



Atacama Desert Herp Adventures

Robert L. Bezy

Dedication:

To the memory of Tien Wei Yang
who sparked my interest in
South American deserts

**Cover:**

Salvatore mariana
(Argentina Black and White Tegu)
by reisegraf.ch

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2023

1. Headin' down to Tegu-landia.

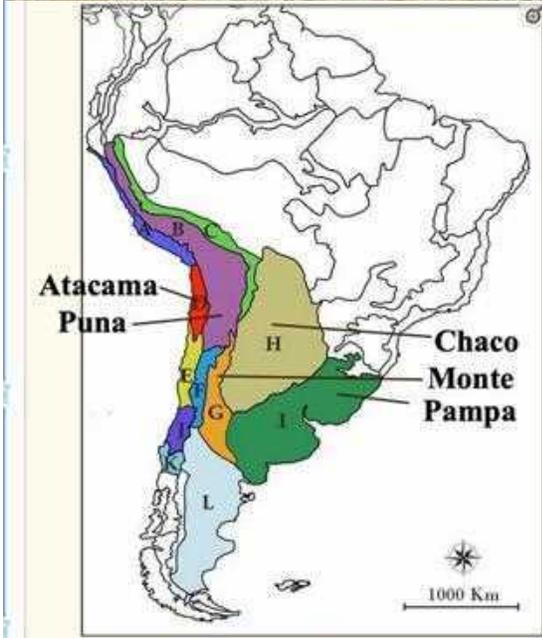
"Billy, I think we should return to the Atacama. It's the driest desert on Earth and I want to better understand its herpetofauna and why it is so depauperate compared to that of the Australian deserts.

And after we explore the coastal deserts I hope you will drive us across the Andes to the Monte in Argentina. It is an interior desert that is in contact with the more tropical Chaco, whereas the Atacama is totally isolated on the narrow coastal shelf along the Cordillera. Comparing the Atacama and the Monte will give us a better understanding of the nature of desert transitions and the role of topographic barriers in the evolution of herpetofaunas."

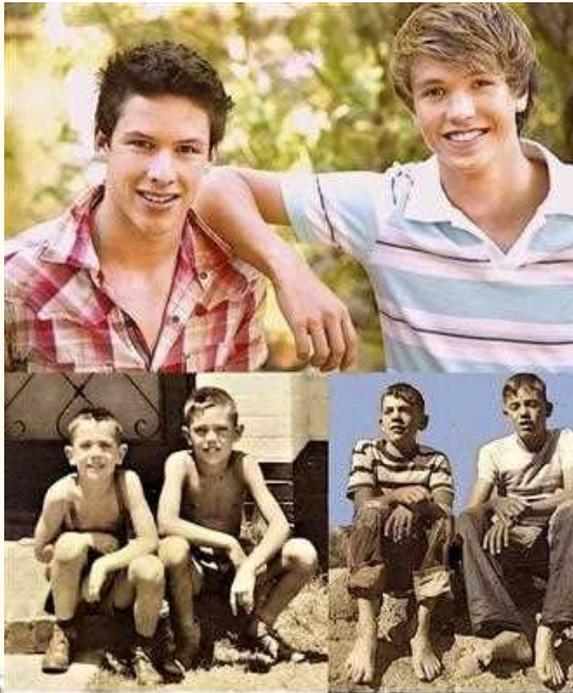
"That sounds like fun, and I really liked the Atacama when we visited it. South America is so vast we could spend our lives exploring the continent. When we gunna leave?"

"There is a noon direct flight to Lima tomorrow. I have sold one of our Sierra Asamablea gold nuggets and have plenty of cash in my pocket. We can buy a Toyota Land Cruiser in Peru and sell it in Argentina. That approach worked well in Oz and it completely eliminates time constraints so we can enjoy our adventure as long as we want."

"Lesgobro. I can't wait to see a tegu."



Data.1
Map of South America showing the biogeographic regions used.
Biogeographic regions of *Mittermeier (2001)* employed in DPC analysis. (A) Distrito Peruano Costero, (B) Puna, (C) Yungas, (D) Atacama, (E) Cuzco, (F) Puna, (G) Monte, (H) Chaco, (I) Pampa, (J) Santiago, (K) Mado, (L) Patagonia Central, and (M) Patagonia Subandina.



Bobby and Billy

2. *Microlophus occipitalis* (Knobbed Pacific Iguana).

Our youthful spirits were soaring like eagles as Billy and I landed in Peru, grabbed our duffel, and took a taxi to the Toyota dealership. They had the Land Cruiser we wanted and the salesman couldn't believe his eyes when I peeled off the bills to pay cash for the vehicle. After brief stops at a sporting goods store, a market, and a petrol station and we were off on our Atacama adventure.

"Billy, let's head up to the northern edge of the Sechura Desert near the Ecuador border. To understand the desert herpetofauna I think we should first see its tropical roots just like we did in Oz"

"You got it, Bro."

How I love to hear those words from Billy. His reassurance that we are on the same page and his enthusiasm mean everything to me.

We were puzzled to see that the desert seemed every bit as arid up near the Equator as it is farther south. It was pure dunes.

"Well let's see if there are any reptiles at all in these dunes," Billy suggested.

Eventually the fog burned off and several *Microlophus occipitalis* emerged. The females looked just like *Sceloporus graciosus* (Sagebrush Lizards). The lizards were scurrying along the shoreline and Billy noticed they were eating the isopods.

"Gee, Bro, I think you have discovered the key to the success of *Microlophus* in these arid coastal deserts," and I gave him a big congratulatory hug.



***Microlophus occipitalis* by Alessandro Catenazzi**



***Microlophus occipitalis* by Pavel Kirillov**



***Microlophus occipitalis* by Sulanna**





3. *Bothrops asper* (Terciopelo).

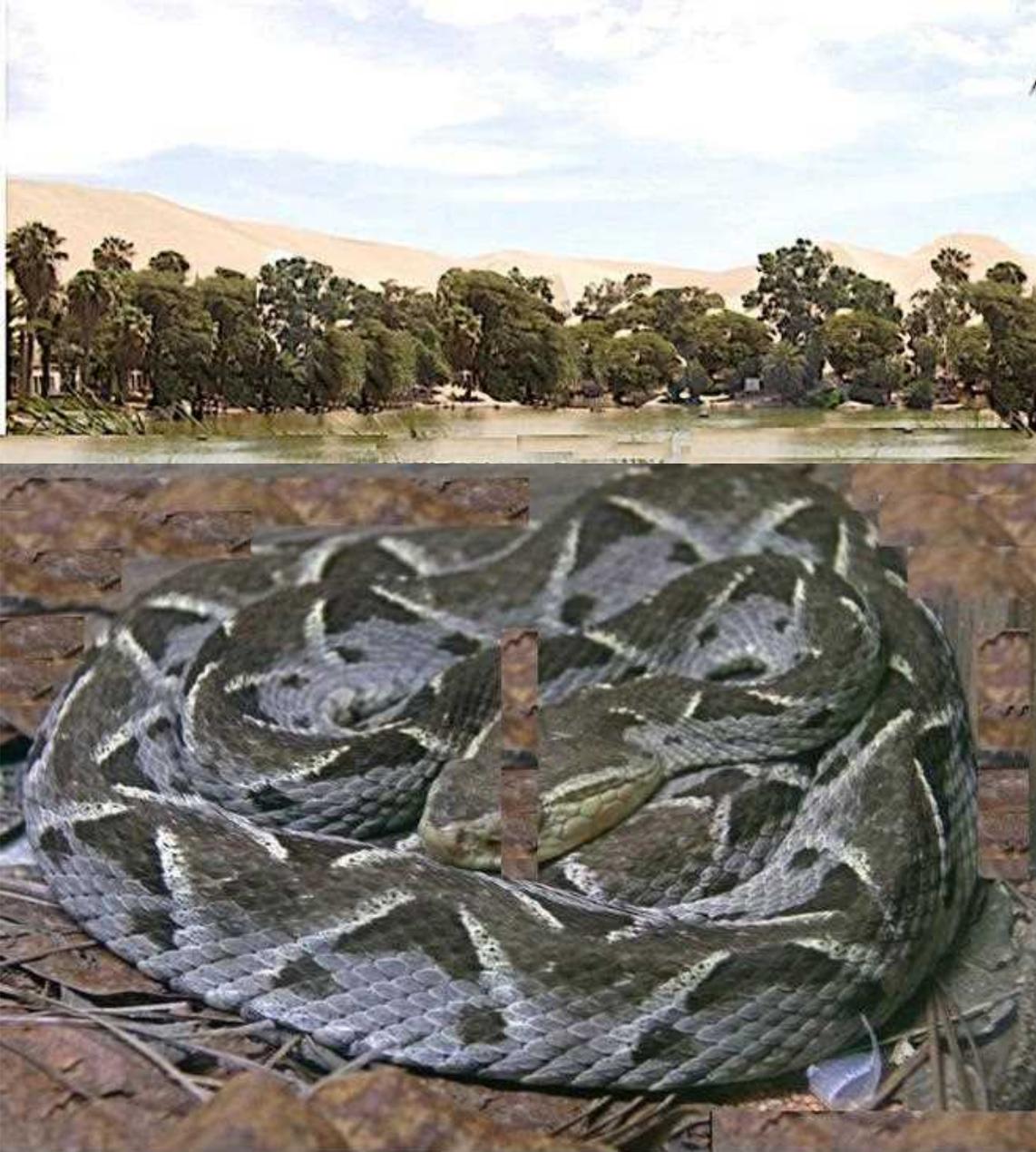
"Billy, this is so different from what we found in the Australian deserts. I want to spend some more time here in the Sechura to try to understand the tropical roots of this extremely depauperate herpetofauna. The Rio Piura drains the Sechura and likely has a riparian community. I would like to see what herps live there."

"Les go Bobbybro. I am always up for another adventure."

The road along the Piura was quite muddy, certainly a change from the adjacent dunes, and Billy got us into a very remote grove of riparian trees.

As we hopped out of Cruiser, Billy yelled, "Hot dog, a *Bothrops asper*."

I was happy that Billy had recovered from his tail grabbing addiction he developed with elapids in Oz and he kept a safe distance from the dangerous pit viper.



***Bothrops asper* by Brian Gratwicke**



***Bothrops asper* by Mark Kostich**



00541015 © Pete Oxford / Minden Pictures

***Bothrops asper* by Pete Oxford**

4. *Boa constrictor*.

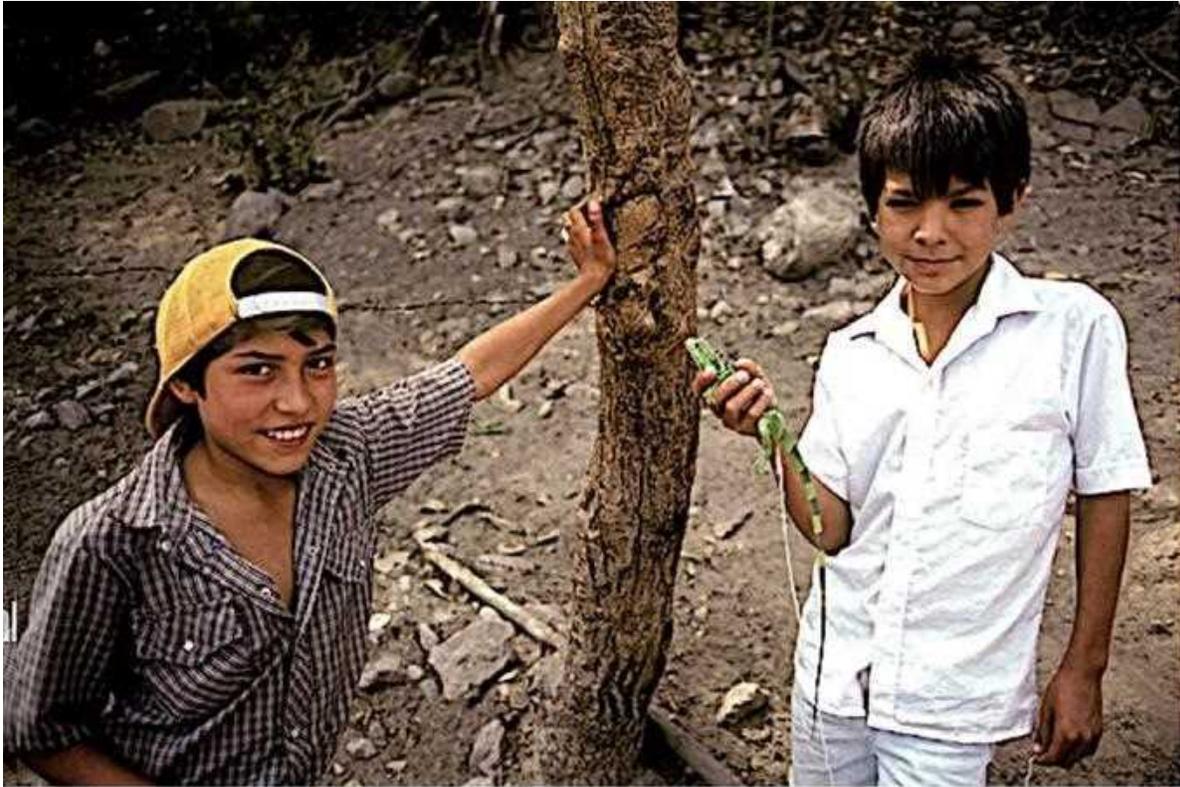
As we were finishing up photographing the *Bothrops asper* two kids came wandering up with their pet *Iguana iguana*. I was really excited to see another tropical herp species here in the middle of the Sechura Desert. Billy immediately started chatting with the boys. He loved talking with kids, especially in Spanish, and they always took to him.

