having one or more upper labials on each side that are not separated from the orbit by lorilabials. About 80% of *Binghamsaurus* *gen. nov.* have two frontonasals rather than one, as seen in *Ophisaurus* and *Smythsaurus* *gen. nov.*

*Binghamsaurus* *gen. nov.* is also further separated from the other North American genera *Ophisaurus* and *Smythsaurus* *gen. nov.* by its hemipenial structure which is unique in that it has two ridges, one on either side of the sulcus, that run the entire length of the organ. These ridges are spinose on top and rugose laterally. The remainder of the hemipenis is plicate and fleshy, except for a few small spines at the base of the ridges.

*Smythsaurus* *gen. nov.* is readily separated from *Ophisaurus* by having dark stripes or dark pigmentation below the lateral fold, a condition not seen in *Ophisaurus*.

*Smythsaurus* *gen. nov.* is further separated from *Ophisaurus* by white markings occurring in the middle of the scales, often forming smooth stripes, (versus occurring on the posterior corners of the scales, but never primarily in the middle in *Ophisaurus*; or in the case of young *Ophisaurus*, absent); a distinct mid-dorsal stripe, usually present in adults and always in young specimens and juveniles as well as dark stripes present on scale rows one or two on the venter, (versus no distinct mid-dorsal stripe present and no dark stripes present on the venter in *Ophisaurus*).

*Ophisaurus*, *Binghamsaurus* *gen. nov.* and *Smythsaurus* *gen.*

*nov.* are readily separated from *Pseudopus* Merrem, 1820 by the absence of external rudiments of hind limbs, as seen in the latter genus.

*Anguis* Linnaeus, 1758 is readily separated from the other genera by having no trace of limbs externally and fang-like lateral teeth.

*Dopasia* Gray, 1853 and *Richardsonisaurus gen. nov.* are both separated from all other Anguid genera by the following suite of characters: Ear-opening not larger than the nostril; 14 longitudinal rows of dorsal plates and three shields on a line from the nasal to the azygos praefrontal.

*Dopasia* Gray, 1853 is separated from the similar *Richardsonisaurus gen. nov.* by having a dark ventrolateral stripe present; nasal separated from frontonasal by three scales and vertebrae from atlas to remnants of hind leg bones (VPS) 47-52, versus there being no dark ventrolateral stripe present; nasal separated from frontonasal by two scales and vertebrae from atlas to remnants of hind leg bones (VPS) 50-50 in *Richardsonisaurus gen. nov.*

**Distribution:** *Binghamisaurus gen. nov.* is found in the South-east USA, including, south-east South Carolina, south-east Georgia and Florida.

**Etymology:** Named in honour of snake handler Jarrod Bingham, of Bacchus Marsh, Victoria, Australia.

Among his many credits, is doing 24 hour wildlife rescue in Melbourne, Australia. Unlike a number of other snake catchers in Melbourne who use "killer tongs" to catch (and at the same time painfully kill) snakes, Jarrod is able to catch snakes quickly, efficiently and painlessly for the snakes using world's best methods taught by Snakebusters.

**Content:** *Binghamisaurus compressus* (Cope, 1900) (monotypic).

#### GENUS SMYTHSAURUS GEN. NOV.

**Type species:** *Ophisaurus attenuatus* Baird, 1880

**Diagnosis:** *Smythsaurus gen. nov.* was until now treated as a member of the better known genus *Ophisaurus* Daudin, 1803.

As traditionally defined morphologically, *Ophisaurus* has been defined as those Anguid lizards with the following suite of characters: A lateral fold. Scales squarish-rhomboidal, forming straight longitudinal and transverse series. Limbs absent externally, or reduced to a rudiment of the hind pair. Teeth with conical or subspherical crowns. Pterygoid teeth; palatine and vomerine teeth may be present or absent.

*Hyalosaurus* Günther, 1873, monotypic for the species *Hyalosaurus koellikeri* Günther, 1873 is readily separated from *Ophisaurus* by a concealed ear opening as opposed to obvious in *Ophisaurus*.

Otherwise the preceding diagnosis can be used to define *Hyalosaurus* as well.

*Ophisaurus* herein confined to North America, is separated from the other two morphologically similar North American genera *Binghamisaurus gen. nov.* (described above) and *Smythsaurus gen. nov.* (described herein) by the following:

*Binghamisaurus gen. nov.* has 97 or less scales along the lateral fold, versus 98 or more in *Ophisaurus* and *Smythsaurus gen. nov.*

*Binghamisaurus gen. nov.* is also separated from the other North American genera *Ophisaurus* and *Smythsaurus gen. nov.* by having one or more upper labials on each side that are not separated from the orbit by lorilabials. About 80% of *Binghamisaurus gen. nov.* have two frontonasals rather than one, as seen in *Ophisaurus* and *Smythsaurus gen. nov.*

*Binghamisaurus gen. nov.* is also further separated from the other North American genera *Ophisaurus* and *Smythsaurus gen. nov.* by its hemipenal structure which is unique in that it has two ridges, one on either side of the sulcus, that run the entire length of the organ. These ridges are spinose on top and

rugose laterally. The remainder of the hemipenis is plicate and fleshy, except for a few small spines at the base of the ridges.

*Smythsaurus gen. nov.* is readily separated from *Ophisaurus* by having dark stripes or dark pigmentation below the lateral fold, a condition not seen in *Ophisaurus*.

*Smythsaurus gen. nov.* is further separated from *Ophisaurus* by white markings occurring in the middle of the scales, often forming smooth stripes, (versus occurring on the posterior corners of the scales, but never primarily in the middle in *Ophisaurus*; or in the case of young *Ophisaurus*, absent); a distinct mid-dorsal stripe, usually present in adults and always in young specimens and juveniles as well as dark stripes present on scale rows one or two on the venter, (versus no distinct mid-dorsal stripe present and no dark stripes present on the venter in *Ophisaurus*).

*Ophisaurus*, *Binghamisaurus gen. nov.* and *Smythsaurus gen. nov.* are readily separated from *Pseudopus* Merrem, 1820 by the absence of external rudiments of hind limbs, as seen in the latter genus.

*Anguis* Linnaeus, 1758 is readily separated from the other genera by having no trace of limbs externally and fang-like lateral teeth.

*Dopasia* Gray, 1853 and *Richardsonisaurus gen. nov.* are both separated from all other Anguid genera by the following suite of characters: Ear-opening not larger than the nostril; 14 longitudinal rows of dorsal plates and three shields on a line from the nasal to the azygos praefrontal.

*Dopasia* Gray, 1853 is separated from the similar *Richardsonisaurus gen. nov.* by having a dark ventrolateral stripe present; nasal separated from frontonasal by three scales and vertebrae from atlas to remnants of hind leg bones (VPS) 47-52, versus there being no dark ventrolateral stripe present; nasal separated from frontonasal by two scales and vertebrae from atlas to remnants of hind leg bones (VPS) 50-50 in *Richardsonisaurus gen. nov.*

**Distribution:** *Smythsaurus gen. nov.* is found in the eastern and south-eastern USA and nearby areas.

**Etymology:** Named in honour of Michael Smyth of Croydon, Melbourne, Victoria, Australia in recognition for his valuable assistance's in reptile education work with Snakebusters, Australia's best reptiles shows and other valuable wildlife conservation activities. This includes when on occasions he has had to deal with illegal armed raids by government officials initiated by "business competitors" who sought to undermine the public benefit activities of Snakebusters for their own nefarious short-term anti-conservation commercial objectives. I also note that the genus *Smythkukri* Hoser, 2012 is also named in honour of the same Michael Smyth. In that description (page 18) (Hoser 2012), the etymology was inadvertently deleted during the pre-publication process.

**Content:** *Smythsaurus attenuatus* (Baird, 1880); *S. longicaudus* (McConkey, 1952); *S. mimicus* (Palmer, 1987); *S. sulcatus* (Cope, 1880).

#### GENUS HYALOSAURUS GÜNTHER, 1873.

**Type species:** *Hyalosaurus koellikeri* Günther, 1873.

**Diagnosis:** The genus *Ophisaurus* Daudin, 1803 (and including *Hyalosaurus*) as traditionally defined morphologically has been defined as those Anguid lizards with the following suite of characters: A lateral fold. Scales squarish-rhomboidal, forming straight longitudinal and transverse series. Limbs absent externally, or reduced to a rudiment of the hind pair. Teeth with conical or subspherical crowns. Pterygoid teeth; palatine and vomerine teeth may be present or absent.

*Hyalosaurus* Günther, 1873, monotypic for the species *Hyalosaurus koellikeri* Günther 1873 is readily separated from *Ophisaurus*, *Binghamisaurus gen. nov.* and *Smythsaurus gen. nov.* by a concealed ear opening as opposed to obvious in the

other three genera.

Otherwise the preceding diagnosis can be used to define *Hyalosaurus* as well.

*Ophisaurus* is separated from the other two morphologically similar North American genera *Binghamsaurus gen. nov.* and *Smythsaurus gen. nov.* by the following:

*Binghamsaurus gen. nov.* has 97 or less scales along the lateral fold, versus 98 or more in *Ophisaurus* and *Smythsaurus gen. nov.*

*Binghamsaurus gen. nov.* is also separated from the other North American genera *Ophisaurus* and *Smythsaurus gen. nov.* by having one or more upper labials on each side that are not separated from the orbit by lorilabials. About 80% of *Binghamsaurus gen. nov.* have two frontonasals rather than one, as seen in *Ophisaurus* and *Smythsaurus gen. nov.*

*Binghamsaurus gen. nov.* is also further separated from the other North American genera *Ophisaurus* and *Smythsaurus gen. nov.* by its hemipenal structure which is unique in that it has two ridges, one on either side of the sulcus, that run the entire length of the organ. These ridges are spinose on top and rugose laterally. The remainder of the hemipenis is plicate and fleshy, except for a few small spines at the base of the ridges.

*Smythsaurus gen. nov.* is readily separated from *Ophisaurus* by having dark stripes or dark pigmentation below the lateral fold, a condition not seen in *Ophisaurus*.

*Smythsaurus gen. nov.* is further separated from *Ophisaurus* by white markings occurring in the middle of the scales, often forming smooth stripes, (versus occurring on the posterior corners of the scales, but never primarily in the middle in *Ophisaurus*; or in the case of young *Ophisaurus*, absent); a distinct mid-dorsal stripe, usually present in adults and always in young specimens and juveniles as well as dark stripes present on scale rows one or two on the venter, (versus no distinct mid-dorsal stripe present and no dark stripes present on the venter in *Ophisaurus*).

*Ophisaurus*, *Binghamsaurus gen. nov.* and *Smythsaurus gen. nov.* are readily separated from *Pseudopus* Merrem, 1820 by the absence of external rudiments of hind limbs, as seen in the latter genus.

*Anguis* Linnaeus, 1758 is readily separated from the other genera by having no trace of limbs externally and fang-like lateral teeth.

*Dopasia* Gray, 1853 and *Richardsonsaurus gen. nov.* are both separated from all other Angiud genera by the following suite of characters: Ear-opening not larger than the nostril; 14 longitudinal rows of dorsal plates and three shields on a line from the nasal to the azygos praefrontal.