"Juanito and Julio say that their rancho is located in a thick selva along the river with lots of lizards and snakes and they invited us to camp there. Lesgobro."

And we were off to more Sechura adventures. It was indeed a pocket of lush forest along the river. Juanito and Julio were enthusiastic herpers and they also alerted the kids living all along the río to bring us reptiles.

I was absolutely shocked by the large *Boa constrictor* and *Iguana iguana* that Tomas and Santiago brought us.

"Billy, I am starting to formulate a hypothesis about the Sechura herpetofauna. This is really exciting."



Juanito and Julio with their pet Iguana iguana

be



***Iguana iguana* by Claudia Paulussen**

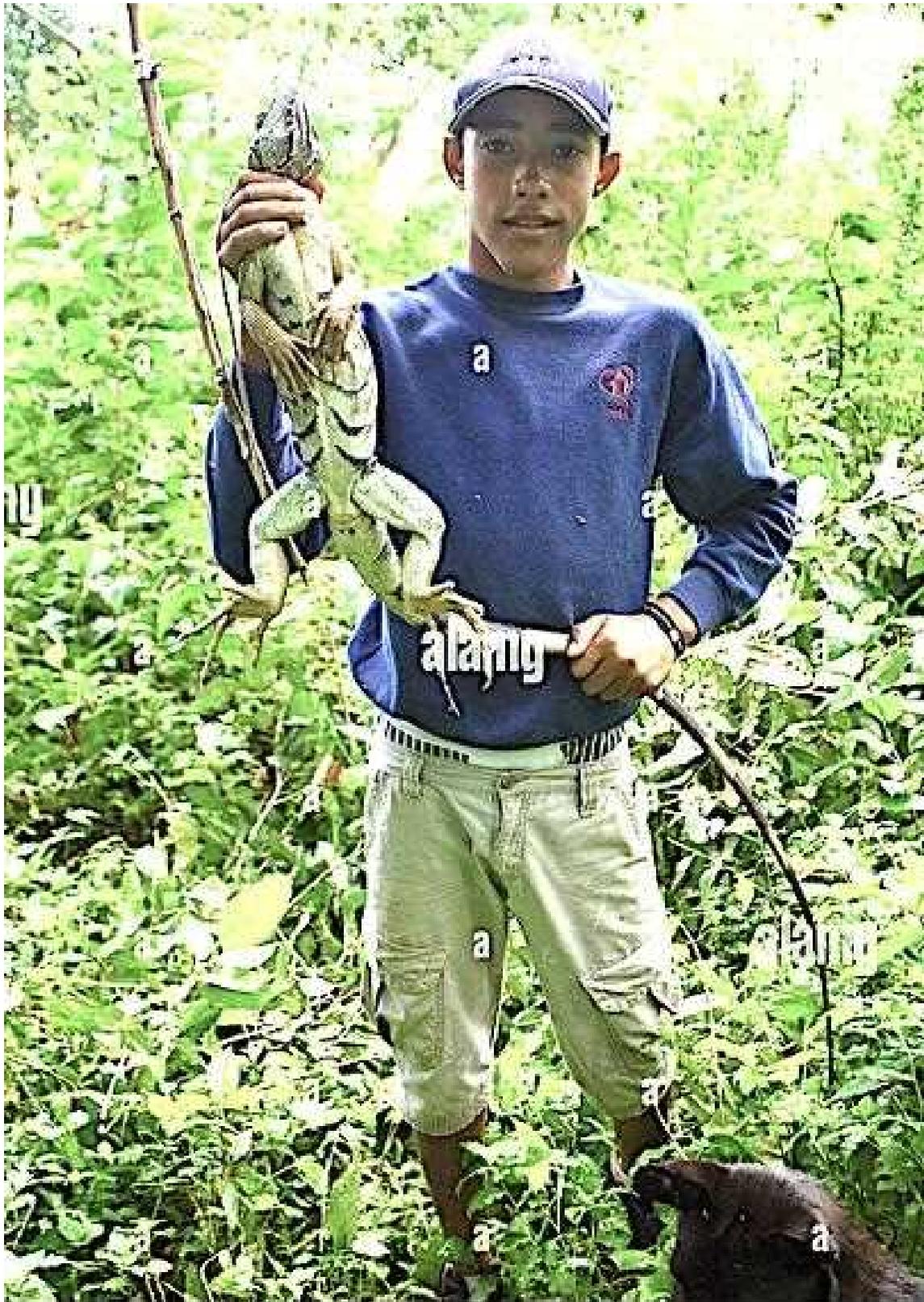


***Boa constrictor* by Lucas Bustamante**



Santiago with *Boa constrictor*





Tomas with Iguana iguana

5 *Microlophus peruvianus* (Peru Pacific Iguana).

"Billy, this is an incredibly rich herpetofauna along the river. The kids have brought in over 20 species. Lets walk out into the desert and see what lives there."

"You're on, Bobbybro."

We walked the dunes to the coast, encountering five *Microlophus peruvianus*. Billy observed this species also feeding on isopods along the waters edge.

That is when it happened. There sitting in right in the middle of the sand was a youth meditating.



***Microlophus peruvianus* by Brandon Ortiz Arenas**



***Microlophus peruvianus* by cstobie**



***Microlophus peruvianus* foraging on beach Brandon Ortiz Arenas**



***Microlophus peruvianus* by Olenka Chienda, Patrick Gamero, Jordi Tarazona**

6. *Chelonoides denticulata* (Yellow-footed Tortoise).

At first I thought youth in the sand was a product of my overly rich imagination. When he finished meditating he smiled at us and said his name is Linnaeus, but usually goes by "Von," for von Linne. Von had an ethereal aura about him that touched my core being.

Von said he was interested in plant distributions in the deserts. I explained that we were studying herp distributions. Von's eyes lit up. "I have never met another biogeographer before. Could I tag along with you?"

I did not hesitate a nanosecond, "I would love that more than you could ever imagine, Von."

At bro time I was beside myself. "Billy, I do not know what to do. I am in love with Linnaeus."

"Why is that a problem, bro?"

"Well, what about you and me?"

And Von makes three. For shit sake, Bobby, you can have more than one bro, and I am quit fond of him also."

And Billybro gave me a reassuring hug that said it better than words.

Additional species of herps continued to pour in, including a *Cheilonoides denticulata* and the rare *Amphisbaenia townsendi* (Townsend's Worm Lizard). Von was a very talented photographer and I just wrangled the reptiles while he obtained exquisite images with a distinctive artistic style.



Amphisbaenia townsendi



***Tantilla melanocephala* by Phil Stouffer**



Linnaeus



***Chelonoides denticulata* by juerginho**



***Leptodeira ornata* by Joshua Addesi**

7. Five Species of *Microlophus* (Pacific Iguanas).

Billy and I were delighted that Von came along with us as we drove south from the Rio Piura toward the actual Atacama Desert.

"This is near the dividing line between the Sechura and the Atacama Deserts and I don't see any differences. What do the plants tell you, Von?" I inquired

"These distinctions between the deserts are strictly topographic not biotic. It is difficult to find plant markers in a desert that is nearly devoid of vegetation," he replied.

"Well I would like to stop here and see just what is left of that rich tropical herpetofauna we documented up on the Rio Piura," I proposed.

The three of us headed out on a walk and Von rattled off the Latin name of every plant we encountered. We found absolutely none of the tropical species of reptiles we documented along the Rio Piura. But we were shocked to find a total of five species of *Microlophus* (Pacific Iguanas).

"Wow, this is an incredible number of species of one genus and they are in a very bleak landscape," I declared.

"I observed them all feeding on the abundant isopods. That is a tremendous resource."

Billy was in serious need of some four-wheeling fun and he got us to a playa so remote we wondered if anyone had ever been there before.

"Now, its fun time. Last one in is a rotten egg," Billy declared as he stripped and dove in.

Von and I did not last long in the icy Antarctic water and we got out and sat together with the sun on our backs looking at Billy.

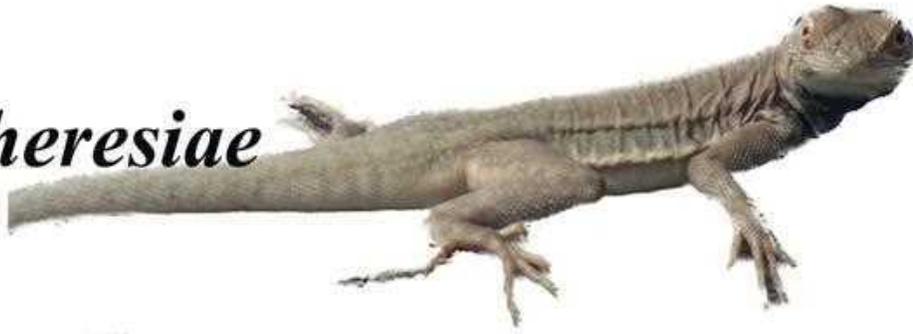
Von was a somewhat of a vegetarian and hesitant to eat the fish that Billy speared and cooked. We were happy that he eventually decided to join us in the feast. Afterwards Von also participated in our bro time, sitting in a lotus position. The real surprise came at the end when he began singing in the most beautiful voice I ever heard.



***Microlophus occipitalis* by bb_593**



theresia



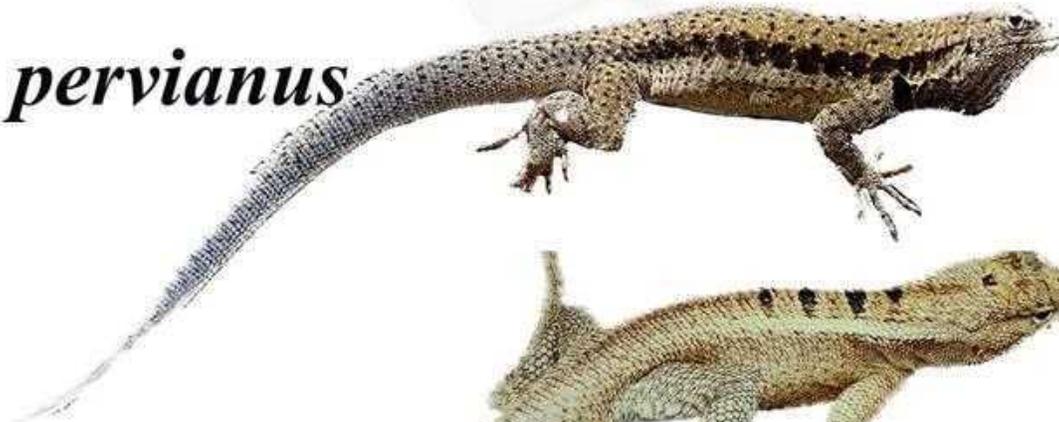
thoracicus



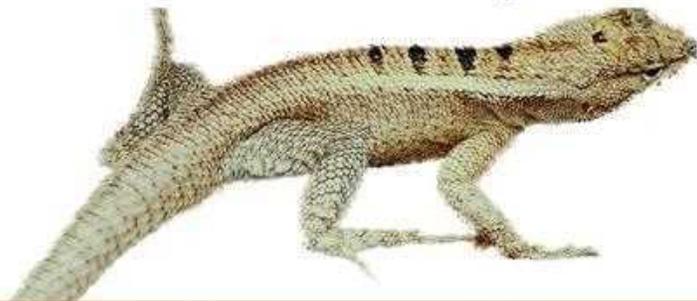
koepckeorum



pervianus



occiptalis



Five Peruvian Species of *Mirolophis* (Composed by Robert Bezy)



8. Linnaeus and El Gran Cruce .

Linnaeus changed my life. He was extremely sensitive, ethereal, and mysterious. Words fail me here, but I guess I would say he was a cosmic spirit. Von also was a new link between me and Billy. Von and I were both very attracted by the same aspects of Billybro, his physical and emotional strength and his happy sunny personality. Von and I were bros down to the very core of our beings. And he was totally in tune with nature. Biogeography was in his veins connecting the parts of his body and he always intuited the grand picture.

"Von, I am wondering about whether the Pacific and the Atlantic Deserts are actually connected."

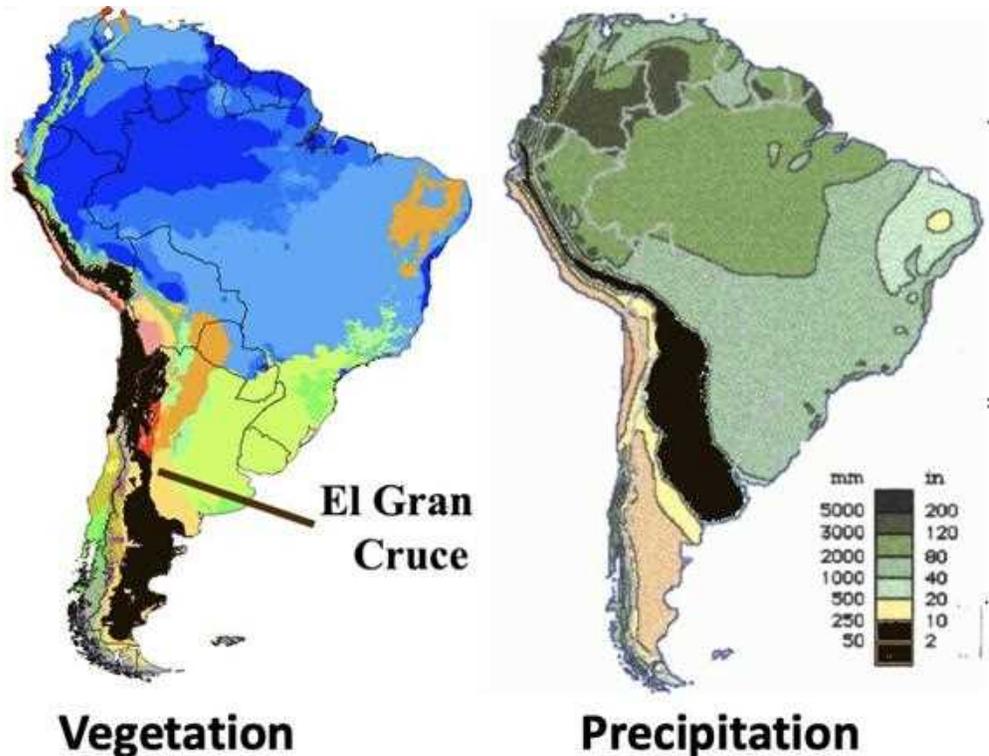
"Yes they are Bobby. I call it the 'El Gran Cruce.' There is a low point in the cordillera south of the Atacama where the Pacific deserts meet the Atlantic deserts.

"Vonbro, how can I become deeply attuned to nature like you are?"

"Well, the answer is meditation. When we have brotime, just let yourself feel the love of all your bros, not just Billy and me. There is a continuous blood line

connecting all life, living and dead, extant and extinct, with Mother Earth. We are all niños de la tierra."

]



9. *Tachymenis peruviana* (Peru Slender Snake).

"I am absolutely starved and I am tired of peanut butter and fish. Do you suppose we could find a restaurant somewhere?" Billy inquired.

"I know a little one room cafe hidden in an oasis in the dunes where we could eat," Von replied.

And it was indeed the most secluded dining venue imaginable with metal tables and chairs and a sand floor. Julio said today he had asada de cabra con frijoles y tortillas, y un postre de flan. We asked if there was enough for double servings for each of us.

"Si como no. Hay bastante," Julio answered with a beautiful smile.

It was a delicious meal and Billy of course struck up a conversation with Julio. The youth said he knew a place up in the monte that had lots of snakes and lizards.

"Could you take us there?" Billy asked.

"Si como no," Julio replied.

After the comida Julio's little brother played the flute for us and then Linnaeus sang. There are moments in life when it all comes together. Siting with Billy and Von, the sun on our backs, listening to the flute and the singing, and gazing out at the peaceful oasis I knew this was how my life would be. Youths have the illusion of a life of their choice.

Julio and Tomas arrived at dawn on their burro and we were off on another adventure, our spirits soaring like an eagle.

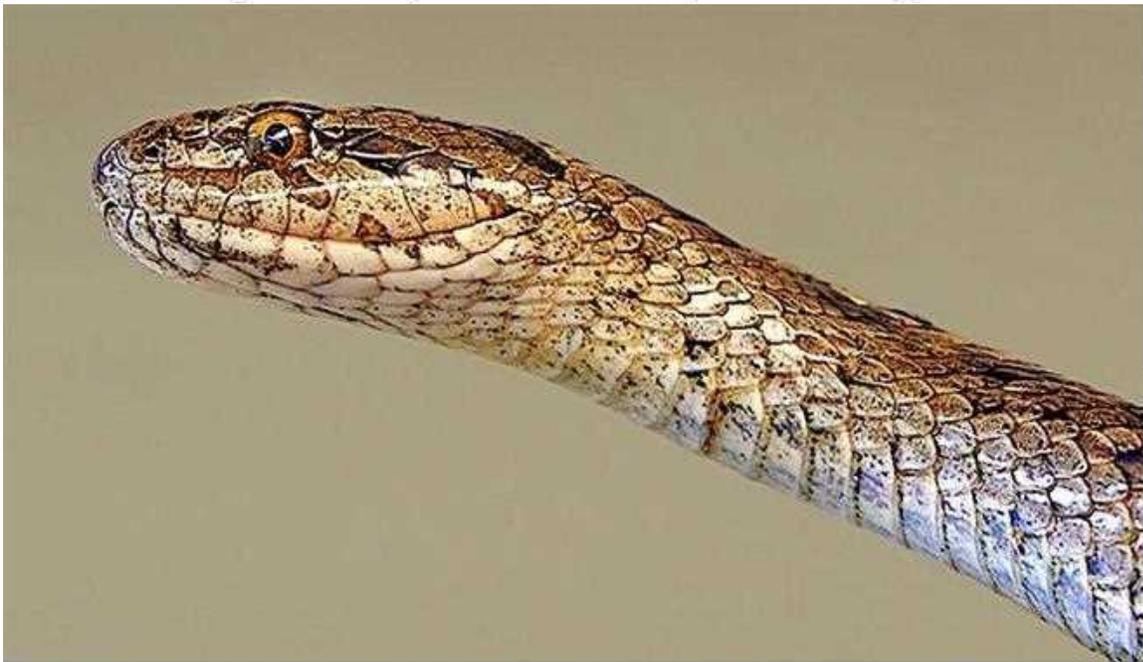
It was a long difficult climb up the slope of the Andean foothills. Billy zoomed ahead with the boys, but as usual I was struggling to just keep putting one foot in front of the other. I was delighted that Von walked with me and he rattled off the name of every plant we encountered.



While I was resting Billy flipped rocks and found our first ever *Tachymenis peruviana*, looking vaguely like a Checkered Gartersnake. snake.



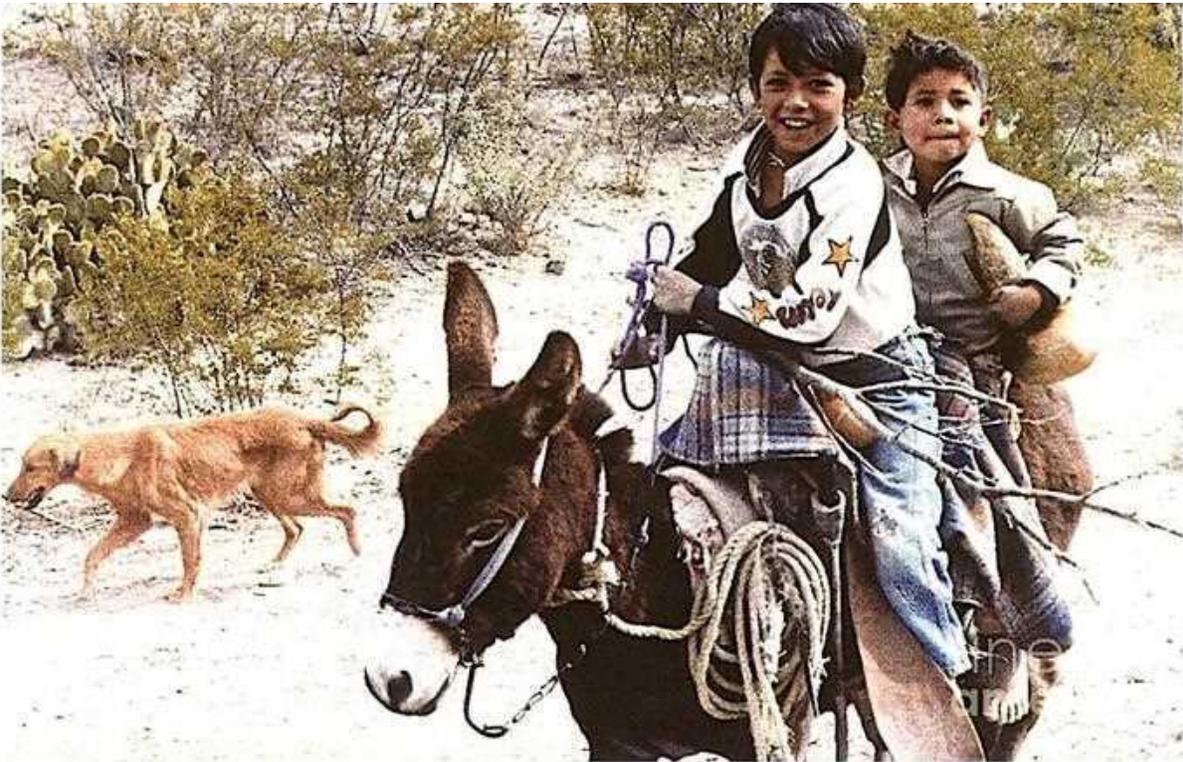
***Tachymenis peruviana* by Rémi Bigonneau**



***Tachymenis peruviana* by Freddie Bugos**



***Tachymenis peruviana* by sachamau**



Julio and Tomas



Chico and Gatito



10. *Dicrodon kitbezyi* (Kit's Desert Tegu).

We arose at dawn and I tried to find the strength to make the final climb to top of the cerro where Julio and Tomas had seen the mystery lizard. Of course Billy and the boys were chomping at the bit to race to the top. Linnaeus assured me that he and I would get there at our own pace. He stopped often as he was finding species of plants he had not encountered before.

Just as Von and I reached the top the fog lifted and the sun warmed the earth. Then they came out. I could not believe my eyes. Lizards were everywhere. We were shocked to encounter two gringos camped on top of the cerro. Kit and Erik were

studying the teiids that appeared to be a new all-female species of *Dicrodon* that had originated by hybridization between *D. heterolepis* and *D. guttulatum*.

Bezy, R.L. 2022. Teen Herp Adventures. 300 pp.

Jaksić, F. M., Greene, H. W., Schwenk, K., & Seib, R. L. (1982). Predation upon reptiles in Mediterranean habitats of Chile, Spain and California: a comparative analysis. *Oecologia*, 53, 152-159.

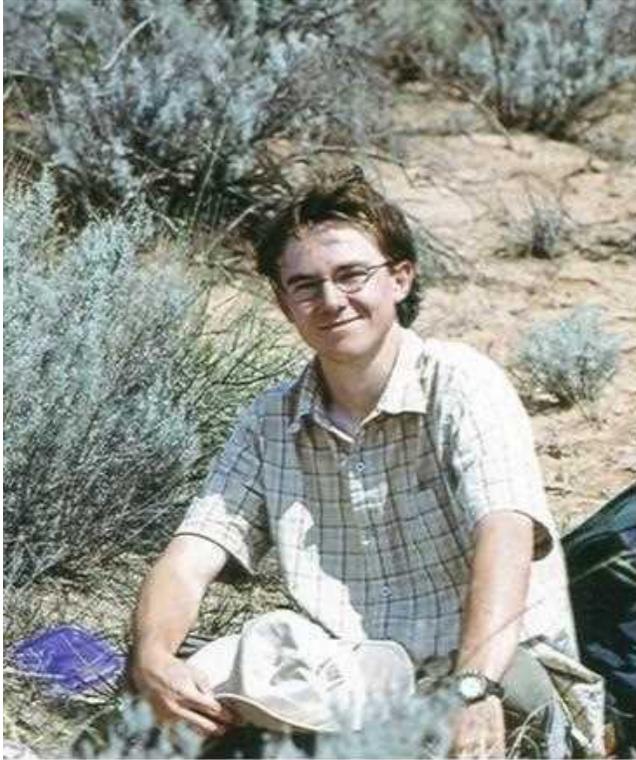


***Dicrodon guttulatum* by Juan Palmero**



***Dicrodon guttulatum* from Jaksić et al. (1982)**





Kit Bezy by Erik Enderson



Erik



Top, *Dicrodon heterolepis* (Ecuador Desert Tegu) by turrifankuki.via.ArgentiNat; middle, *Dicrodon... kitbezyi* modified from *Dicrodon heterolepis*, original by Claudia Koch; bottom, *Dicrodon gutullatum* (Peru Desert Tegu) by Juan Palmero. From Bezy (2022).