*Dopasia* Gray, 1853 is separated from the similar *Richardsonsaurus gen. nov.* by having a dark ventrolateral stripe present; nasal separated from frontonasal by three scales and vertebrae from atlas to remnants of hind leg bones (VPS) 47-52, versus there being no dark ventrolateral stripe present; nasal separated from frontonasal by two scales and vertebrae from atlas to remnants of hind leg bones (VPS) 50-50 in *Richardsonsaurus gen. nov.*

**Distribution:** Algeria and Morocco, North Africa.

**Content:** *Hyalosaurus koellikeri* Günther, 1873 (monotypic).

#### GENUS PSEUDOPUS MERREM, 1820.

**Type species:** *Lacerta apoda* Pallas, 1775.

**Diagnosis:** In terms of other species within the Anguidae, the most relevant diagnostic features of *Pseudopus* Merrem, 1820 that differentiate it from the other Anguidae genera are the fact that the ear-opening is distinct and that there are external rudiments of hind limbs.

The genus most similar morphologically to this one and close by molecular phylogenies, is *Anguis* Linnaeus, 1758. It is separated from *Anguis* by the fact that *Anguis* has no traces of

external limbs and the lateral teeth are fang-like.

*Pseudopus* is further diagnosed as follows:

Lateral teeth with subspherical crowns; teeth on the pterygoids (in two rows), palatines, and frequently also on the vomers. Shape, arrangement, and number of the head-shields extremely similar to those of *Anguis fragilis* Linnaeus, 1758, and likewise subject to a certain amount of variation: azygos praefrontal narrower than the greatest width of the frontal, usually separated from the latter by two or three praefrontals on a transverse line; interparietal narrower than the parietals, as broad as or narrower than the occipital; two shields on a line from the nasal to the azygos praefrontal; three supraoculars and five supraciliaries. Ear-opening distinct, horizontal, slightly larger than the nostril. Dorsal plates in twelve or fourteen longitudinal series, keeled, the keels much stronger in the young than in the adult; ventrals in ten longitudinal series, strongly keeled in the young, the keels disappearing with age. A small rudiment of extremities on each side of the anal flap. Tail once and a half to twice as long as head and body; upper and lower caudal plates keeled. Brown, lighter inferiorly; young olive-grey, with dark-brown undulated cross bands on the back and vertical bars on the sides of the head (modified from Boulenger, 1885, pp. 280-281).

**Distribution:** Southern Eurasia in a band stretching between Greece and southern Kazakhstan.

**Content:** *Pseudopus apoda* (Pallas, 1775) (monotypic).

#### GENUS ANGUIS LINNAEUS, 1758.

**Type species:** *Anguis fragilis* Linnaeus, 1758

**Diagnosis:** The genus *Anguis* Linnaeus, 1758 is separated from all other Anguidae by the following unique suite of characters: No lateral fold. Scales roundish, arranged quincuncially on the back, forming vertical series on the sides. No limbs or remnants of them. Lateral teeth are fanglike. Palate is toothless.

**Distribution:** Most of Europe and nearby parts of Asia.

**Content:** *Anguis fragilis* Linnaeus, 1758 (type species); *A. cephalonica* Werner, 1894; *A. colchica* (Nordmann, 1840); *A. graeca* (Bedraiga, 1881); *A. veronensis* Pollini, 1818.

#### GENUS DOPASIA GRAY, 1853.

**Type species:** *Pseudopus gracilis* Gray, 1845.

**Diagnosis:** *Dopasia* Gray, 1853 and *Richardsonsaurus gen. nov.* (formerly treated as a part of *Dopasia*) are both separated from all other Angiud genera by the following suite of characters: Ear-opening not larger than the nostril; 14 longitudinal rows of dorsal plates and three shields on a line from the nasal to the azygos praefrontal.

*Dopasia* Gray, 1853 is separated from the similar *Richardsonsaurus gen. nov.* by having a dark ventrolateral stripe present; nasal separated from frontonasal by three scales and vertebrae from atlas to remnants of hind leg bones (VPS) 47-52, versus there being no dark ventrolateral stripe present; nasal separated from frontonasal by two scales and vertebrae from atlas to remnants of hind leg bones (VPS) 50-50 in *Richardsonsaurus gen. nov.*

The genus *Ophisaurus* Daudin, 1803 as traditionally defined morphologically has been defined as those Anguid lizards with the following suite of characters: A lateral fold. Scales squarish-rhomboidal, forming straight longitudinal and transverse series. Limbs absent externally, or reduced to a rudiment of the hind pair. Teeth with conical or subspherical crowns. Pterygoid teeth; palatine and vomerine teeth may be present or absent.

*Hyalosaurus* Günther, 1873, monotypic for the species *Hyalosaurus koellikeri* Günther, 1873 is readily separated from *Ophisaurus* by a concealed ear opening as opposed to obvious in *Ophisaurus*.

Otherwise the preceding diagnosis can be used to define

*Hyalosaurus* as well.

*Ophisaurus* is separated from the other two morphologically similar North American genera *Binghamsaurus gen. nov.* and *Smythsaurus gen. nov.* by the following:

*Binghamsaurus gen. nov.* has 97 or less scales along the lateral fold, versus 98 or more in *Ophisaurus* and *Smythsaurus gen. nov.*

*Binghamsaurus gen. nov.* is also separated from the other North American genera *Ophisaurus* and *Smythsaurus gen. nov.* by having one or more upper labials on each side that are not separated from the orbit by lorilabials. About 80% of *Binghamsaurus gen. nov.* have two frontonasals rather than one, as seen in *Ophisaurus* and *Smythsaurus gen. nov.*

*Binghamsaurus gen. nov.* is also further separated from the other North American genera *Ophisaurus* and *Smythsaurus gen. nov.* by its hemipenial structure which is unique in that it has two ridges, one on either side of the sulcus, that run the entire length of the organ. These ridges are spinose on top and rugose laterally. The remainder of the hemipenis is plicate and fleshy, except for a few small spines at the base of the ridges.

*Smythsaurus gen. nov.* is readily separated from *Ophisaurus* by having dark stripes or dark pigmentation below the lateral fold, a condition not seen in *Ophisaurus*.

*Smythsaurus gen. nov.* is further separated from *Ophisaurus* by white markings occurring in the middle of the scales, often forming smooth stripes, (versus occurring on the posterior corners of the scales, but never primarily in the middle in *Ophisaurus*; or in the case of young *Ophisaurus*, absent); a distinct mid-dorsal stripe, usually present in adults and always in young specimens and juveniles as well as dark stripes present on scale rows one or two on the venter, (versus no distinct mid-dorsal stripe present and no dark stripes present on the venter in *Ophisaurus*).

*Ophisaurus*, *Binghamsaurus gen. nov.* and *Smythsaurus gen. nov.* are readily separated from *Pseudopus* Merrem, 1820 by the absence of external rudiments of hind limbs, as seen in the latter genus.

*Anguis* Linnaeus, 1758 is readily separated from the other genera by having no trace of limbs externally and fang-like lateral teeth.

**Distribution:** Southern Asia, including Sumatra and Borneo in a region stretching from Nepal/India to Thailand and Vietnam.

**Content:** *Dopasia gracilis* (Gray, 1845) (type species); *D. buettikoferi* (Lidith De Juede 1905); *D. sokolovi* (Darevsky and Nguyen-Van-Sang, 1983); *D. wegneri* (Mertens, 1959).

#### GENUS RICHARDSONSAURUS GEN. NOV.

**Type species:** *Ophisaurus harti* Boulenger, 1899.

**Diagnosis:** *Richardsonosaurus gen. nov.* was until now regarded as part of *Dopasia* Gray, 1853.

*Dopasia* Gray, 1853 and *Richardsonosaurus gen. nov.* are both separated from all other Angiud genera by the following suite of characters: Ear-opening not larger than the nostril; 14 longitudinal rows of dorsal plates and three shields on a line from the nasal to the azygos praefrontal.

*Dopasia* Gray, 1853 is separated from *Richardsonosaurus gen. nov.* by having a dark ventrolateral stripe present; nasal separated from frontonasal by three scales and vertebrae from atlas to remnants of hind leg bones (VPS) 47-52, versus there being no dark ventrolateral stripe present; nasal separated from frontonasal by two scales and vertebrae from atlas to remnants of hind leg bones (VPS) 50-50 in *Richardsonosaurus gen. nov.*

The genus *Ophisaurus* Daudin, 1803 as traditionally defined morphologically has been defined as those Anguid lizards with the following suite of characters: A lateral fold. Scales squarish-rhomboidal, forming straight longitudinal and transverse series. Limbs absent externally, or reduced to a rudiment of the hind

pair. Teeth with conical or subspherical crowns. Pterygoid teeth; palatine and vomerine teeth may be present or absent.

*Hyalosaurus* Günther, 1873, monotypic for the species *Hyalosaurus koellikeri* Günther, 1873 is readily separated from *Ophisaurus* by a concealed ear opening as opposed to obvious in *Ophisaurus*.

Otherwise the preceding diagnosis can be used to define *Hyalosaurus* as well.

*Ophisaurus* is separated from the other two morphologically similar North American genera *Binghamsaurus gen. nov.* and *Smythsaurus gen. nov.* by the following:

*Binghamsaurus gen. nov.* has 97 or less scales along the lateral fold, versus 98 or more in *Ophisaurus* and *Smythsaurus gen. nov.*

*Binghamsaurus gen. nov.* is also separated from the other North American genera *Ophisaurus* and *Smythsaurus gen. nov.* by having one or more upper labials on each side that are not separated from the orbit by lorilabials. About 80% of *Binghamsaurus gen. nov.* have two frontonasals rather than one, as seen in *Ophisaurus* and *Smythsaurus gen. nov.*

*Binghamsaurus gen. nov.* is also further separated from the other North American genera *Ophisaurus* and *Smythsaurus gen. nov.* by its hemipenial structure which is unique in that it has two ridges, one on either side of the sulcus, that run the entire length of the organ. These ridges are spinose on top and rugose laterally. The remainder of the hemipenis is plicate and fleshy, except for a few small spines at the base of the ridges.

*Smythsaurus gen. nov.* is readily separated from *Ophisaurus* by having dark stripes or dark pigmentation below the lateral fold, a condition not seen in *Ophisaurus*.

*Smythsaurus gen. nov.* is further separated from *Ophisaurus* by white markings occurring in the middle of the scales, often forming smooth stripes, (versus occurring on the posterior corners of the scales, but never primarily in the middle in *Ophisaurus*; or in the case of young *Ophisaurus*, absent); a distinct mid-dorsal stripe, usually present in adults and always in young specimens and juveniles as well as dark stripes present on scale rows one or two on the venter, (versus no distinct mid-dorsal stripe present and no dark stripes present on the venter in *Ophisaurus*).

*Ophisaurus*, *Binghamsaurus gen. nov.* and *Smythsaurus gen. nov.* are readily separated from *Pseudopus* Merrem, 1820 by the absence of external rudiments of hind limbs, as seen in the latter genus.

*Anguis* Linnaeus, 1758 is readily separated from the other genera by having no trace of limbs externally and fang-like lateral teeth.

**Distribution:** North Vietnam, Southern China and Taiwan.

**Ertmology:** Named in honour of Peter Richardson, long-time owner of Dreamtime Reptile Park, Bundaberg, Queensland, in recognition of his long-term commitment to wildlife education in Queensland. His successful wildlife education business was effectively killed when the ruthless Steve Irwin business machine attempted to monopolize the wildlife space in Queensland. This was to the detriment of others in Queensland who owned and managed wildlife parks and reserves.

Instead of public moneys being spent on wildlife conservation outcomes, the Steve Irwin business masqueraded as a wildlife charity to effectively siphon taxpayer's funds off for their own business interests and ruthless self promotion.