11. *Rhinella atacamensis* (Atacama Toad).

"Bobby, I think you are missing the big picture here. In the Atacama all life depends on water condensed from the fog generated by cold water upwelling. You are so focused on finding heliothermic lizards you miss the unique neblinaphilic biota of this desert. I want to spend a day and a night on a fog oasis loma." Von proposed.

"Les go Vonbro," I replied.

We could not believe the relatively lush vegetation on the loma. We wandered with our headlamps at night and were thrilled to find a pair of of the rare endemic *Rhinella atacamensis* in amplexus.

It was a long difficult night because our sleeping bags became soaking wet from the condensation. We were slow to get started exploring in the morning, but eventually the sun burned through. We came across a young guy studying the plants in a beautiful floral display. Rafinesque was a botany student at the Universidad de Chile. Linnaeus sprang to life in ways we had never imagined he could. Not only was Rafinesque a fellow plant-lover but he had the sunny personality of Billybro. And from their dilated pupils I could see they were both attracted to one another physically.



***Rhinella atacamensis* by Pedro Vargas**



***Rhinella atacamensis* by Sergio Bitran M.**



Rafinesque and Linnaeus



Rafinesque

Linnaeus

12. *Dicrodon guttulatum* (Peru Desert Tegu).

I was surprised that Linnaeus did not seem particularly sad to say goodbye to Rafinesque.

"Von, are you unhappy to leave Rafinesque?"

"Not at all Bobbybro. We enjoyed our fun together and that is the end of it. But he is also a botanybro and and he and I have planned many plant research projects together.

On the long walk down from the loma we came to a pocket of mesquite and we stopped to rest in the shade for a little while. "Wow, look at that *Dicrodon guttulatum* climbing in the mesquite and foraging on the leaves and pods. That must be the key to the survival of such a large teiid in the Atacama Desert".

"That is really interesting Billy. In color pattern they remind me of *Aspidoscelis exsanguis* (Chihuahuan Spotted Whiptail), but are larger. Herbivory is associated with large size in lizards, but that may be more phylogenetic than ecological," I remarked.

The next day we met Fernanda and a group of students that were investigating the ecology of *Dicrodon guttulatum*. "We are finding that this large teiid is totally dependent on *Prosopis pallida* for survival," she explained.

We spent an enjoyable afternoon working with her and the IIECCO participants taking data from the *Dicrodon*.

Rabanal Che Leon, M. F. (2015). Sistemática del género *Dicrodon* (Reptilia: Teiidae) basada en análisis de secuencia de ADN mitocondrial.

Vitt, L. J. (2004). Shifting paradigms: herbivory and body size in lizards. *Proceedings of the National Academy of Sciences*, 101(48), 16713-16714.



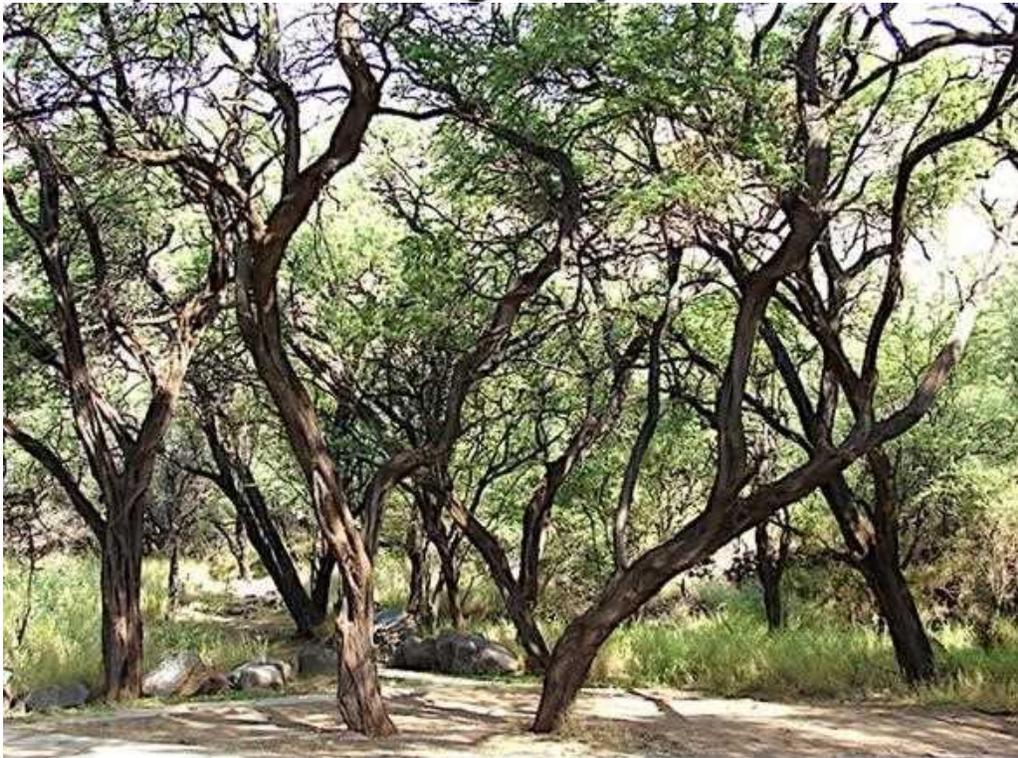
***Dicrodon guttulatum* by gnormand**



***Dicrodon guttulatum* by Alessandro Catenazzi**



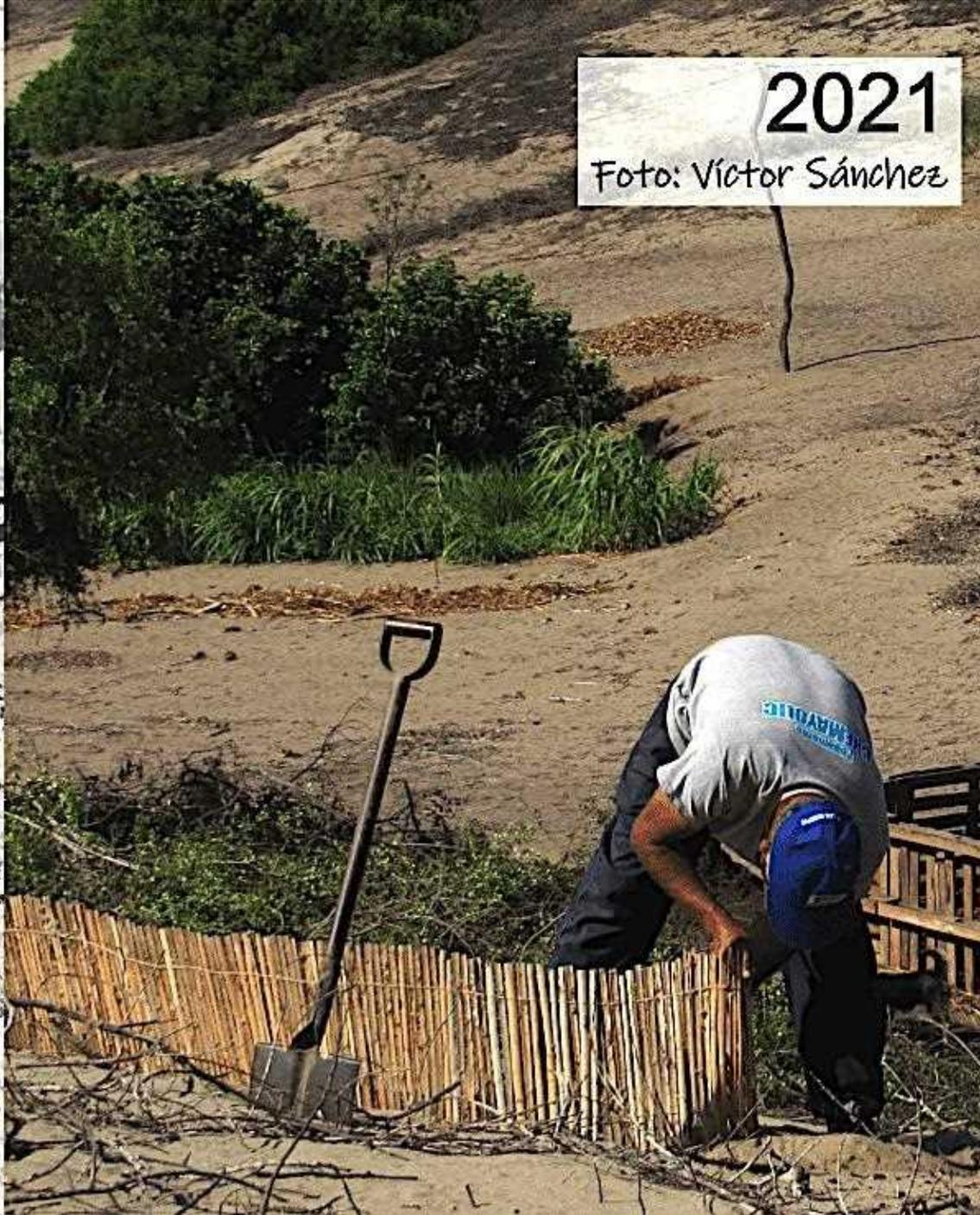
***Aspidoscelis exsanguis* by Vicente Mata-Silva**



Prosopis pallida



Fernanda



2021

Foto: Víctor Sánchez



13. *Liolaemus fabiana* (Salazar Iguana).

Linnaeus had loosened up and he became quite talkative on the walk down from the loma. He asked Billy and me about our views of the connections between sex and love. Billy gave his usual view that they were not connected for him and I indicated that they were for me. Von did not express his thoughts on the subject, but from the way he looked at Billybro I could see that his feelings ran deep.

Billy and Von really liked these long walks, but they were difficult for me and I was glad when we finally returned to Cruiser we had abandoned on the playa. Billy went for a dip in the cold Pacific while Von and I enjoyed just sitting in the sun and watching him. After he returned we had a bro sit and then Von and Billy sang together.

We hopped in Cruiser and were off. I noticed a two guys noosing lizards near the road and we stopped to chat. Steve and Edmundo were studying reproduction in *Microlophus quadravittatus* (Four-striped Iguana) and *M. theresioides* (Small Pacific Iguana). They were finding that in both species the females were reproductively active in austral spring-summer, whereas spermiogenesis was aseasonal.

We spent the morning with Steve and Edmundo flipping driftwood along the playa and were delighted to find several *Phyllodactylus gerrhopygus* (South American Leaf-toed Geckos).

Afterwards we drove to the Salazar de Atacama and observed *Liolaemus fabiana* fighting over territories. With the aid of the alpha female, the male establishes and defends a territory with access to its females and its flies aggregated along the water-front in this driest desert on Earth.

We were shocked to see costumed people crawling along holding statutes. Steve and Edmundo said they the crawlers were headed to the Fiesta de Tirana and they invited us to attend the celebration. As usual I was hesitant, but adventurous Billy immediately snapped up the offer. And it turned out to be the most cheerful and colorful fiesta we have ever experienced.

Goldberg, S. R., & Rodriguez, E. (1986). Reproductive cycles of two iguanid lizards from northern Chile, *Tropidurus quadrivittatus* and *Tropidurus theresioides*. *Journal of arid environments*, 10(2), 147-151.

Marambio-Alfaro, Y., Álvarez, G., Cortés Araya, M., & Serrano, A. E. (2017). The salt flats fighter: agonistic survival of *Liolaemus fabiani* in the Salar de Atacama. *PeerJ Preprints*, 5, e2891v1.



***Liolaemus fabiana* by Mirko Ramos Leiva**



***Microlophus qudravittatus* by Sebastian K. Herzog**



***Microlophus qudravittatus* by ritasouza**



***Microlophus theresioides* by bob15noble**



***Microlophus theresioides* by benja gallardo**

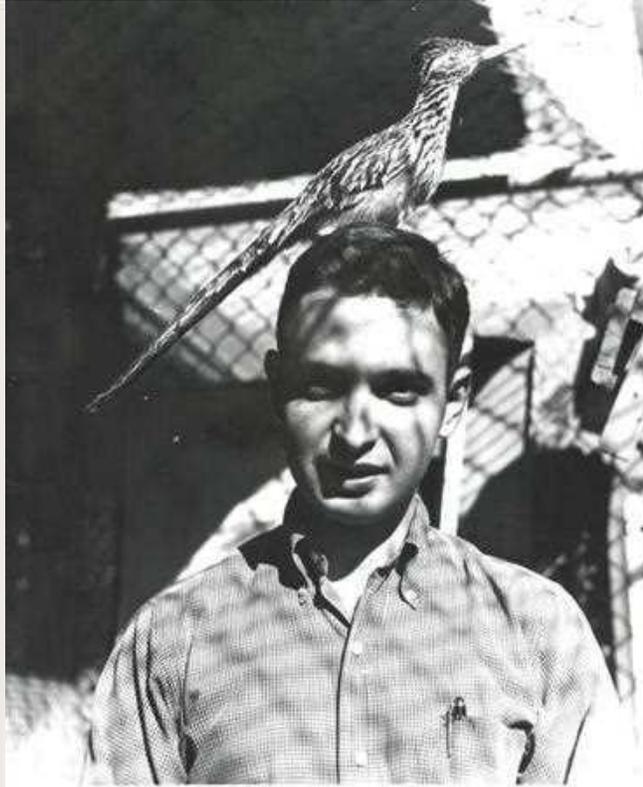


***Phyllodactylus gerrhopygus* by Fernanda Berríos**





Stephen Goldberg
by Robert Shirley



Stephen Goldberg



From Marambio-Alfaro et al. (2017).







Von

Billy

14. *Microlophus* (Pacific Iguanas) and *Tropidurus* (Lava Lizards).

"I am really happy to see the cold foggy Pacific in the rearview mirror, " I declared as we headed towards the Andean foothills.

"I enjoyed the cold dips in the Pacific, but they shrunk my assets to where I had trouble finding them afterwards. And the roads here on the coast are no fun at all. I am looking forward to getting my rocks off driving us across the Andes," Billy chimed in.

Linnaeus liked riding in Cruiser straddling the gear shift so he was in contact with both Billybro and me, and all three of us enjoyed being close together. "You guys can't begin to understand the biogeography of the South America unless you cross the Andes. The Gran Cruce between the Atacama and the Monte Deserts has played a major role in South American biogeography. The rise of Cordillera is the most important cladogenic event on this continent. Just look for example at the distributions of the members of *Microlophus* in relation to those of *Tropidurus*."

Benavides, E., Baum, R., McClellan, D., & Sites, J. W. (2007). Molecular phylogenetics of the lizard genus *Microlophus* (Squamata: Tropiduridae): aligning and retrieving indel signal from nuclear introns. *Systematic biology*, 56(5), 776-797.



***Microlophus occipitalis* by Alessandro Catenazzi**



***Tropidurus torquatus* by Dick Snell**



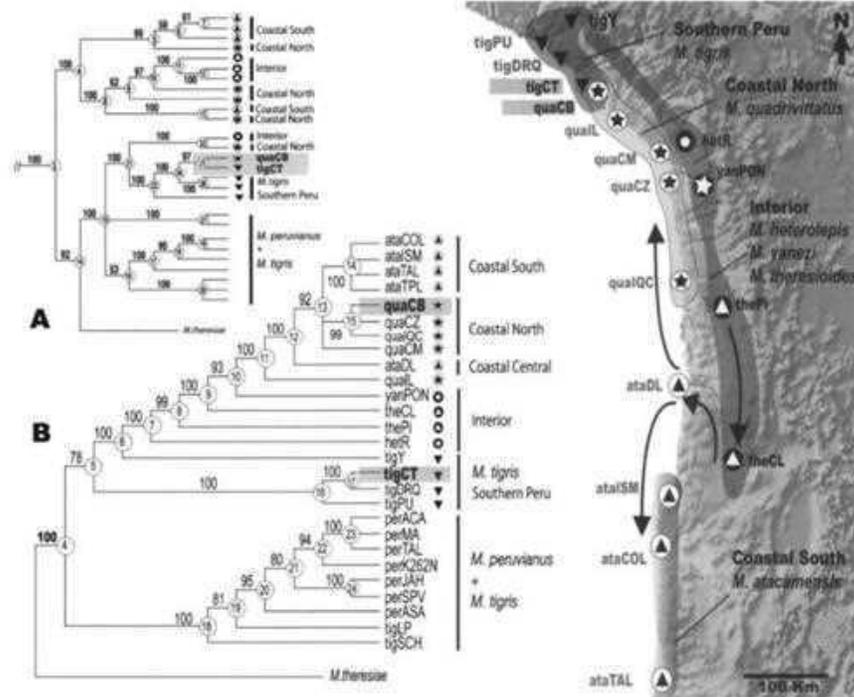
Distribution of members of *Microlophus* based on iNaturalist records (March 2023)



Distribution of members of *Tropidurus* based on iNaturalist records (March 2023)



El Gran Cruce



From Benavides et al. (2007)

15. *Bothrops ammodytoides* (Patagonia Lancehead).

The road across the Andes was Billy's wet dream come true and he loved showing off his driving ability to Von. He would let go of the steering wheel and as cruiser neared the precipice he would scream in ecstasy until Von screamed back, "Stop, Billy, that's enough!"

Billy did not really appreciate just how sensitive Von was and eventually he frightened him so bad the boy wet his pants. When we stopped to let him put on dry clothes Von spotted a *Bothrops ammodytoides* coiled in the rocks and that redeemed him in Billy's eyes.

Billy wanted to put on a trail-grabbing show for Linnaeus, but fortunately I was able to talk him down. That night at brotime I had a deep conversation with Billy about being more sensitive to Von.



***Bothrops ammodytoides* by Iara Safronchik**



gentle with sweet Von.



***Bothrops ammodytoides* by nicochimento**



***Bothrops ammodytoides* by Martina Arias**

16. *Tupinambis teguixin* (Gold Tegu).

I was absolutely enthralled with the Monte.

"Billy, I want to camp here. Do you think you could possibly find a good place with water?" I asked.

"Ah, Bobbyboy, there ya go baiting me again, but you are a master baiter." That even got a laugh out of Von.

Of course Billy found a track to a pond. There we encountered a young gringo examining something on a *Erythrina* tree. Von was interested in people who studied plants and he emerged from his cocoon to ask, "Are you interested in Coral Beans?"

"I sure am," Wade replied.

Just then a *Tupinambis teguixin* came into view.

Sherbrooke, W. C., & Scheerens, J. C. (1979). Ant-visited extrafloral (calyx and foliar) nectaries and nectar sugars of *Erythrina flabelliformis* Kearney in Arizona. *Annals of the Missouri Botanical Garden*, 472-481



***Tupinambis teguixin* by lelocelyn**



***Tupinambis teguixin* by Suhei Castro**



***Erythrina crista-galli* by Mariano Ordano**



17. *Xenodon semicinctus* (Banded Hognose Snake).

Wade discussed his interests in the relationship between ants, extra-floral sugars, and poisonous seeds of *Erythrina* and we were swept up by his boundless enthusiasm. We brotalked far into the night about explorations of wildness and the unknown. He viewed himself as a scout who rode the far periphery of the known world and pursued faint glimpses in the darkness, tiny specs in the night sky that might be a star.

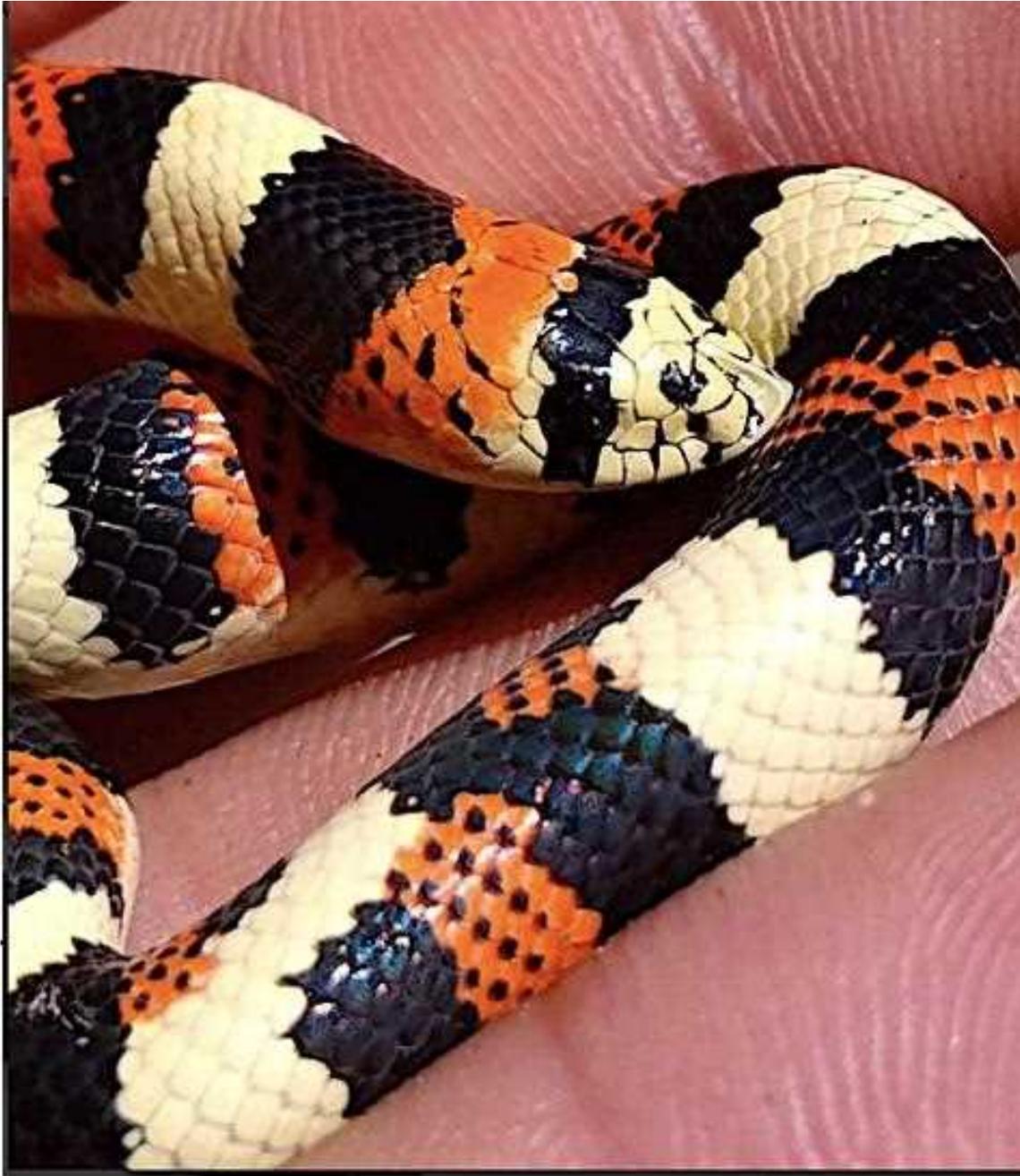
Wade was fresh out the Peace Corps service in Amazonian Peru where he had studied the gymnophthalmid diving lizard *Neusticurus ecleopus*. He got interested in Coral Beans and ants observing them in the Dragoon Mountains of Arizona with his friends Bob and Jim on Rafagas.

We donned our headlamps and had a walkabout, finding a beautiful *Xenodon semicinctus*. After our bro-sit we had a midnight dip. Gazing up at the full moon on a warm summer night sitting close together in the Monte with bros I came to know joy.