Steve Irwin, a police-protected criminal, became known internationally for his repeated acts of extreme animal cruelty that he performed for TV audiences, before he was killed on 4 September 2006 after illegally mistreating a Stingray.

**Content:** *Richardsonosaurus harti* (Boulenger, 1899) (type species); *R. hainanensis* (Yang, 1984); *R. ludovici* (Mocquard, 1905).

**TRIBE OPHISAURIINI TRIBE NOV.****(Terminal taxon: *Anguis ventralis* Linnaeus, 1766)****Diagnosis:** The tribe is monotypic for the genus *Ophisaurus* Daudin, 1803 as defined previously in this paper.

Therefore the tribe Ophisauriini *tribe nov.* is defined as follows: The genus *Ophisaurus* Daudin, 1803 as traditionally defined morphologically has been defined as those Anguid lizards with the following suite of characters: A lateral fold. Scales squarish-rhomboidal, forming straight longitudinal and transverse series. Limbs absent externally, or reduced to a rudiment of the hind pair. Teeth with conical or subspherical crowns. Pterygoid teeth; palatine and vomerine teeth may be present or absent.

However a number of genera confused with this are defined in this paper and belong to the other Anguinae tribe Anguiniini *tribe nov.*

Hence they are defined below to separate them from *Ophisaurus* and in turn Ophisauriini *tribe nov.*

*Hyalosaurus* Günther, 1873, monotypic for the species *Hyalosaurus koellikeri* Günther, 1873 is readily separated from *Ophisaurus* by a concealed ear opening as opposed to obvious in *Ophisaurus*.

Otherwise the preceding diagnosis can be used to define *Hyalosaurus* as well.

*Ophisaurus* is separated from the other two morphologically similar North American genera *Binghamsaurus gen. nov.* and *Smythsaurus gen. nov.* by the following:

*Binghamsaurus gen. nov.* has 97 or less scales along the lateral fold, versus 98 or more in *Ophisaurus* and *Smythsaurus gen. nov.*

*Binghamsaurus gen. nov.* is also separated from the other North American genera *Ophisaurus* and *Smythsaurus gen. nov.* by having one or more upper labials on each side that are not separated from the orbit by lorilabials. About 80% of *Binghamsaurus gen. nov.* have two frontonasals rather than one, as seen in *Ophisaurus* and *Smythsaurus gen. nov.*

*Binghamsaurus gen. nov.* is also further separated from the other North American genera *Ophisaurus* and *Smythsaurus gen. nov.* by its hemipenal structure which is unique in that it has two ridges, one on either side of the sulcus, that run the entire length of the organ. These ridges are spinose on top and rugose laterally. The remainder of the hemipenis is plicate and fleshy, except for a few small spines at the base of the ridges.

*Smythsaurus gen. nov.* is readily separated from *Ophisaurus* by having dark stripes or dark pigmentation below the lateral fold, a condition not seen in *Ophisaurus*.

*Smythsaurus gen. nov.* is further separated from *Ophisaurus* by white markings occurring in the middle of the scales, often forming smooth stripes, (versus occurring on the posterior corners of the scales, but never primarily in the middle in *Ophisaurus*; or in the case of young *Ophisaurus*, absent); a distinct mid-dorsal stripe, usually present in adults and always in young specimens and juveniles as well as dark stripes present on scale rows one or two on the venter, (versus no distinct mid-dorsal stripe present and no dark stripes present on the venter in *Ophisaurus*).

*Ophisaurus*, *Binghamsaurus gen. nov.* and *Smythsaurus gen. nov.* are readily separated from *Pseudopus* Merrem, 1820 by the absence of external rudiments of hind limbs, as seen in the latter genus.

*Anguis* Linnaeus, 1758 is readily separated from the other genera by having no trace of limbs externally and fang-like lateral teeth.

*Dopasia* Gray, 1853 and *Richardsonsaurus gen. nov.* are both separated from all other Anguid genera by the following suite of characters: Ear-opening not larger than the nostril; 14 longitudinal rows of dorsal plates and three shields on a line from the nasal to the azygous praefrontal.

*Dopasia* Gray, 1853 is separated from the similar *Richardsonsaurus gen. nov.* by having a dark ventrolateral stripe present; nasal separated from frontonasal by three scales and vertebrae from atlas to remnants of hind leg bones (VPS) 47-52, versus there being no dark ventrolateral stripe present; nasal separated from frontonasal by two scales and vertebrae from atlas to remnants of hind leg bones (VPS) 50-50 in *Richardsonsaurus gen. nov.*

**Distribution:** USA and Mexico.

**Content:** *Ophisaurus* Daudin, 1803 (monotypic).

**TRIBE ANGUIINI TRIBE NOV.****(Terminal taxon: *Anguis ventralis* Linnaeus, 1766)****Diagnosis:** The tribe Anguiniini *tribe nov.* includes all species and genera within Anguinae except for *Ophisaurus* Daudin, 1803.

Therefore the tribe is defined by defining the component genera as well as *Ophisaurus* Daudin, 1803.

The genus *Ophisaurus* Daudin, 1803 as traditionally defined morphologically has been defined as those Anguid lizards with the following suite of characters: A lateral fold. Scales squarish-rhomboidal, forming straight longitudinal and transverse series. Limbs absent externally, or reduced to a rudiment of the hind pair. Teeth with conical or subspherical crowns. Pterygoid teeth; palatine and vomerine teeth may be present or absent.

However a number of genera confused with this are defined in this paper and belong to the other Anguinae tribe Anguiniini *tribe nov.* as defined here.

Hence they are defined below to separate them from *Ophisaurus* and in turn Ophisauriini *tribe nov.*

*Hyalosaurus* Günther, 1873, monotypic for the species *Hyalosaurus koellikeri* Günther, 1873 is readily separated from *Ophisaurus* by a concealed ear opening as opposed to obvious in *Ophisaurus*.

Otherwise the preceding diagnosis can be used to define *Hyalosaurus* as well.

*Ophisaurus* is separated from the other two morphologically similar North American genera *Binghamsaurus gen. nov.* and *Smythsaurus gen. nov.* by the following:

*Binghamsaurus gen. nov.* has 97 or less scales along the lateral fold, versus 98 or more in *Ophisaurus* and *Smythsaurus gen. nov.*

*Binghamsaurus gen. nov.* is also separated from the other North American genera *Ophisaurus* and *Smythsaurus gen. nov.* by having one or more upper labials on each side that are not separated from the orbit by lorilabials. About 80% of *Binghamsaurus gen. nov.* have two frontonasals rather than one, as seen in *Ophisaurus* and *Smythsaurus gen. nov.*

*Binghamsaurus gen. nov.* is also further separated from the other North American genera *Ophisaurus* and *Smythsaurus gen. nov.* by its hemipenal structure which is unique in that it has two ridges, one on either side of the sulcus, that run the entire length of the organ. These ridges are spinose on top and rugose laterally. The remainder of the hemipenis is plicate and fleshy, except for a few small spines at the base of the ridges.

*Smythsaurus gen. nov.* is readily separated from *Ophisaurus* by having dark stripes or dark pigmentation below the lateral fold, a condition not seen in *Ophisaurus*.

*Smythsaurus gen. nov.* is further separated from *Ophisaurus* by white markings occurring in the middle of the scales, often forming smooth stripes, (versus occurring on the posterior corners of the scales, but never primarily in the middle in *Ophisaurus*; or in the case of young *Ophisaurus*, absent); a distinct mid-dorsal stripe, usually present in adults and always in young specimens and juveniles as well as dark stripes present on scale rows one or two on the venter, (versus no distinct mid-dorsal stripe present and no dark stripes present

on the venter in *Ophisaurus*).

*Ophisaurus*, *Binghamsaurus* *gen. nov.* and *Smythsaurus* *gen. nov.* are readily separated from *Pseudopus* Merrem, 1820 by the absence of external rudiments of hind limbs, as seen in the latter genus.

*Anguis* Linnaeus, 1758 is readily separated from the other genera by having no trace of limbs externally and fang-like lateral teeth.

*Dopasia* Gray, 1853 and *Richardsonsaurus* *gen. nov.* are both separated from all other Anguid genera by the following suite of characters: Ear-opening not larger than the nostril; 14 longitudinal rows of dorsal plates and three shields on a line from the nasal to the azygos praefrontal.

*Dopasia* Gray, 1853 is separated from the similar *Richardsonsaurus* *gen. nov.* by having a dark ventrolateral stripe present; nasal separated from frontonasal by three scales and vertebrae from atlas to remnants of hind leg bones (VPS) 47-52, versus there being no dark ventrolateral stripe present; nasal separated from frontonasal by two scales and vertebrae from atlas to remnants of hind leg bones (VPS) 50-50 in *Richardsonsaurus* *gen. nov.*

**Distribution:** North Africa, North America, Europe and nearby areas, southern Asia including an area from India to China and south into Indonesia.

**Content:** *Anguis* Linnaeus, 1758 (type genus); *Binghamsaurus* *gen. nov.*; *Dopasia* Gray, 1853; *Hyalosaurus* Günther, 1873; *Pseudopus* Merrem, 1820; *Richardsonsaurus* *gen. nov.*; *Smythsaurus* *gen. nov.*

#### THE SUBFAMILY GERRHONOTINAE

Within Gerrhonotinae, *Elgaria* Gray, 1838 is divided into two with the erection of *Pitmansaurus* *gen. nov.* to accommodate the significantly divergent taxon *Elgaria coerulea* (Wiegmann, 1828). That this taxon hadn't been placed in its own genus prior is astounding. This comment is made noting that as far back as 1988, Good (1988) showed a divergence of 12.5 MYA divergence of this taxon from other species of *Elgaria*, this divergence alone being sufficient to warrant the lizard being placed in its own genus and that is without even noting obvious morphological divergence.

It is likely that Stebbins (1958) was the first to suggest removal of the taxon *Elgaria coerulea* (Wiegmann, 1828) from the genus.

Both these genera are also placed in a new tribe Pitmansauriini *tribe nov.* with all others in the subfamily Gerrhonotinae placed in the nominate tribe.

*Gerrhonotus* Wiegmann, 1828 is divided into two with the erection of *Lindholtisaurus* to accommodate the divergent species *Gerrhonotus parvus* Knight and Scudday, 1985 and two others, these species being widely divergent from the nominate taxon in the genus and at times also placed in *Elgaria*.

*Mesaspis* Cope, 1878 is divided into two with the erection of *Rentonsaurus* *gen. nov.* to accommodate the divergent taxon *Mesaspis gadovii* (Boulenger, 1913). For the remainder, two species are placed in the subgenus *Rayplattsaurus* *subgen. nov.*

*Abronia* Gray, 1838 is herein regarded as paraphyletic (at the subgenus level) with the adoption of all subgenera formally proposed by Campbell and Frost, 1993, (the others being *Abaculabronia*, *Aenigmabronia*, *Auriculabronia*, *Lissabronia*, *Scopaeabronia*).

In addition three new subgenera, *Assangesaurus* *subgen. nov.*, *Elliottsaura* *subgen. nov.* and *Lanisaura* *subgen. nov.* are erected for species not properly accommodated within the existing divisions. One divergent taxon, *Abronia mixteca* Bogert and Porter, 1967 is herein placed in the newly erected genus *Snowdonsaurus* *gen. nov.*

#### GENUS ELGARIA GRAY, 1838.

**Type species:** *Cordylus (Gerhonotus) multi-carinatus* Blainville, 1835.

**Diagnosis:** The genera *Elgaria* Gray, 1838 and *Pitmansaurus* *gen. nov.* until now included within *Elgaria* (and both genera herein placed within the tribe Pitmansauriini *tribe nov.*) are defined as follows:

Anguids, with a lateral fold; scales squarish or rhomboidal, forming transverse series. Limbs well developed and pentadactyle. Teeth conical. Pterygoid teeth present or absent. Dorsal scales not larger than or only scarcely larger than the ventrals. Dorsal scales in 14 or 16 longitudinal series.