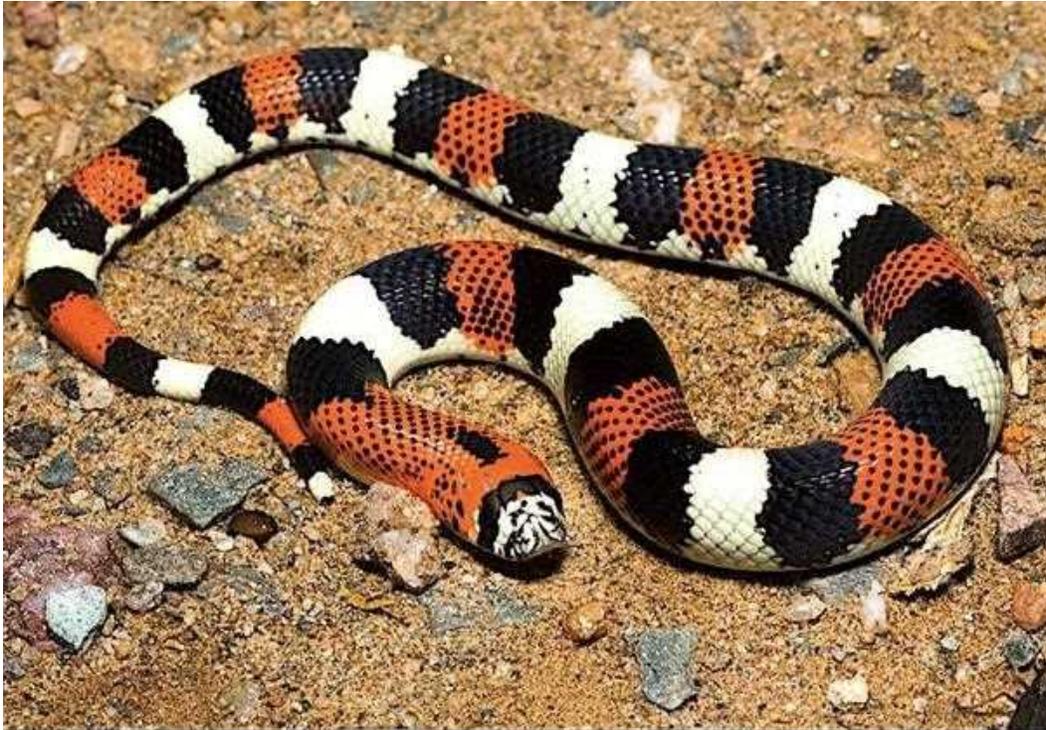
Sherbrooke, W. C. (1975). Reproductive cycle of a tropical teiid lizard, *Neusticurus ecleopus* Cope, in Peru. *Biotropica*, 194-207.

Sherbrooke, W. C., & Cole, C. J. (1972). Chromosomes of the South American teiid lizards *Neusticurus ecleopus* Cope and *Neusticurus strangulatus* trachodus Uzzell. *Copeia*, 1972(4), 886-889.

Stabile, Jenifer and Wade Sherbrooke. 2017. Perspectives in Conservation: An interview with Wade Sherbrooke. *Herpetological Review* 48(4), 794–797.



***Xenodon semicinctus* by Guiñazu**



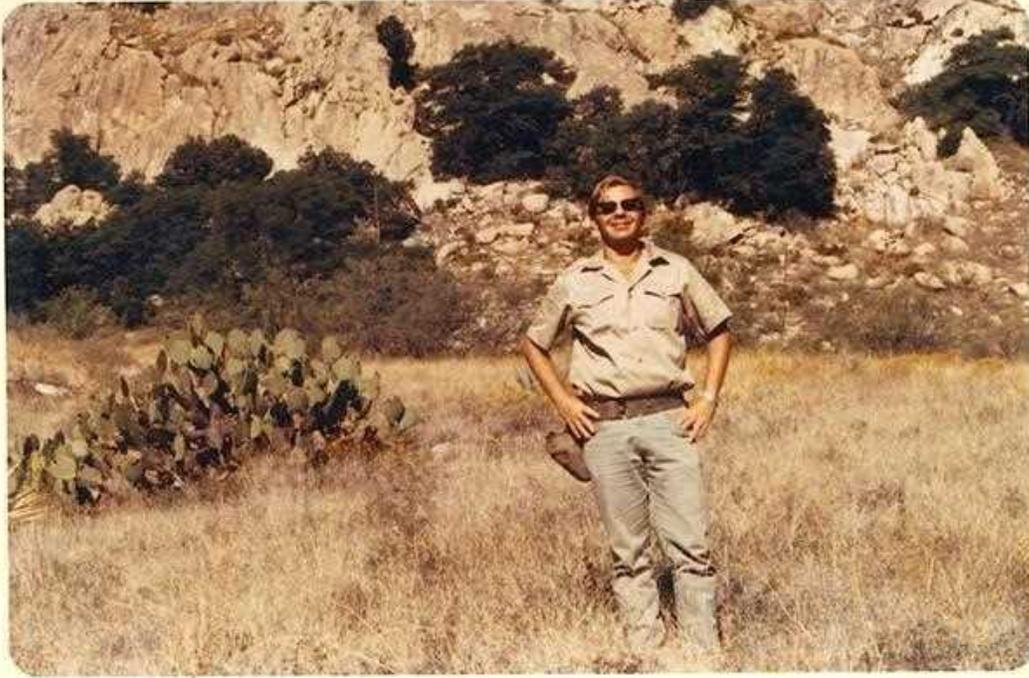
***Xenodon semicinctus* by Guiñazu**



***Neusticurus ecpleopus* by captainjack0000**



***Erythrina flabelliformis* by Deborah Bird**



James Ambrose at Rafagas by Wade Sherbrooke



Robert Bezy at Rafagas by Wade Sherbrooke



Wade Sherbrooke, Galiuro Mts., by James Ambrose

18. *Micrurus pyrrhocryptus* (Argentine Coral Snake).

Linnaeus' infatuation with Billy was becoming extreme and I made brave to broach the subject at brotime. But both of them felt their relationship was a good thing so I

decided to mind my own business and just let nature take its course regarding sensitive boy's obvious attraction to Billybro.

And I had all I could handle with my own infatuation with the Monte and its gigantic columnar cacti. The vegetation and landscape struck a deep chord in me and my interest in plants was displacing my need to find herps. Von understood entirely and he spent the day with me rattling off the name of every plant. He and I were coming to share a strong interest in plants as well as in each other.

But it did not take long for my love of herps to surge again. Three delightful kids came running up, "Coralillo!" We all went running after them and there lay the most beautiful *Micrurus pyrrhocryptus* anyone ever laid eyes on. I realized then and there that I did not have to chose between herps, vegetation, Von, Billy, or these wonderful kids, I loved them all.

da Silva Jr, N. J., & Sites Jr, J. W. (2001). Phylogeny of South American triad coral snakes (Elapidae: Micrurus) based



***Micrurus pyrrhocryptus* by Quentin Vandemoortele**



***Micrurus pyrrhocryptus* by narettofergio**



***Micrurus pyrrhocryptus* by sab_alfred**



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Asset number: 6063-18362752

19. *Crotalus durissus* (Neotropical Rattlesnake).

Somehow the addition of Linnaeus to Billy and my life needed to stabilize. Perhaps the emotional turmoil was a product of Von's adolescence. But otherwise we were a good fit, the three of us. Billy's happy go lucky personality and his physical and emotional strength were really the stabilizing rudder. I also served that function in at least a small way for Von, and I liked that. The boy was intrinsically artistic, emotional, and dependent, and Billy and I were attracted to him by those very traits.

The three of us discussed this at brotime. But Von said he enjoyed being dependent on Billy and me and we had to admit we enjoyed his dependence. I decided that I just needed to stop concerning myself with such emotional baggage, accept reality, and enjoy our bro love together.

And Von and my interest in plants formed a new link between us that we both thoroughly enjoyed. He not only knew the names of the plants but understood their biogeographic affinities as well. With his tutoring I reached a much deeper understanding of the biogeography of the Monte and, indeed, all of all South America.

"Animals can avoid the climatic extremes by retreating underground and employing any number of behavioral tactics, but the plants are out there exposed 24 hours a day. As a result plants are much more attuned to climate and tell a much clearer story of biogeography.

"On the narrow coastal strip along the Pacific there are virtually no plants. But the lomas do have a small flora and it is primarily derived from the Austral temperate forests, not from the Neotropics. Here in the Monte the desert plants, such as those *Echinopsis terscheckii* (Cardones Grandes) are derived from the Neotropics and the flora is incredibly rich," Linnaeus explained.

"Wow Vonbro you are really something," I said, just as the kids came running up again.

"Cascabel grande!" and we all went galloping off behind them. And what a magnificent *Crotalus durissus* it was. It was so formidable Billy did not dare to hand hold the huge serpent to show off.



***Crotalus durissus* by Renan Martini**

Vonbro.

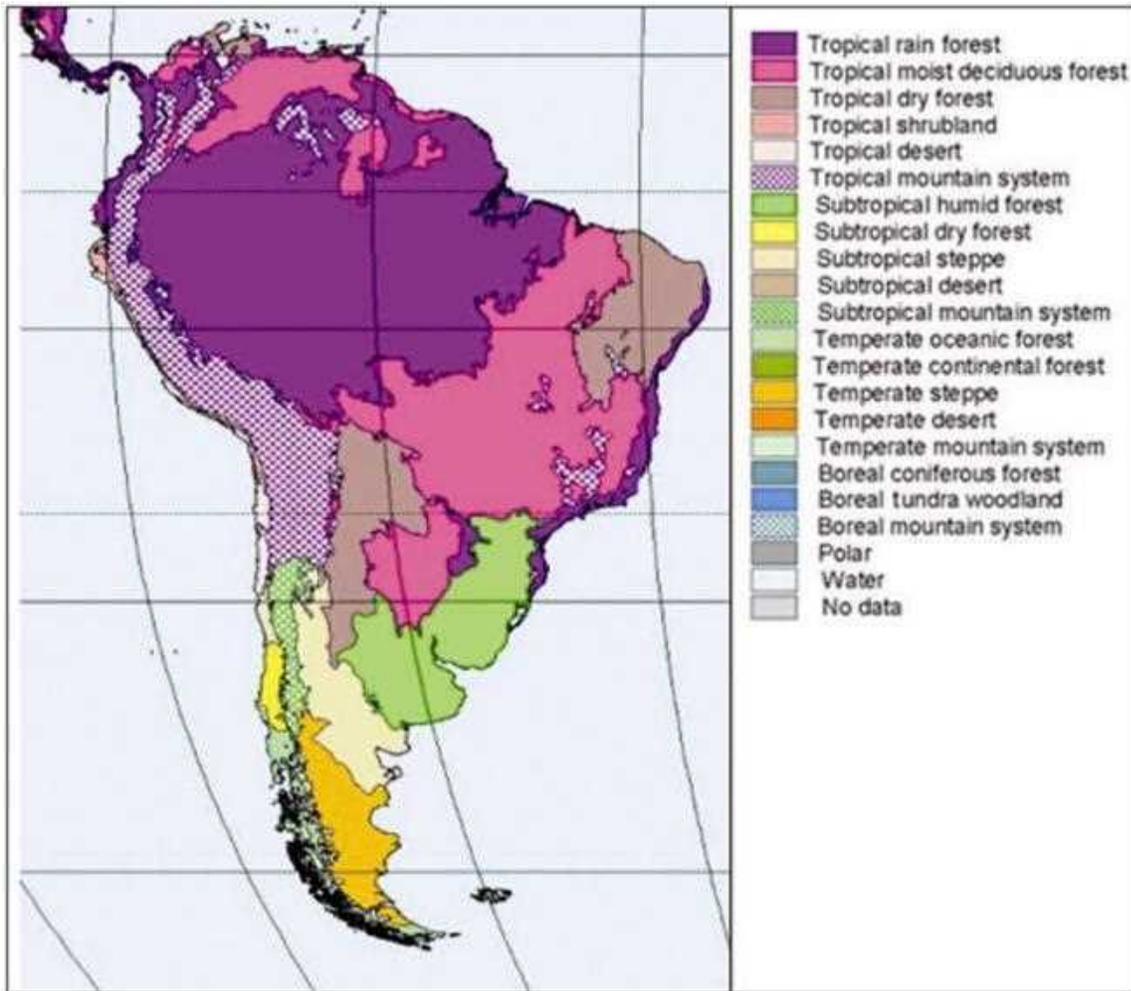
or



***Crotalus durissus* by pablosanluis**



***Crotalus durissus* by Renan Martini**



20. *Philodryas psammophidea* (Günther's Green Racer).

Our herper kids, Diego, Juanito, and Angel, were bringing us lots of interesting reptiles. Today they caught a *Philodryas psammophidea*. Linnaeus seemed very interested in the species and he went to extra effort to get an artistic photo of the beautiful snake.