The absence of anterior internasals, separating the nasal from the rostral, and the fact that the suboculars reach the temporals, distinguish these two genera from other Gerrhonotidae, Gerrhonotinae and Gerrhonotiini *tribe nov.*

The genus *Elgaria* as redefined herein includes those lizards with the following unique suite of characters:

Lateral dorsal scales smooth. An azygos praefrontal, separated from the frontal by a pair of praefrontals. Dorsal scales obtusely keeled. Six or eight median dorsal series keeled. Tail when perfect is more than twice the length of the head and body. Number of whorls of scales on the tail (from the first one behind the thigh to the tip of the tail) is usually more than 114; the iris of the eye is yellow and devoid of dark pigment; dorsal body scales are usually in 14 longitudinal rows; in adults the scales on the sides of the tail are usually smooth or at best slightly keeled.

The lizards in the genus *Pitmansaurus* *gen. nov.* are in turn separated from *Elgaria* by the following unique suite of characters: Lateral dorsal scales keeled. Tail when perfect is less than twice the length of the head and body; number of whorls of scales on the tail (from the first one behind the thigh to the tip of the tail) is usually more than 114; the iris of the eye is pigmented, especially around the margin of the pupil, so that often the whole eye appears to be black; dorsal body scales are usually in 16 longitudinal rows; in adults the scales on the sides of the tail are strongly keeled.

**Distribution:** *Elgaria* as defined herein are found in western North America, ranging from the northern United States of America to Mexico.

**Content:** *Elgaria multicarinata* (Blainville, 1835) (type species); *E. cedrosensis* (Fitch, 1934); *E. kingii* Gray, 1838; *E. panamintina* (Stebbins, 1958); *E. paucicarinata* (Fitch, 1934); *E. velazquezi* Grismer and Hollingsworth, 2001.

#### GENUS PITMANSAURUS GEN. NOV.

**Type species:** *Gerrhonotus coeruleus* Wiegmann, 1828.

**Diagnosis:** The genera *Elgaria* Gray, 1838 and *Pitmansaurus* *gen. nov.* until now both included within *Elgaria* (and both genera herein placed within the tribe Pitmansauriini *tribe nov.*) are defined as follows:

Anguids, with a lateral fold; scales squarish or rhomboidal, forming transverse series. Limbs well developed and pentadactyle. Teeth conical. Pterygoid teeth present or absent. Dorsal scales not larger than or only scarcely larger than the ventrals. Dorsal scales in 14 or 16 longitudinal series.

The absence of anterior internasals, separating the nasal from the rostral, and the fact that the suboculars reach the temporals, distinguish these two genera from other Gerrhonotidae, Gerrhonotinae and Gerrhonotiini *tribe nov.*

The genus *Elgaria* as redefined herein includes those lizards with the following unique suite of characters:

Lateral dorsal scales smooth. An azygos praefrontal, separated from the frontal by a pair of praefrontals. Dorsal scales obtusely keeled. Six or eight median dorsal series keeled. Tail when perfect is more than twice the length of the head and body. Number of whorls of scales on the tail (from the first one behind

the thigh to the tip of the tail) is usually more than 114; the iris of the eye is yellow and devoid of dark pigment; dorsal body scales are usually in 14 longitudinal rows; in adults the scales on the sides of the tail are usually smooth or at best slightly keeled.

The lizards in the genus *Pitmansaurus gen. nov.* are in turn separated from *Elgaria* by the following unique suite of characters: Lateral dorsal scales keeled. Tail when perfect is less than twice the length of the head and body; number of whorls of scales on the tail (from the first one behind the thigh to the tip of the tail) is usually more than 114; the iris of the eye is pigmented, especially around the margin of the pupil, so that often the whole eye appears to be black; dorsal body scales are usually in 16 longitudinal rows; in adults the scales on the sides of the tail are strongly keeled.

The genus *Pitmansaurus gen. nov.* is further diagnosed by the following unique suite of characters: Head-shields smooth; an azygos praefrontal, very variable in form and size, either completely enclosed between the other praefrontals or in contact with the loreals or with the frontal, separated from the rostral by one or two pairs of shields; sometimes a small azygos shield behind the rostral, separating the anterior pair; nasal usually in contact with the rostral; two superposed postnasals, followed by one or two loreals; two or three small outer supraoculars; ten or eleven upper labials. Sides of neck granular. Lateral fold very strong, beginning on the neck. Nuchal shields in eight to twelve longitudinal series, keeled except in very young specimens. Dorsal scales in fourteen or sixteen longitudinal series, sharply keeled, of nearly the same size as the ventrals; forty-five to fifty-two transverse series. Ventrals in twelve longitudinal series. The adpressed forelimb reaches the angle of the mouth or the eye; the hind limb measures half to two thirds the distance from axilla to groin. Tail once and two thirds to twice as long as head and body, round, subquadrangular at the base; upper caudal scales sharply keeled.

Brown or olive above, usually with irregular undulated blackish cross bars bordered with small yellowish spots posteriorly; back sometimes irregularly spotted with blackish, and the flanks closely spotted with black and dotted with yellowish; lower surfaces whitish olive, uniform or with longitudinal series of confluent brown spots.

**Distribution:** *Pitmansaurus gen. nov.* is found in the west of the United States and in southwestern Canada. It ranges from southern British Columbia (including Vancouver Island), southward through western Washington and western Oregon to west-central coastal California and the central Sierra Nevada (including the east side of Lake Tahoe basin) and Washoe County, Nevada (Vindum and Arnold 1997). It also ranges southward in the Rocky Mountains to northern Idaho and western Montana. Disjunct populations occur in several areas in south-central Oregon, northeastern California, and northwestern Nevada (Stebbins 2003). The western edge of the distribution includes some small coastal islands (Stebbins 2003). The elevational range extends from sea level to around 3,200 m (Stebbins 2003); adapted from Hammerson (2007).

**Etymology:** Named in honour of Australia's original "Crocodile Hunter" Mick Pitman, after whom the hit movie "Crocodile Dundee" was modelled. Pitman's successful crocodile conservation business based in Queensland was effectively destroyed by a business rival named Steve Irwin.

A police-protected criminal and shrewd businessman, Steve Irwin cultivated a close relationship with corrupt government officials who acted as his paid thugs to repeatedly engage in illegal armed raids of Pitman's home and business in order to shut him down.

Irwin also effectively stole his (at the time unregistered) common-law trademark by quietly applying for registration of it

(in two classes) on 2 September 1998, via IP Australia through a family connected business. After obtaining registration for the trademarks (unopposed), Irwin then took action to stop Pitman using the name for himself.

Once Pitman was prohibited from trading as "the Crocodile Hunter", the result being that business was instead channelled to the Irwin enterprise and in the face of non-stop illegal armed raids (including more than 26 in two years) at Steve Irwin's instigation, Pitman had to completely shut down his enterprise and move to the Northern Territory, in effect as a fugitive.

While Irwin ended up making many millions of dollars through government hands-outs to his family business and became famous globally for his on-TV acts of extreme animal cruelty, Pitman was forced to languish in poverty and obscurity.

Karma kicked in on 4 September 2006, when after mistreating a stringray, Irwin was killed by its tail barb that penetrated his chest.

Following his death, Irwin's family attempted to re-write history by alleging Steve Irwin had been a tireless wildlife conservation icon. In fact nothing could have been further from the truth!

**Content:** *Pitmansaurus coerulea* (Wiegmann, 1828) (monotypic, but including four recognized subspecies, namely *Pitmansaurus coerulea coerulea* (Wiegmann, 1828), *P. coerulea palmeri* (Stejneger, 1893), *P. coerulea principis* (Baird and Girard, 1852), *P. coerulea shastensis* (Fitch, 1934)).

#### TRIBE PITMANSAURIINI TRIBE NOV.

(Terminal taxon: *Gerrhonotus coeruleus* Wiegmann, 1828).

**Diagnosis:** The genera *Elgaria* Gray, 1838 and *Pitmansaurus gen. nov.* until now both included within *Elgaria* consist the entirety of this tribe.

Both genera are separated from all other Gerrhonotinae (and by definition herein the tribe Gerrhonotiini *tribe nov.*) by the following unique suite of characters:

Anguids, with a lateral fold; scales squarish or rhomboidal, forming transverse series. Limbs well developed and pentadactyle. Teeth conical. Pterygoid teeth present or absent. Dorsal scales not larger than or only scarcely larger than the ventrals. Dorsal scales in 14 or 16 longitudinal series.

The absence of anterior internasals, separating the nasal from the rostral, and the fact that the suboculars reach the temporals, distinguish these two genera from other Gerrhonotidae, Gerrhonotinae and Gerrhonotiini *tribe nov.* The genus *Elgaria* as redefined herein includes those lizards with the following unique suite of characters:

Lateral dorsal scales smooth. An azygos praefrontal, separated from the frontal by a pair of praefrontals. Dorsal scales obtusely keeled. Six or eight median dorsal series keeled. Tail when perfect is more than twice the length of the head and body. Number of whorls of scales on the tail (from the first one behind the thigh to the tip of the tail) is usually more than 114; the iris of the eye is yellow and devoid of dark pigment; dorsal body scales are usually in 14 longitudinal rows; in adults the scales on the sides of the tail are usually smooth or at best slightly keeled.

The lizards in the genus *Pitmansaurus gen. nov.* are in turn separated from *Elgaria* by the following unique suite of characters: Lateral dorsal scales keeled. Tail when perfect is less than twice the length of the head and body; number of whorls of scales on the tail (from the first one behind the thigh to the tip of the tail) is usually more than 114; the iris of the eye is pigmented, especially around the margin of the pupil, so that often the whole eye appears to be black; dorsal body scales are usually in 16 longitudinal rows; in adults the scales on the sides of the tail are strongly keeled.

**Distribution:** Found in western North America, ranging from southern Canada, through the USA to Mexico.

**Etymology:** See for the genus *Pitmansaurus gen. nov.*

**Content:** *Pitmansaurus gen. nov.* (type genus); *Elgaria* Gray, 1838.

**TRIBE GERRHONOTIINI TRIBE NOV.**

**(Terminal taxon: *Gerrhonotus liocephalus* Wiegmann, 1828)**

**Diagnosis:** The genera *Elgaria* Gray, 1838 and *Pitmansaurus gen. nov.* until now both included within *Elgaria* consist the entirety of the other tribe in the subfamily Gerrhonotinae, namely *Pitmansauriini tribe nov.*

The tribe *Gerrhonotiini tribe nov.*, is most easily defined by removal of the two genera in the tribe *Pitmansaurus gen. nov.* by process of elimination.

Both those genera are separated from all other Gerrhonotinae (and by definition herein the tribe *Gerrhonotiini tribe nov.*) by the following unique suite of characters:

Anguids, with a lateral fold; scales squarish or rhomboidal, forming transverse series. Limbs well developed and pentadactyle. Teeth conical. Pterygoid teeth present or absent. Dorsal scales not larger than or only scarcely larger than the ventrals. Dorsal scales in 14 or 16 longitudinal series. The absence of anterior internasals, separating the nasal from the rostral, and the fact that the suboculars reach the temporals, distinguish these two genera from other Gerrhonotidae, Gerrhonotinae and *Gerrhonotiini tribe nov.*

**Distribution:** North and Central America and north-eastern South America.

**Content:** *Gerrhonotus* Wiegmann, 1828 (type genus); *Abronia* Gray, 1838; *Barisia* Cope, 1878; *Coloptychon* Tihen, 1949; *Lindholtsaurus gen. nov.*; *Mesaspis* Cope, 1878; *Rentonsaurus gen. nov.*; *Snowdonsaurus gen. nov.*

**THE DIVISION OF GERRHONOTUS WIEGMANN, 1828.**

Numerous studies have shown *Gerrhonotus* Wiegmann, 1828 as presently recognized to contain two distinct clades (e.g. Bryson and Graham 2010, Pyron *et al.* 2013). These are the nominate species group, including the taxa, *Gerrhonotus liocephalus* Wiegmann, 1828, the type for the genus, *Gerrhonotus infernalis* Baird, 1859 and *Gerrhonotus ophiurus* Cope, 1867, and the second group of species comprising, *Gerrhonotus parvus* Knight and Scudday, 1985, *Gerrhonotus lugoi* McCoy, 1970 and *Gerrhonotus farri* Bryson and Graham, 2010.

Morphologically the second trio of species are separated from the first trio by having smooth dorsal scales and the lack of a postrostral. Smith (1986) and Liner (1994) dealt with this problem by transferring the relevant species to *Elgaria* Gray, 1838. However this situation was appropriate as in other attributes, these species clearly don't fit with other species in the entire *Pitmansauriini tribe nov.*

More recently Conroy *et al.* (2005), Bryson and Graham (2010), Pyron *et al.* (2013) and others have called the relevant taxa *Gerrhonotus*, even though this generic assignment is not satisfactory.

To correct this anomaly, the three relevant species are herein placed in a new genus, *Lindholtsaurus gen. nov.* described according to the rules of the Zoological Code (Ride *et al.* 1999).

**GENUS LINDHOLTSAURUS GEN. NOV.**

**Type species:** *Gerrhonotus parvus* Knight and Scudday, 1985.

**Diagnosis:** Morphologically, all species of *Lindholtsaurus gen. nov.* are separated from those within the genus *Gerrhonotus* Wiegmann, 1828 (and all other Anguillidae) by the following suite of characters: Smooth dorsal scales, the rostral in contact with the nasals, a second primary temporal that is in contact with the fifth medial supraocular, suboculars separated from the lower primary temporal by an upper labial, and wide pale crossbands on the tail (after Knight and Scudday, 1985).

**Distribution:** Mexico.

**Etymology:** Named in honour of taxi driver and magazine publisher, Peer Lindholt. For many years he produced a number of probing journals including *Cabbie*, which did something no other Australian periodical publisher ever did and that was to stand up for the rights of honest, decent hard-working taxi drivers. In Australia and other places as well, taxi drivers are downtrodden workers who are in effect cannon fodder used to ferry drunks and other undesirable from venue to venue.

They are commonly treated with contempt by employers, the public and most notably law-enforcement agencies, whose workers see cabbies as an easy soft target to harass and persecute.

Lindholt's magazine was also the first to publicly expose serious endemic corruption involving Mr. Reg Kermode and others running the Australian taxi business, calling them the "Mafia".

His description was apt in view of the graft, corruption and violence that underpinned their business.

Kermode in particular was responsible for numerous deaths of taxi drivers through illegal activities he sanctioned and promoted, invariably with the support of corrupt people in government, in the transport bureaucracies as well as with the aid of corrupt State and Federal parliamentarians.

**Content:** *Lindholtsaurus parvus* (Knight and Scudday, 1985) (type species); *L. lugoi* (McCoy, 1970); *L. farri* Bryson and Graham, 2010.

**THE DIVISION OF MESASPIS COPE, 1878.**

In his monograph, Good (1988) separated the genus *Mesaspis* Cope, 1879 into three distinctive groups. He divided them into the *moreletii* group, the *antauges* group as sister to the other and finally the *gadovii* group, which he regarded as "the outgroup".

While his data was incomplete, it was clear that the *antauges* group shared more affinities with the *moreletii* group than the obviously most distinct *gadovii* group.

A number of more recent phylogenetic studies (e.g. Pyron *et al.* 2013) have shown the *moreletii* group to be sufficiently divergent to the *gadovii* group to warrant being placed in a separate genus.

On the basis of the preceding, I hereby divide the genus *Mesaspis* Cope, 1879 into two genera, with the new genus *Rentonsaurus gen. nov.* erected to accommodate the divergent taxon *Mesaspis gadovii* (Boulenger, 1913).

For the remainder of *Mesaspis*, two species (the so-called *antauges* group) are placed in the subgenus *Rayplattsaurus subgen. nov.* defined according to the Zoological Code (Ride *et al.* 1999).

**GENUS MESASPIS COPE, 1878.**

**Type species:** *Gerrhonotus moreletii* Bocourt, 1872.

**Diagnosis:** In common with other Gerrhonotinae and *Gerrhonotiini*, *Mesaspis* Cope, 1878 are characterized by the presence of a lateral fold; scales that are squarish or rhomboidal, forming transverse series; limbs that are well developed with pentadactyle feet; conical teeth.

In common with the genera *Abronia* Gray, 1838 *sensu lato* and *Coloptychon* Tihen, 1949, *Mesaspis* has a reduction of the lateral fold.

*Mesaspis* Cope, 1878 and the new genus *Rentonsaurus gen. nov.* (formerly included in *Mesaspis*) are both diagnosed by the following four unique characters: eight (rather than ten) longitudinal ventrals at the forelimbs; subgranular scales on the leading edges of the shanks; labial striping and ventral speckling.

The genus *Rentonsaurus gen. nov.* is readily separated from

*Mesaspis* Cope, 1878 by the presence of a single subocular; reduction in size of the supranasal; increased keeling and the considerably larger adult size of adults within this genus as opposed to *Mesaspis*.

The subgenus of *Mesaspis*, *Rayplattsaurus subgen. nov.* are separated from the other subgenus *Mesaspis* and also *Rentonsaurus gen. nov.* by the following unique characters: An enhancement of keeling reduction so the scale keels are virtually absent; the presence of a postrostral; broad frontal-interparietal contact; an elongate anterior superciliary.

In addition to the preceding, the subgenus *Mesaspis* is separated from both *Rayplattsaurus subgen. nov.* and *Rentonsaurus gen. nov.* by the presence of a single postmental scale rather than two as well as two lateral supraoculars (versus three in the other groups) and a high degree of canthal/loreal variability.

**Distribution:** Central America.

**Content:** *Mesaspis moreletii* (Bocourt, 1872) (type species); *M. antauges* (Cope, 1866); *M. juarezi* (Karges and Wright, 1987); *M. monticola* (Cope, 1878); *M. viridiflava* (Bocourt, 1873).

#### SUBGENUS RAYPLATTSAUROS SUBGEN. NOV.

**Type species:** *Barisia antauges* Cope, 1866.

**Diagnosis:** In common with other Gerrhonotinae and Gerrhonotiini, *Mesaspis* Cope, 1878 are characterized by the presence of a lateral fold; scales that are squarish or rhomboidal, forming transverse series; limbs that are well developed with pentadactyle feet; conical teeth.

In common with the genera *Abronia* Gray, 1838 *sensu lato* and *Coloptychon* Tihen, 1949, *Mesaspis* has a reduction of the lateral fold.

*Mesaspis* Cope, 1878 and the new genus *Rentonsaurus gen. nov.* (formerly included in *Mesaspis*) are both diagnosed by the following four unique characters: eight (rather than ten) longitudinal ventrals at the forelimbs; subgranular scales on the leading edges of the shanks; labial striping and ventral speckling.

The genus *Rentonsaurus gen. nov.* is readily separated from *Mesaspis* Cope, 1878 by the presence of a single subocular; reduction in size of the supranasal; increased keeling and the considerably larger adult size of adults within this genus as opposed to *Mesaspis*.

The subgenus of *Mesaspis*, *Rayplattsaurus subgen. nov.* as described herein, are separated from the other subgenus *Mesaspis* and also *Rentonsaurus gen. nov.* by the following unique characters: An enhancement of keeling reduction so the scale keels are virtually absent; the presence of a postrostral; broad frontal-interparietal contact; an elongate anterior superciliary.

In addition to the preceding, the subgenus *Mesaspis* is separated from both *Rayplattsaurus subgen. nov.* and *Rentonsaurus gen. nov.* by the presence of a single postmental scale rather than two as well as two lateral supraoculars (versus three in the other groups) and a high degree of canthal/loreal variability.

**Distribution:** Known only from Mount Orizaba, Veracruz, Mexico for *Mesaspis (Rayplattsaurus) antauges* (Cope, 1866) and known only from the northern slope of the Sierra Juarez between 6.1 and 11.6 km (3.8 and 7.2 miles) on the north crest of Cerro Pelon, Ixtlan District, Oaxaca, Mexico for *Mesaspis (Rayplattsaurus) juarezi* (Karges and Wright, 1987).

**Etymology:** Named in honour of Ray Platt, of Bendigo, Victoria, Australia and later Yarram, Victoria, Australia. Platt was an activist publisher of the newspaper called *The Strategy*, which was unusual in news media in Australia in that his sole agenda was to publish the truth. As a result, he regularly

published material embarrassing of corrupt people in government within Australia. The government-controlled Murdoch Press regularly vilified Platt and his newspaper in their own tightly controlled and heavily censored publications calling Platt "racist" and "ant-semitic" although he was neither.

**Content:** *Mesaspis (Rayplattsaurus) antauges* (Cope, 1866) (type species); *M. (Rayplattsaurus) juarezi* (Karges and Wright, 1987).

#### SUBGENUS MESASPIS COPE, 1878.

**Type species:** *Gerrhonotus moreletii* Bocourt, 1872.

**Diagnosis:** In common with other Gerrhonotinae and Gerrhonotiini, *Mesaspis* Cope, 1878 are characterized by the presence of a lateral fold; scales that are squarish or rhomboidal, forming transverse series; limbs that are well developed with pentadactyle feet; conical teeth.

In common with the genera *Abronia* Gray, 1838 *sensu lato* and *Coloptychon* Tihen, 1949, *Mesaspis* has a reduction of the lateral fold.

*Mesaspis* Cope, 1878 and the new genus *Rentonsaurus gen. nov.* (formerly included in *Mesaspis*) are both diagnosed by the following four unique characters: eight (rather than ten) longitudinal ventrals at the forelimbs; subgranular scales on the leading edges of the shanks; labial striping and ventral speckling.

The genus *Rentonsaurus gen. nov.* is readily separated from *Mesaspis* Cope, 1878 by the presence of a single subocular; reduction in size of the supranasal; increased keeling and the considerably larger adult size of adults within this genus as opposed to *Mesaspis*.

The subgenus of *Mesaspis*, *Rayplattsaurus subgen. nov.* are separated from the other subgenus *Mesaspis* and also *Rentonsaurus gen. nov.* by the following unique characters: An enhancement of keeling reduction so the scale keels are virtually absent; the presence of a postrostral; broad frontal-interparietal contact; an elongate anterior superciliary.

In addition to the preceding, the subgenus *Mesaspis* is separated from both *Rayplattsaurus subgen. nov.* and *Rentonsaurus gen. nov.* by the presence of a single postmental scale rather than two as well as two lateral supraoculars (versus three in the other groups) and a high degree of canthal/loreal variability.