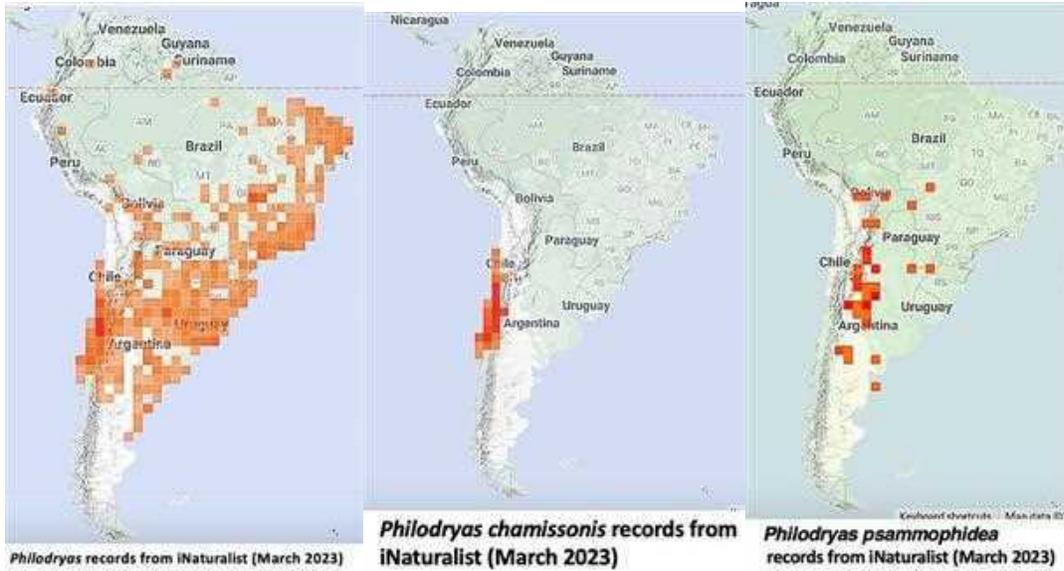
Linnaeus and I botanized together all day and he liked being close when he showed me the characteristics of each plant species. He also enjoyed expounding on herp biogeography, explaining how the distributions of amphibians and reptiles reflect those of the plants.

"Look for example at the *Philodryas* the boys brought us today. The genus is distributed widely across the drier parts of the continent, *Philodryas chamissonis* (Chilean Green Racer) is restricted to the Atacama where we found several and *Philodryas psammophidea* lives in the Monte and Pampa. These biotic regions were defined on the basis of mappable vegetation but they also reflect snake distributions."

One afternoon Feliz, the older brother of our herper kids, showed up holding a large *Tupinambis teguixin* (Gold Tegu). He was an outgoing happy teen and he and Linnaeus immediately took to one another and spent hours together holding the huge lizard. I had conflicting feelings about their rapidly developing closeness. I claimed to want Von to become less dependent on Billy and me, but maybe I was not being quite honest with myself. Was I jealous of them or happy for them? I wasn't quite sure.



***Philodryas psammophidea* by Alexander Guiñazu**



***Philodryas psammophidea* by Nico Rossi**





Feliz with *Tupinambus tequixin*



Diego Juanito Angel



***Philodryas chamissonis* by Francisco Riquelme Tapia**

21. *Bothrops diporus* (Painted Lancehead).

When Linnaeus came back from his one-night fling with Feliz he was in a fester over sexual orientation issues and wanted to know what Billy and I thought about them.

"Its a non-issue if there ever was one. There is absolutely no reason to restrict yourself to frolicking with only one sex or gender. Its all fun," Billy proffered.

"And if you are like me and prefer selfing, your sweet imagination can enjoy the full spectrum of genders and sexes every night," I chimed it. The boy seemed greatly relieved by our relaxed attitudes and all three of us became less inhibited about our nocturnal activities.

At dawn we were awaked by the herper kids who came running yelling, "Jararaca!" We all went galloping off with them to see the snake. We were shocked to discover a boy free handling a *Bothrops diporus*. Billy and Diego tried to talk Santito to put the dangerous pit viper down. But Santito just made the sign of the cross and said "Dios me protegerá."



***Bothrops diporus* by Alfredo Sabaliauskas**



Santito with *Bothrops diporus*



***Bothrops diporus* by Leandro Bareiro Guiñazú**



***Bothrops diporus* by Oliver Kohler**



***Bothrops diporus* by Nora Celeste Frank**

. 22 . *Lachesis muta* (Bushmaster).

The unexpected twists and turns in the road of life are what make it such a grand adventure. Linnaeus was charmed by a young kid named Rafael. Rafe was interested in plants and he took to following Von around all day and the two became absolutely inseparable. The boy quickly learned the botanical names and had a knack for finding plant species Linnaeus had overlooked. Rafael and Linnaeus also liked to sing together and they both had heavenly boy soprano voices, even though Von was past the age of most such sopranos.

Young Rafael sat with us during brotime and Von liked putting his arm around the boy. They were two sweet peas in a pod. Rafe's parents had died and he started sleeping next to Vonbro every night. Of course, Rafe eventually began to participate in our herping and we all liked flipping with him because of his great enthusiasm whenever we uncovered a species he had not seen before.

Rafe was not much interested in biogeography so Linnaeus continued to expound on it with Billy and me. Due to our experience with Santito Von became interested in the distributions of venomous snakes on the continent.

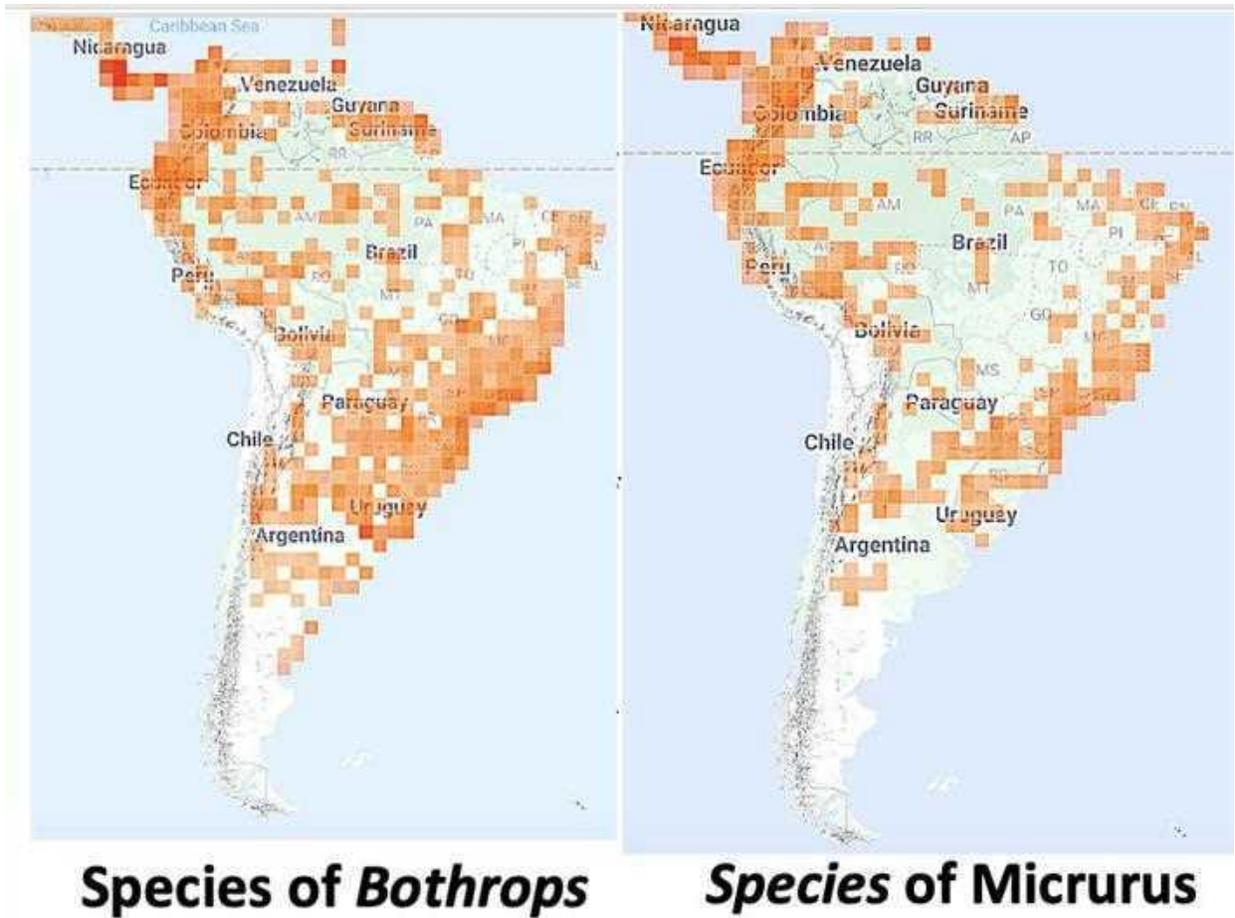
"The interesting thing is that venomous snakes are absent on most of the Pacific strip. *Lachesis muta* and *Bothriechis schlegelii* stop in Ecuador do not extend into the desert. *Bothrops picta*, and *Micrurus obscurus* extend into northern Peru, reaching their limit at only 15 degrees south. But on the Atlantic side of the Cordillera, *Bothrops ammo* extends much farther, reaching about 40 degrees south. This is consistent with the hyper-arid climate being a limiting factor on the Pacific coast, but I wonder what else is involved."

"Well, its all about food. That is something a peanut butter-loving bro does not fully appreciate. There simply are not enough rodent prey items in the hyper-arid desert to support a large venomous snake like a pit viper. Coralsnake diets are not well studied but their prey is probably mostly lizards and their a few suarians in the Atacama except right along the intertidal zone and the sand is probably too salty there for Coralsnakes."

"Wow, Billy, you are always into physical things like food, sex, and surfers" I exclaimed with a chuckle. Vonbro's night with Feliz had loosened him up and he joined me in a long hug of our physical bro.



***Bothrops ammodytoides* by nicochimento**



***Bothriechis schlegelii* by andraescholz**



***Bothrops pictus* Eduardo Quispe Salcedo**



***Lachesis muta* Peter Marting**



***Micrurus obscurus* by Martin Acosta**



Lachesis muta

Species of *Bothriechis*

.23. *Caiman latirostris* (Broad-snouted Caiman).

Billy felt he was not getting to use his muscles as much as he would like and wanted to go somewhere there was enough water for him to really swim. Rafe said he knew where Lago Oscuro is located but that it was not possible to drive their in the rainy season because the track was so muddy. That of course was just what Billybro was hoping to hear.

"Lesgobro," and we were off on our Oscuro Mudpuppy adventure.

It started out as a half-way descent track and Billy was disappointed. But it just got muddier and muddier until until 4X compound low no longer saved us and we bogged down to the axel. We got out, saw it was hopeless, and plodded off toward Lago through the mud. Two hours later we were shocked to come to four boys with their quad stuck in a mud.

"What in the hell are you kids doing out here in the middle of muddy nowhere?" I asked.

"We are trying to get to Lago Oscuro to find our missing tio, Lodo. He is camped at the lake making mud sculptures, but no one had heard from him in days."

We trudged on and eventually got to Lago Oscuro. There we encountered several youths. "We are also looking for Tio Lodo and all we found were his sculptures and his severed hand. We think the Corcodilos ate him," one of the dudes said.

I looked around and saw several *Caiman latirostris*, one carrying a baby in her mouth.

"These are just caimanes. They wont hurt anyone," I retorted.

"Well maybe the cannibals ate Tio, bones and all."

"Billy, I also saw a foot and one of the guys had red teeth. I do not like this situation at all. I would like to get the hell out of here immediately," I whispered.

"So would we," Von and Rafe chimed in together.

"I hear ya talkin bros, let's gallop."

We left Lago Oscuro never to return.



***Caiman latirostris* by David Smith**



***Caiman latirostris* carrying young by Mark Macewen**



***Caiman lateralis* by Lucas Aosf**



















24. *Stenocercus doellojurado* (Doello-Jurado's Ground Lizard).

"Billy, I want to explore the herp diversity in the deserts on this side of the Cordillera. These deserts seem to differ from one another greatly in their vegetation and wonder if their herpetofauna differs also. This difference between the deserts in vegetation contrasts strongly with what we saw on the Pacific coastal strip where there were no conspicuous changes in vegetation between the Sechura and the Atacama Deserts. We saw very few obvious differences in vegetation between the various deserts in Australia or between the Chalbi and the Koroli Deserts in northern Kenya."

"For shits sake, Bobby, the answer to that is obvious. There is no way you can see conspicuous differences in vegetation if it's totally barren."

"Billy, you are incredible at pointing out the obvious that I cant see."

"Well, bro, understanding the world requires physical contact with it not just cerebral abstraction. You need to discover the physical world."

"Ouch, that really hurt, Billybro."

"Sometimes the truth hurts, Bobbybro."

Linnaeus was waiting for we amateur biogeographers to finish and then he dove in and turned the light on.

"Well, bros, biogeography is both abiotic and biotic. The hyper arid deserts on the Pacific side of the Andes are not in contact with semi-arid adapted species. On this side you have the enormous Amazon basin with its extremely species-rich tropical forests. These slowly grade over thousands of kilometers into semi-arid and arid vegetation in the south. Over this great distance there is ample gradual change in climate to foster the evolution of drought-deciduous species and these give rise to truly desert-adapted species farther south. It is the mirror image of what you see in North America where Tropical Forests evolve into Tropical Deciduous Woodlands, and then into Thorn Scrub and deserts, ending in hot hyper-arid lowlands like the Gran Desierto de Sonora."