**Distribution:** Southern Mexico (Chiapas), Honduras, El Salvador, Nicaragua and Guatemala for the species *Mesaspis moreletii* (Bocourt, 1872); Costa Rica and Panama in a zone with an elevation between 8000 to 11,000 feet for *Mesaspis monticola* (Cope, 1878); the highlands of Central Oaxaca, near the city of Oaxaca, Mexico for *Mesaspis viridiflava* (Bocourt, 1873).

**Content:** *Mesaspis (Mesaspis) moreletii* (Bocourt, 1872) (type species); *M. (Mesaspis) monticola* (Cope, 1878); *M. (Mesaspis) viridiflava* (Bocourt, 1873).

#### GENUS RENTONSAURUS GEN. NOV.

**Type species:** *Gerrhonotus gadovii* Boulenger, 1913.

**Diagnosis:** In common with other Gerrhonotinae and Gerrhonotiini, *Rentonsaurus gen. nov.* (and *Mesaspis* Cope, 1878 as defined above) are characterized by the presence of a lateral fold; scales that are squarish or rhomboidal, forming transverse series; limbs that are well developed with pentadactyle feet; conical teeth.

In common with the genera *Abronia* Gray, 1838 *sensu lato* and *Coloptychon* Tihen, 1949, *Rentonsaurus gen. nov.* (and *Mesaspis* as defined above) has a reduction of the lateral fold.

*Mesaspis* Cope, 1878 and the new genus *Rentonsaurus gen. nov.* (formerly included in *Mesaspis*) are both diagnosed by the following four unique characters: eight (rather than ten) longitudinal ventrals at the forelimbs; subgranular scales on the

leading edges of the shanks; labial striping and ventral speckling.

The genus *Rentonsaurus gen. nov.* is readily separated from *Mesaspis* Cope, 1878 by the presence of a single subocular; reduction in size of the supranasal; increased keeling and the considerably larger adult size of adults within this genus as opposed to *Mesaspis*.

The subgenus of *Mesaspis*, *Rayplattsaurus subgen. nov.* are separated from the other subgenus *Mesaspis* and also *Rentonsaurus gen. nov.* by the following unique characters: An enhancement of keeling reduction so the scale keels are virtually absent; the presence of a postrostral; broad frontal-interparietal contact; an elongate anterior superciliary.

In addition to the preceding, the nominate subgenus within *Mesaspis*, namely *Mesaspis* is separated from both *Rayplattsaurus subgen. nov.* and *Rentonsaurus gen. nov.* by the presence of a single postmental scale rather than two as well as two lateral supraoculars (versus three in the other groups) and a high degree of canthal/loreal variability.

**Distribution:** Mexico (Sierra Madre del Sur, Guerrero).

**Ertmology:** Named in honour of Ian Renton, owner of Snake-away services, Adelaide, South Australia, Australia in recognition of many decades working with snakes, reptiles and wildlife conservation in general. He has also provided logistical support to many herpetologists for various scientific projects.

**Content:** *Rentonsaurus gadovii* (Boulenger, 1913) (monotypic).

#### **ABRONIA GRAY, 1838 SENSU LATO.**

The genus as recognized at the present time has been subject of many taxonomic reviews, the most notable being those of Good (1988) and Campbell and Frost (1993).

The latter authors created 5 new subgenera for *Abronia sensu lato*, although the names have rarely appeared in the literature since.

This is in part due to a general reluctance of the herpetological community to recognize subgenera.

Notwithstanding this fact, the species groups identified by these authors are generally well defined and the subgeneric designations do appear appropriate and are therefore adopted herein by myself as correct assemblages.

Exceptional to this is the following:

The so-called *deppii* group, including the type species for the genus "*Gerrhonotus deppii* Wiegmann, 1828" within which Campbell and Frost (1993) had considerable difficulties in terms of ascertaining relationships between described species is clearly paraphyletic.

Good (1988) also noted that "evidence for the monophyly of the group was lacking".

Molecular studies since that paper was published, including that of Pyron *et al.* (2013) have shown the *deppii* group to be paraphyletic, with one taxon, *Abronia mixteca* Bogert and Porter, 1967 appearing to be basal to all other *Abronia*, *Mesaspis* (including *Rentonsaurus gen. nov.* as described within this paper) and *Barisia*. Therefore the taxon originally described as *Abronia mixteca* Bogert and Porter, 1967 is hereby placed in a new genus, namely *Snowdonsaurus gen. nov.*

Excluding *Abronia deppii* (Wiegmann, 1828) and *Abronia martindelcampoi* Flores-Villela and Sanchez-H., 2003, which remain in the subgenus *Abronia*, the rest of the so-called *deppii* group are hereby placed in a new subgenus *Elliottsaura subgen. nov.*

Another relatively recently described taxon *Abronia frosti* Campbell, Sasa, Acedo and Mendelson, 1998

while sharing affinities with the subgenus *Lissabronia* (*Abronia*) (*Lissabronia*) *salvadorensis* Hidalgo, 1983) is sufficiently divergent to be placed in its own subgenus. The subgenus

*Lanisaurea subgen. nov.* is formally erected to accommodate it. The species *Abronia gaiophantasma* Campbell and Frost, 1993 was placed by those authors within the subgenus *Auriculabronia* that they created at the same time. However it is sufficiently divergent and different to the type species of that subgenus to warrant being placed within its own monotypic subgenus, herein named *Assangesaurus subgen. nov.*

Excluding the new genus and three new subgenera formally named below, the other six accepted subgenera of *Abronia*, including the nominate one are as follows:

*Abronia*, *Abaculabronia*, *Aenigmabronia*, *Auriculabronia*, *Lissabronia*, *Scopaeabronia*.

With the exception of the diagnosis for the subgenus *Abronia*, all as published by Campbell and Frost (1993) in the first instance, are adopted in total as more-or-less correct for the purposes of this paper.

#### **GENUS ABRONIA GRAY, 1838.**

**Type species:** *Gerrhonotus deppii* Wiegmann, 1828.

**Diagnosis:** The genera *Abronia* Gray, 1838 and *Snowdonsaurus gen. nov.* (until now regarded as part of *Abronia*) can both be distinguished from all other Gerrhonotinae (namely *Gerrhonotus* Wiegmann, 1828 (type genus); *Barisia* Cope, 1878; *Coloptychon* Tihen, 1949; *Elgaria* Gray, 1838; *Lindholtsaurus gen. nov.*; *Mesaspis* Cope, 1878; *Pitmansaurus gen. nov.* and *Rentonsaurus gen. nov.*) by the following three diagnostic characters: (1) the fifth row of temporal scales absent (on at least one side and usually both) versus present in all other genera; (2) large, well-clawed limbs (smaller limbs in all other genera); and (3) a reduced lateral fold (much better developed in all other genera), particularly between the anterior limb and ear.

The nominate subgenus within *Abronia*, namely *Abronia* Gray, 1838 as well as *Elliottsaura subgen. nov.* and *Snowdonsaurus gen. nov.* (both formerly included in this subgenus) can in turn be separated from all other *Abronia* subgenera by the following suite of characters: The lack of prefrontal-anterior superciliary contact (found only in *Scopaeabronia* Campbell and Frost, 1993 and *Abaculabronia* Campbell and Frost, 1993), in lacking expanded lower temporal scales (found only in *Scopaeabronia* Campbell and Frost, 1993), in having two primary temporals contacting the postocular scale series (three in *Abaculabronia*), in having protuberant head shields on posterolateral "corners" of the head (not in other subgenera), in lacking protuberant supra-auricular scales in adults (present in *Auriculabronia* Campbell and Frost, 1993 and *Assangesaurus subgen. nov.*), in having fewer than 38 transverse rows of dorsal scales (more than 38 in *Scopaeabronia*), in having six or fewer longitudinal rows of nuchal scales (eight in *Scopaeabronia*), in having the lateralmost rows of ventral scales not expanded (expanded in *Lissabronia* Campbell and Frost, 1993, *Lanisaurea subgen. nov.*, *Auriculabronia*, *Assangesaurus subgen. nov.* and *Abaculabronia*).

Excluding *Abronia deppii* (Wiegmann, 1828) and *Abronia martindelcampoi* Flores-Villela and Sanchez-H., 2003, which remain in the subgenus *Abronia*, the rest of the so-called *deppii* group excluding *Abronia mixteca* Bogert and Porter, 1967 are hereby placed in a new subgenus *Elliottsaura subgen. nov.* The species *Abronia mixteca* Bogert and Porter, 1967 is hereby placed in a new genus *Snowdonsaurus gen. nov.* formally named below according to the Zoological Code (Ride *at al.* 1999).

Another relatively recently described taxon *Abronia frosti* Campbell, Sasa, Acedo and Mendelson, 1998 while sharing affinities with the subgenus *Lissabronia* (type species: *Abronia*) (*Lissabronia*) *salvadorensis* Hidalgo, 1983) is sufficiently divergent to be placed in its own subgenus. The subgenus *Lanisaurea subgen. nov.* is formally erected to accommodate that taxon.

The species *Abronia gaiophasma* Campbell and Frost, 1993 was placed by those authors within the subgenus *Auriculabronia* Campbell and Frost, 1993 (type species *Gerrhonotus auritus* Cope,

1868) that they created at the same time. However it is sufficiently divergent and different to the type species of that subgenus to warrant being placed within its own monotypic subgenus, herein named *Assangesaurus subgen. nov.*

The subgeneric diagnoses for subgenera within *Abronia* as defined by Campbell and Frost, 1993 are adopted herein, adapted and republished here, except in terms of the four divisions indicated immediately above.

The three new subgenera and the single new genus *Snowdonsaurus gen. nov.* are each defined and separated from their relevant subgenera as follows:

*Snowdonsaurus gen. nov.* (monotypic for the type species *Abronia mixteca* Bogert and Porter, 1967) is separated from species within both the subgenera *Abronia* and *Elliottsaurea subgen. nov.* and all other species within *Abronia* by the following unique suite of characters:

Adults without spinelike supra-auricular scales; supranasals usually not expanded; if so, only moderately and not in contact at dorsal midline; dorsal color pattern; variable; longitudinal scale rows on side of body arranged in oblique rows with respect to dorsolateral fold; dorsal body scales very slightly keeled, usually almost flat; two primary temporals contacting postocular series; three occipitals; minimum of six nuchals in transverse row across the nape; anterior superciliary contacting cantholoreal.

Members of the subgenus *Abronia* are separated from the subgenus *Elliottsaurea subgen. nov.* (type species: *Gerrhonotus gramineus* Cope, 1864) by the following suite of characters: Adults without spinelike supra-auricular scales; supranasals usually not expanded; if so, only moderately and not in contact at dorsal midline; dorsal color pattern variable; longitudinal scale rows on side of body arranged in oblique rows with respect to dorsolateral fold; dorsal body scales very slightly keeled, usually almost flat; a single (lower) primary temporal contacting postocular series; a single occipital.

*Elliottsaurea subgen. nov.* are best separated from the subgenus *Abronia* by having two primary temporals contacting postocular series and three occipitals.

*Lissabronia* Campbell and Frost, 1993 (type species: *Abronia salvadorensis* Hidalgo, 1983) is distinguished from all other subgenera in lacking prefrontal-anterior superciliary scale contact (contact in *Scopaeabronia* Campbell and Frost, 1993 and *Abaculabronia* Campbell and Frost, 1993), in lacking expanded lower primary temporal scales (expanded in *Scopaeabronia*), in having two primary temporals contacting the postocular scale series (three in *Abaculabronia*), in lacking protuberant head shields on the posterolateral "corners" of the head (head casquing in the subgenus *Abronia*), in lacking protuberant supra-auricular scales in adults (present in *Auriculabronia* Campbell and Frost, 1993), in having fewer than the 38 or more transverse rows of dorsal scales (38 or more in *Scopaeabronia*), in having fewer than the eight longitudinal rows of nuchal scales (eight in *Scopaeabronia*), and in having the lateralmost rows of ventral scales expanded (not expanded in *Aenigmabronia* Campbell and Frost, 1993, *Scopaeabronia*, and *Abronia*).

The genus *Lanisaurea gen. nov.* (monotypic for the species *A. frosti* Campbell, Sasa, Aceedo and Mendelson, 1998) is readily separated from all other *Abronia* subgenera, including other *Lissabronia* (the subgenus with which it shares obvious affinities) by the unique body pattern of white and yellow transverse markings on a black background, as well as a suite of morphological characters as defined by Campbell *et al.* (1998), including most notably being the only *Abronia* known

from Guatemala that lacks protuberant supra-auricular spines. The subgenera *Auriculabronia* Campbell and Frost, 1993 (type species: *Gerrhonotus auritus* Cope, 1868) and *Assangesaurus subgen. nov.* (type species: *Abronia gaiophasma* Campbell and Frost, 1993), both until now placed in *Auriculabronia* are readily separated from all other *Abronia* subgenera by the following suite of characters: in lacking a prefrontal-anterior superciliary scale contact (present only in *Scopaeabronia*), lacking expanded lower temporal scales (expanded in *Scopaeabronia*), in having two primary temporals contacting postocular scale series (three in *Abaculabronia*), in lacking protuberant head shields on posterolateral "corners" of the head (head casquing present in the subgenus *Abronia*), in having strongly protuberant supra-auricular scales in adults unlike all other groups, in having fewer than 38 transverse rows of dorsal scales (38 or more in *Scopaeabronia*), in having less than eight longitudinal rows of nuchal scales (eight in *Scopaeabronia*), and in having the lateralmost rows of ventral scales expanded (not expanded in *Scopaeabronia*, *Abronia*, and *Aenigmabronia*).

Specimens within the subgenus *Assangesaurus subgen. nov.* are readily separated from all other *Abronia* (including those within the subgenus *Auriculabronia* Campbell and Frost, 1993, where it was previously placed), by the following unique suite of characters:

Adults with spinelike supra-auricular scales; supranasals not expanded, not meeting at dorsal midline; frontonasal scale present or absent; ventral longitudinal scale rows 14 or more, or, if 12, with the lowest tertiary temporal enlarged and contacting the second primary temporal scale; circumorbital region not distinctly set off in coloration from ambient head color; dorsal longitudinal scale rows 123; dorsum brownish; preauriculars not in distinctive multiple rows of tubercular scales; second primary temporal (behind the corner of the eye) and the following secondary temporal much larger (about 3 x) than the following tertiary temporal.

The subgenus *Scopaeabronia* Campbell and Frost, 1993 (type species: *Abronia bogerti* Tihen, 1954) are readily separated from all other *Abronia* species by having prefrontal-anterior superciliary scale contact (seen otherwise only variably in *Abaculabronia* Campbell and Frost, 1993); in having the lower primary temporals expanded (unlike all other *Abronia*); in having two primary temporals contacting postocular scale series (three in *Abaculabronia*); in lacking protuberant head shields on the posterolateral "corners" of the head (present in the subgenus *Abronia*); in lacking protuberant supra-auricular scales in adults (present only in *Auriculabronia*); in having 38 or more transverse rows of dorsal scales (fewer in all other members of the genus); in having eight longitudinal rows of nuchal scales unlike all other *Abronia*, which have fewer, and in not having the lateralmost rows of ventral scales expanded (expanded in *Lissabronia*, *Abaculabronia*, and *Auriculabronia*).

The subgenus *Aenigmabronia* Campbell and Frost, 1993 (type species: *Abronia mitchelli* Campbell, 1982) is separated from all other *Abronia* by the following unique suite of characters:

Lacking prefrontal-anterior superciliary scale contact (present in *Scopaeabronia* and *Abaculabronia*), in lacking expanded lower temporal scales (present in *Scopaeabronia*), in having two primary temporals contacting postocular scale series (unlike the three in *Abaculabronia*), in lacking protuberant head shields on posterolateral "corners" of the head (present in the subgenus *Abronia*), in lacking strongly protuberant supra-auricular scales (present in *Auriculabronia*), in having fewer than 38 transverse rows of dorsal scales (38 or more in *Scopaeabronia*), in having less than eight longitudinal rows of nuchal scales (eight in *Scopaeabronia*), and in not having the lateralmost rows of ventral scales expanded (expanded in *Lissabronia*, *Auriculabronia*, and *Abaculabronia*).

The subgenus *Abaculabronia* Campbell and Frost, 1993 (type species: *Abronia reidi* Werler and Shannon, 1961) is readily separated from all other *Abronia* by the following suite of characters:

Having frequent prefrontal-anterior superciliary contact (found otherwise only in *Scopaeabronia*);

in lacking expanded lower temporal elements (enlarged only in *Scopaeabronia*); in having three primary temporals contacting postocular scale series (only two in all other subgenera); in lacking protuberant head shields on posterolateral "corners" of the head (found only in the subgenus *Abronia*); in lacking protuberant supra-auricular scales (present in *Auriculabronia*); in having fewer than 38 transverse rows of dorsal scales (a greater number found only in *Scopaeabronia*); in having fewer than eight longitudinal rows of nuchal scales (eight appearing only in *Scopaeabronia*), and in having the lateralmost rows of ventral scales expanded (not seen in *Abronia*, *Scopaeabronia*, and *Aenigmabronia*).

**Distribution:** From Mexico through Central America to north-eastern South America.

**Content:** *Abronia* (*Abronia*) *deppii* (Wiegmann, 1828) (type species for genus); *A. (Auriculabronia) anzueto* Campbell and Frost, 1993; *A. (Auriculabronia) aurita* (Cope, 1869); *A. (Scopaeabronia) bogerti* Tihen, 1954; *A. (Auriculabronia) campbelli* Brodie and Savage, 1993; *A. (Scopaeabronia) chiszari* Smith and Smith, 1981; *A. (Auriculabronia) fimbriata* (Cope, 1884); *A. (Lanisaurea) frosti* Campbell, Sasa, Aceedo and Mendelson, 1998; *A. (Elliottsaura) fuscolabialis* (Tihen, 1944); *A. (Assangesaurus) gaiophantasma* Campbell and Frost, 1993; *A. (Elliottsaura) graminea* (Cope, 1864); *A. (Auriculabronia) leurolepis* Campbell and Frost, 1993; *A. (Auriculabronia) lythrochila* Smith and Alvarez Del Toro, 1963; *A. (Abronia) martindelcampoi* Flores-Villela-Sanchez-H., 2003; *A. (Auriculabronia) matudai* (Hartweg and Tihen, 1946); *A. (Auriculabronia) meledona* Campbell and Brodie, 1999; *A. (Aenigmabronia) mitchelli* Campbell, 1982; *A. (Lissabronia) montecristoi* Hidalgo, 1983; *A. (Elliottsaura) oaxacae* (Günther, 1885); *A. (Auriculabronia) ochoterenai* (Martin Del Campo, 1939); *A. (Abaculabronia) ornelasi* Campbell, 1984; *A. (Scopaeabronia) ramirezi* Campbell, 1994; *A. (Abaculabronia) reidi* Werler and Shannon, 1961; *A. (Lissabronia) salvadorensis* Hidalgo, 1983; *A. (Auriculabronia) smithi* Campbell and Frost, 1993; *A. (Elliottsaura) taeniata* (Wiegmann, 1828); *A. (Auriculabronia) vasconcelosii* (Bocourt, 1871).

#### SUBGENUS ELLIOTSAUREA SUBGEN. NOV.

**Type species:** *Gerrhonotus gramineus* Cope, 1864.

**Diagnosis:** The genera *Abronia* Gray, 1838 and *Snowdonsaurus* gen. nov. (until now regarded as part of *Abronia*) can both be distinguished from all other *Gerrhonotinae* (namely *Gerrhonotus* Wiegmann, 1828 (type genus); *Barisia* Cope, 1878; *Coloptychon* Tihen, 1949; *Elgaria* Gray, 1838; *Lindholtsaurus* gen. nov.; *Mesaspis* Cope, 1878; *Pitmansaurus* gen. nov. and *Rentonsaurus* gen. nov.) by the following three diagnostic characters: (1) the fifth row of temporal scales absent (on at least one side and usually both) versus present in all other genera; (2) large, well-clawed limbs (smaller limbs in all other genera); and (3) a reduced lateral fold (much better developed in all other genera), particularly between the anterior limb and ear.

The nominate subgenus within *Abronia*, namely *Abronia* Gray, 1838 as well as *Elliottsaura* subgen. nov. and *Snowdonsaurus* gen. nov. (both formerly included in this subgenus) can in turn be separated from all other *Abronia* subgenera by the following suite of characters: The lack of prefrontal-anterior superciliary contact (found only in *Scopaeabronia* Campbell and Frost, 1993 and *Abaculabronia* Campbell and Frost, 1993), in lacking expanded lower temporal scales (found only in *Scopaeabronia* Campbell and Frost, 1993), in having two primary temporals

contacting the postocular scale series (three in *Abaculabronia*), in having protuberant head shields on posterolateral "corners" of the head (not in other subgenera), in lacking protuberant supra-auricular scales in adults (present in *Auriculabronia* Campbell and Frost, 1993 and *Assangesaurus* subgen. nov.), in having fewer than 38 transverse rows of dorsal scales (more than 38 in *Scopaeabronia*), in having six or fewer longitudinal rows of nuchal scales (eight in *Scopaeabronia*), in having the lateralmost rows of ventral scales not expanded (expanded in *Lissabronia* Campbell and Frost, 1993, *Lanisaurea* subgen. nov. *Auriculabronia*, *Assangesaurus* subgen. nov. and *Abaculabronia*).

Excluding *Abronia deppii* (Wiegmann, 1828) and *Abronia martindelcampoi* Flores-Villela and Sanchez-H., 2003, which remain in the subgenus *Abronia*, the rest of the so-called *deppii* group excluding *Abronia mixteca* Bogert and Porter, 1967 are hereby placed in a new subgenus *Elliottsaura* subgen. nov. defined here. The species *Abronia mixteca* Bogert and Porter, 1967 is hereby placed in a new genus *Snowdonsaurus* gen. nov. formally named below according to the Zoological Code (Ride *et al.* 1999).

*Snowdonsaurus* gen. nov. (monotypic for the type species *Abronia mixteca* Bogert and Porter, 1967) is separated from species within both the subgenera *Abronia* and *Elliottsaura* subgen. nov. and all other species within *Abronia* by the following unique suite of characters:

Adults without spinelike supra-auricular scales; supranasals usually not expanded; if so, only moderately and not in contact at dorsal midline; dorsal color pattern; variable; longitudinal scale rows on side of body arranged in oblique rows with respect to dorsolateral fold; dorsal body scales very slightly keeled, usually almost flat; two primary temporals contacting postocular series; three occipitals; Minimum of six nuchals in transverse row across the nape; anterior superciliary contacting cantholoreal.

Members of the subgenus *Abronia* are separated from the subgenus *Elliottsaura* subgen. nov. by the following suite of characters:

Adults without spinelike supra-auricular scales; supranasals usually not expanded; if so, only moderately and not in contact at dorsal midline; dorsal color pattern variable; longitudinal scale rows on side of body arranged in oblique rows with respect to dorsolateral fold; dorsal body scales very slightly keeled, usually almost flat; a single (lower) primary temporal contacting postocular series; a single occipital.

*Elliottsaura* subgen. nov. are best separated from the subgenus *Abronia* by having two primary temporals contacting postocular series and three occipitals.

**Distribution:** Oaxaca, Veracruz, Puebla, Tamaulipas, San Luis Potosi, Puebla, Nuevo Leon, Quéretaro, all in Mexico.

**Etymology:** Named in honour of Elizabeth (Liz) Elliott of Hoppers Crossing, Victoria, Australia, long-suffering wife of herpetologist Adam Elliott.

While Adam has made many valuable contributions to herpetology, he is perhaps best known to most for his magnificent book, *A Guide to Australian Pythons in Captivity* (Elliott 2014), published by Australian Birdkeeper Publications. It is without doubt the best book published so far on the keeping and breeding of Australian pythons, a statement made noting that there have been several very good such publications prior by other expert authors.

Liz has managed the Elliott household and provided invaluable logistical support for Adam in his herpetological endeavours over more than a decade. The includes maintaining his collection of reptiles during Adam's long absences in the field as well as having to suffer the indignity of being subject to the trauma of illegal armed raids by corrupt government wildlife

officers in Victoria. Her largely unrecognized help is hereby acknowledged by the formal naming of this subgenus.

**Content:** *Gerrhonotus (Elliottsaura) graminea* Cope, 1864 (type species); *A. (Elliottsaura) fuscolabialis* (Tihen, 1944); *A. (Elliottsaura) oaxacae* (Günther, 1885); *A. (Elliottsaura) taeniata* (Wiegmann, 1828).

**SUBGENUS LANISAUREA SUBGEN. NOV.**

**Type species:** *Abronia frosti* Campbell, Sasa, Aceedo and Mendelson, 1998.

**Diagnosis:** *Lissabronia* Campbell and Frost, 1993 (type species: *Abronia salvadorensis* Hidalgo, 1983) is distinguished from all other subgenera in lacking prefrontal-anterior superciliary scale contact (contact in *Scopaeabronia* Campbell and Frost, 1993 and *Abaculabronia* Campbell and Frost, 1993), in lacking expanded lower primary temporal scales (expanded in *Scopaeabronia*), in having two primary temporals contacting the postocular scale series (three in *Abaculabronia*), in lacking protuberant head shields on the posterolateral "corners" of the head (head casquing in the subgenus *Abronia*), in lacking protuberant supra-auricular scales in adults (present in *Auriculabronia* Campbell and Frost, 1993), in having fewer than the 38 or more transverse rows of dorsal scales (38 or more in *Scopaeabronia*), in having fewer than the eight longitudinal rows of nuchal scales (eight in *Scopaeabronia*), and in having the lateralmost rows of ventral scales expanded (not expanded in *Aenigmabronia* Campbell and Frost, 1993, *Scopaeabronia*, and *Abronia*).

The genus *Lanisaurea gen. nov.* (monotypic for the species *A. frosti* Campbell, Sasa, Aceedo and Mendelson, 1998) is readily separated from all other *Abronia* subgenera, including other *Lissabronia* (the subgenus with which it shares obvious affinities) by the unique body pattern of white and yellow transverse markings on a black background, as well as a suite of morphological characters as defined by Campbell *et al.* (1998), including most notably being the only *Abronia* known from Guatemala that lacks protuberant supra-auricular spines.

**Distribution:** Guatemala.

**Etymology:** Named in honour of Lani Barnett of Ardeer, Victoria, Australia, wife of Brian Barnett, a well known Australian herpetologist and long-time president of the Victorian Herpetological Society (VHS).

The two of them made enormous personal sacrifices when running the herpetological society throughout the 1990's and as a result of their efforts, their society was widely regarded as the best ever in Australia and at one time boasted a membership of nearly 1,000 members.

**Content:** *Abronia (Lanisaurea) frosti* Campbell, Sasa, Aceedo and Mendelson, 1998 (monotypic).

**SUBGENUS ASSANGESAURUS SUBGEN. NOV.**

**Type species:** *Abronia gaiophasma* Campbell and Frost, 1993.

**Diagnosis:** Specimens within the subgenus *Assangesaurus subgen. nov.* are readily separated from all other *Abronia* (including those within the subgenus *Auriculabronia* Campbell and Frost, 1993, where it was previously placed), by the following unique suite of characters:

Adults with spinelike supra-auricular scales; supranasals not expanded, not meeting at dorsal midline; frontonasal scale present or absent; ventral longitudinal scale rows 14 or more, or, if 12, with the lowest tertiary temporal enlarged and contacting the second primary temporal scale; circumorbital region not distinctly set off in coloration from ambient head color; dorsal longitudinal scale rows 123; dorsum brownish; preauriculars not in distinctive multiple rows of tubercular scales; second primary temporal (behind the corner of the eye) and the following secondary temporal much larger (about 3 x) than the following tertiary temporal.

The subgenera *Auriculabronia* Campbell and Frost, 1993 (type species: *Gerrhonotus auritus* Cope, 1868) and *Assangesaurus subgen. nov.* (type species: *Abronia gaiophasma* Campbell and Frost, 1993), both until now placed in *Auriculabronia* are readily separated from all other *Abronia* subgenera by the following suite of characters: in lacking a prefrontal-anterior superciliary scale contact (present only in *Scopaeabronia*), lacking expanded lower temporal scales (expanded in *Scopaeabronia*), in having two primary temporals contacting postocular scale series (three in *Abaculabronia*), in lacking protuberant head shields on posterolateral "corners" of the head (head casquing present in the subgenus *Abronia*), in having strongly protuberant supra-auricular scales in adults unlike all other groups, in having fewer than 38 transverse rows of dorsal scales (38 or more in *Scopaeabronia*), in having less than eight longitudinal rows of nuchal scales (eight in *Scopaeabronia*), and in having the lateralmost rows of ventral scales expanded (not expanded in *Scopaeabronia*, *Abronia*, and *Aenigmabronia*).

**Distribution:** North-east Guatemala.

**Etymology:** Named in honour of Wikileaks founder Julian Assange, in recognition of his globally patriotic work for human rights and freedom from government tyranny in exposing reckless government corruption.

**Content:** *Abronia (Assangesaurus) gaiophasma* Campbell and Frost, 1993 (monotypic).

**GENUS SNOWDONSAURUS GEN. NOV.**

**Type species:** *Abronia mixteca* Bogert and Porter, 1967.

**Diagnosis:** *Snowdonsaurus gen. nov.* (monotypic for the type species *Abronia mixteca* Bogert and Porter, 1967) is separated from species within both the subgenus *Abronia* and all other species within *Abronia* by the following unique suite of characters:

Adults without spinelike supra-auricular scales; supranasals usually not expanded; if so, only moderately and not in contact at dorsal midline; dorsal color pattern; variable; longitudinal scale rows on side of body arranged in oblique rows with respect to dorsolateral fold; dorsal body scales very slightly keeled, usually almost flat; two primary temporals contacting postocular series; three occipitals; minimum of six nuchals in transverse row across the nape; anterior superciliary contacting cantholoreal.

**Distribution:** Mexico (Guerrero, Oaxaca, Nuevo Leon).

**Etymology:** Named in honour of Edward Joseph Snowden (born June 21, 1983) an American computer specialist, a former Central Intelligence Agency (CIA) employee, and former National Security Agency (NSA) contractor who disclosed top secret NSA documents to several media outlets, initiating the NSA leaks in May 2013.

These revealed operational details of a global surveillance apparatus run by the NSA and other members of the Five Eyes alliance, along with numerous commercial and international partners.

Having been a victim of illegal long-term surveillance by corrupt government officials myself and the criminal attacks on my family arising from the information so obtained, I view the ongoing mass surveillance of law-abiding citizens by corrupt government employees to plan illegal attacks on them as a serious crime and at the same sort of level as mass killings of Jews by dictators in years past as well as other acts of mass genocide and violent attacks on decent law-abiding people. Hence it is entirely appropriate that a genus of lizard be named in honour of this corruption whistleblower.

**Content:** *Snowdonsaurus mixteca* (Bogert and Porter, 1967) (monotypic).

**CURRENTLY RECOGNIZED SPECIES LIST FOR THE  
GENERA ABRONIA GRAY, 1838 AND SNOWDONSAURUS  
GEN. NOV.**

**GENUS ABRONIA GRAY, 1838.**

**Subgenus *Abronia* Gray, 1838.**

*Abronia* (*Abronia*) *deppii* (Wiegmann, 1828) (type species); *A.* (*Abronia*) *martindelcampoi* Flores-Villela and Sanchez-H., 2003.

**Subgenus *Abaculabronia* Campbell and Frost, 1993.**

*Abronia* (*Abaculabronia*) *reidi* Werler and Shannon, 1961 (type species); *A.* (*Abaculabronia*) *ornelasi* Campbell, 1984.

**Subgenus *Aenigmabronia* Campbell and Frost, 1993.**

*Abronia* (*Aenigmabronia*) *mitchelli* Campbell, 1982 (monotypic).

**Subgenus *Assangesaurus* subgen. nov.**

*A.* (*Assangesaurus*) *gaiophantasma* Campbell and Frost, 1993 (monotypic).

**Subgenus *Auriculabronia* Campbell and Frost, 1993.**

*Abronia* (*Auriculabronia*) *aurita* (Cope, 1868) (type species); *A.* (*Auriculabronia*) *anzuetoi* Campbell and Frost, 1993; *A.* (*Auriculabronia*) *fimbriata* (Cope, 1884); *A.* (*Auriculabronia*) *leurolepis* Campbell and Frost, 1993; *A.* (*Auriculabronia*) *lythrochila* Smith and Alvarez del Toro, 1963; *A.* (*Auriculabronia*) *matudai* (Hartweg and Tihen, 1946); *A.* (*Auriculabronia*) *meledona* Campbell and Brodie, 1999; *A.* (*Auriculabronia*) *ochoterenai* (Martin del Campo, 1939); *A.* (*Auriculabronia*) *smithi* Campbell and Frost, 1993.

**Subgenus: *Elliottsaura* subgen. nov.**

*Abronia* (*Elliottsaura*) *graminea* (Cope, 1864) (type species); *A.* *fuscolabialis* (Tihen, 1944); *A.* *oaxacae* (Günther, 1885); *A.* *taeniata* (Wiegmann, 1828).

**Subgenus: *Lanisaura* subgen. nov.**

*Abronia* (*Lanisaura*) *frosti* Campbell, Sasa, Acedo and Mendelson, 1998 (monotypic).

**Subgenus *Lissabronia* Campbell and Frost, 1993.**

*Abronia* (*Lissabronia*) *salvadorensis* Hidalgo, 1983 (type species); *A.* (*Abaculabronia*) *montecristoi* Hidalgo, 1983.

**Subgenus *Scopaeabronia* Campbell and Frost, 1993.**

*Abronia* (*Scopaeabronia*) *bogerti* Tihen, 1954 (type species); *A.* (*Scopaeabronia*) *chiszari* Smith and Smith, 1981; *A.* (*Scopaeabronia*) *ramirezi* Campbell, 1994.

**GENUS SNOWDONSAURUS GEN. NOV.**

*Snowdonsaurus mixteca* Bogert and Porter, 1967 (monotypic).

**CONFLICT OF INTEREST**

This author reports no conflicts of interest in terms of the preparation of and publishing of this paper.

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