"Wow, Von, you are really something," I blurted out. I should have been happy to have close buds like Billy and Linnaeus who saw the big picture. But, quite frankly, I was hurt and jealous.

But Von is a very sensitive boy and felt my emotional pain. He threw his arms around me as said, I love you and will help you become more sensitive to the big biogeographic picture."

And Billybro chimed in, "And I will help you learn to enjoy being more physical." And he gave me such a strong hug.

My heart sang.

Just then I spied a lizard on the ground and walked over and noosed it. "Wow, it looks just like a *Sceloporus variabilis* (Rose-bellied Lizard) but it's a *Stenocercus doellojurado*.

Teixeira, Mauro; Ivan Prates, Carolina Nisa, Nathalia Suzan Camarão Silva-Martins, Christine Strüssmann, Miguel Trefaut Rodrigues 2015. Molecular data reveal spatial and temporal patterns of diversification and a cryptic new species of lowland *Stenocercus* Duméril & Bibron, 1837 (Squamata: Tropiduridae). *Molecular Phylogenetics and Evolution* 94: 410-423 (2016), doi:10.1016/j.ympev.2015.09.010

Torres-Carvajal, Omar; James A. Schulte II and John E. Cadle 2006. Phylogenetic relationships of South American lizards of the genus *Stenocercus* (Squamata: Iguania): A new approach using a general mixture model for gene sequence data. *Molecular Phylogenetics and Evolution* 39 (1): 171-185



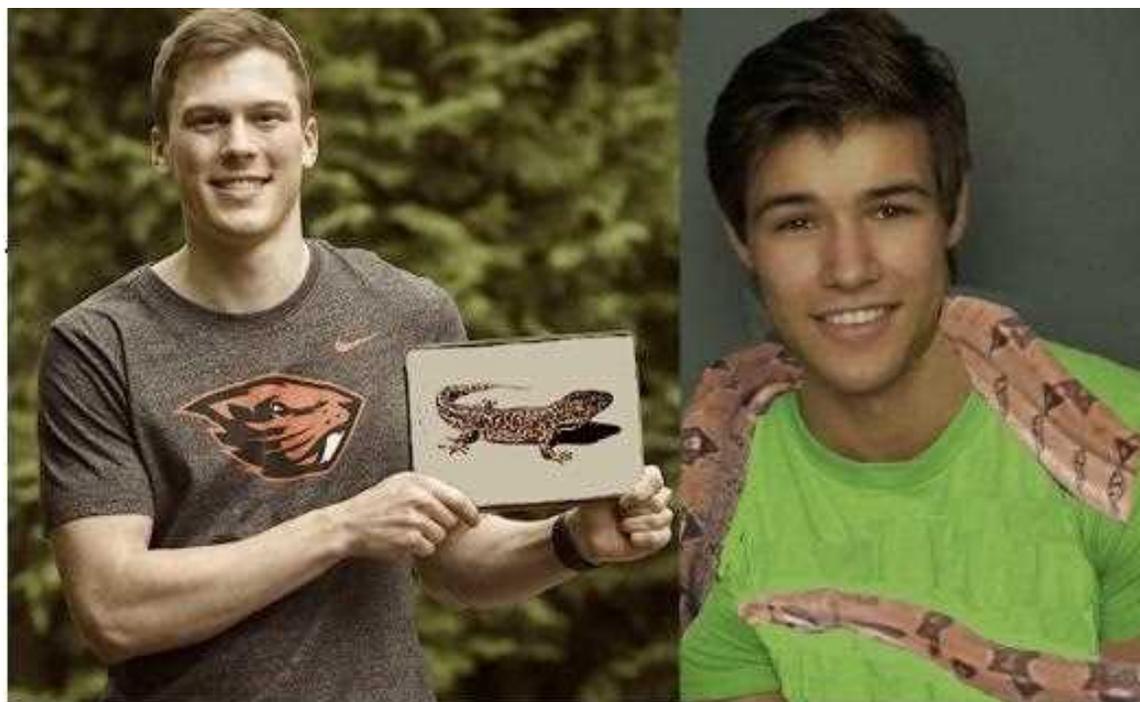
***Stenocercus doellojurado* by abracaarl**



***Stenocercus doellojurado* by Dario Coria**



***Stenocercus doellojurado* by Julien Birard**



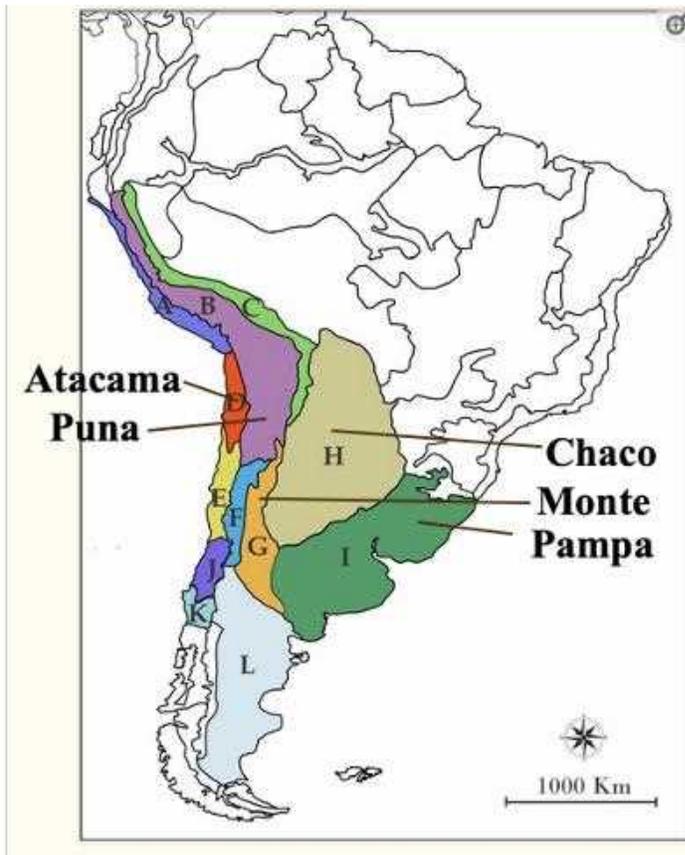
Bobby

Billy



Linnaeus

Rafael



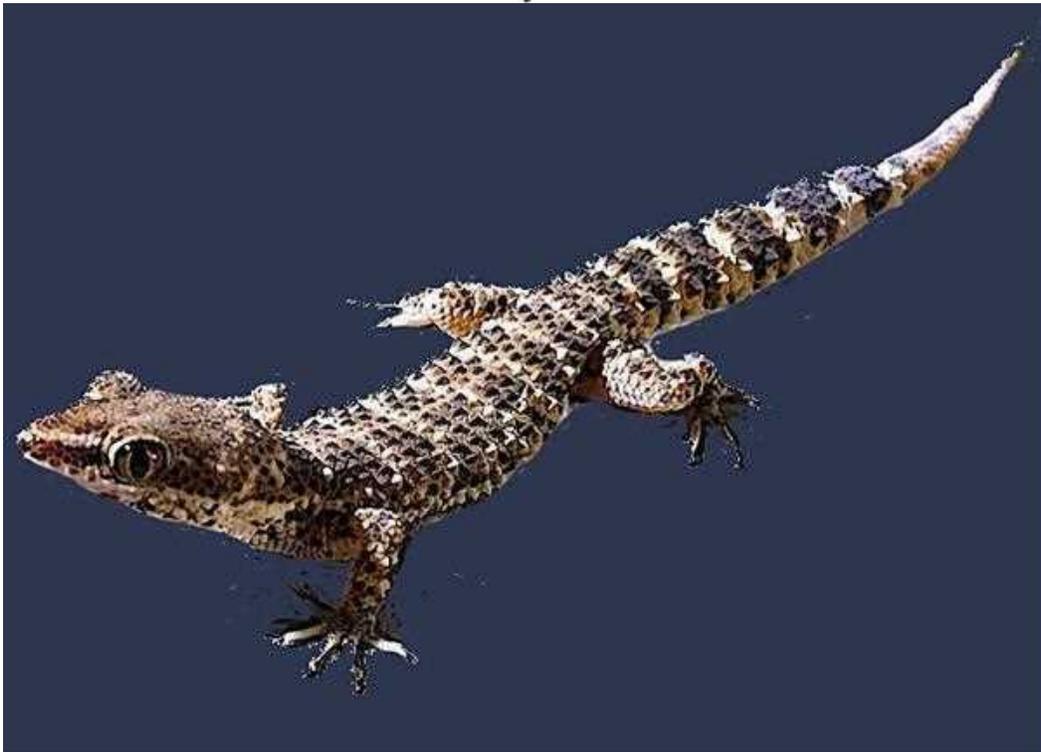
***Sceloporus variabilis* by José Rodríguez**

25. *Homonota hermosa* (Handsome Marked Gecko).

Billy and I decided we needed to spend a night together at the waterfall rekindling our relationship. Afterwards we went on a nocturnal walkabout with the headlamps, finding several *Homonota hermosa*.



***Homonota hermosa* by Damián Ganime**



***Homonota hermosa* by Rodrigo Matias Alfaro**

26. *Salvator merianae* (Argentine Tegu).

"Ok, bros, we have gotten way too bogged down with personal crap of no importance. It's time to embrace our herpetological mission and I have put my expedition hat on. Our mission is to discover and document the herpetofaunas of the Monte, the Chaco, and the Pampa and to appraise their differences.

"No herp will elude us.

"Billy as always you are the driver and I know that there is no track you can't get us down. Linnaeus you are the expedition botanist and you can identify the locality with the most typical vegetation of each of the deserts for our herpetofaunal investigation. I will place a species ID's on every herp we encounter and take tissue samples for DNA comparisons among the deserts. Linnaeus and Rafael can get artistic photos of each species for our publication.

"Let's herp and roll, bros."

Linnaeus did have a great eye for vegetation and after surveying several tracks that Rafe had suggested, he picked a spot with vegetation most typical of the Northern Monte. Von explained that this northern subregion of the Monte lies in the eastern foothills of the Andes and is part of the Gran Cruce between the Atacama and the eastern deserts. Von also pointed out the extensive stands of *Larrea divaricata* (Jarillo), and explained that the bush originated in these southern deserts and arrived in the North American desert relatively recently,

We herped in pairs, Billy turning and I grabbing, Linnaeus flipping and Rafael catching. Typical of a boy his age, Rafe was the ace herper and caught more reptiles than the rest of us combined.

In all we found 9 species of lizards and 7 snakes. Von and Rafe secured magnificent photos and I took tissue samples to study of DNA divergence among the deserts.

We were shocked to find two species of Tegu at this one locality.

Van Devender, T. R. (1990). Late quaternary vegetation and climate of the Sonoran Desert, United States and Mexico. *Packrat middens: the last 40,000 years of biotic change*, 134-165.

Yang, T. W. (1967). Ecotypic variation in *Larrea divaricata*. *American Journal of Botany*, 54(8), 1041-1044.



***Liolaemus wieamannii* (Eastern Smooth-throated Lizard) by Alexander Guñazu**



***Salvator merianae* (Argentine Tegu) by osiasfotografo**



***Salvator rufescens* (Red Tegu) by Oliver Kohler**



***Amphisbaena darwini* (Darwin's Ringed Worm Lizard) by [afr](#)**



***Homontus borellii* (Borelli's Marked Gecko) by Manuel Godoy**



***Xenodon merremii* (Wagler's Snake) by Joseferson Gomes Xwn**



***Phrynops hilarii* (Hilair's Side-necked Turtle) Nicolas Mazzini**





***Larrea divaricata* (Jarillo) in Argentina**

27, *Phymaturus antofagastensis* (Antofagasta Chuckwalla).

"I think that Cardon Grande (*Trichocereus atacamensis*) is the best indicator species for the Monte. Most of the Monte plant species range into the Chaco, but these giant columnar cactus seem to be largely restricted to area near the Gran Cruce, where the the Pacific and Atlantic deserts meet," Linnaeus proclaimed.

"It will be interesting to see if there are any reptile species that are endemic to the Monte. *Liolaemus* contains over 250 species of lizards and we found four species of the genus at our Monte study site. I wonder if any of them are truly endemic to the Monte and do not extend into the Chaco," I pondered.

"Its an open question about the degree of association between distributions of animal species with those plant species. Are "biomes" really just about mappable vegetation, not about the entire biota?" Linnaeus inquired.

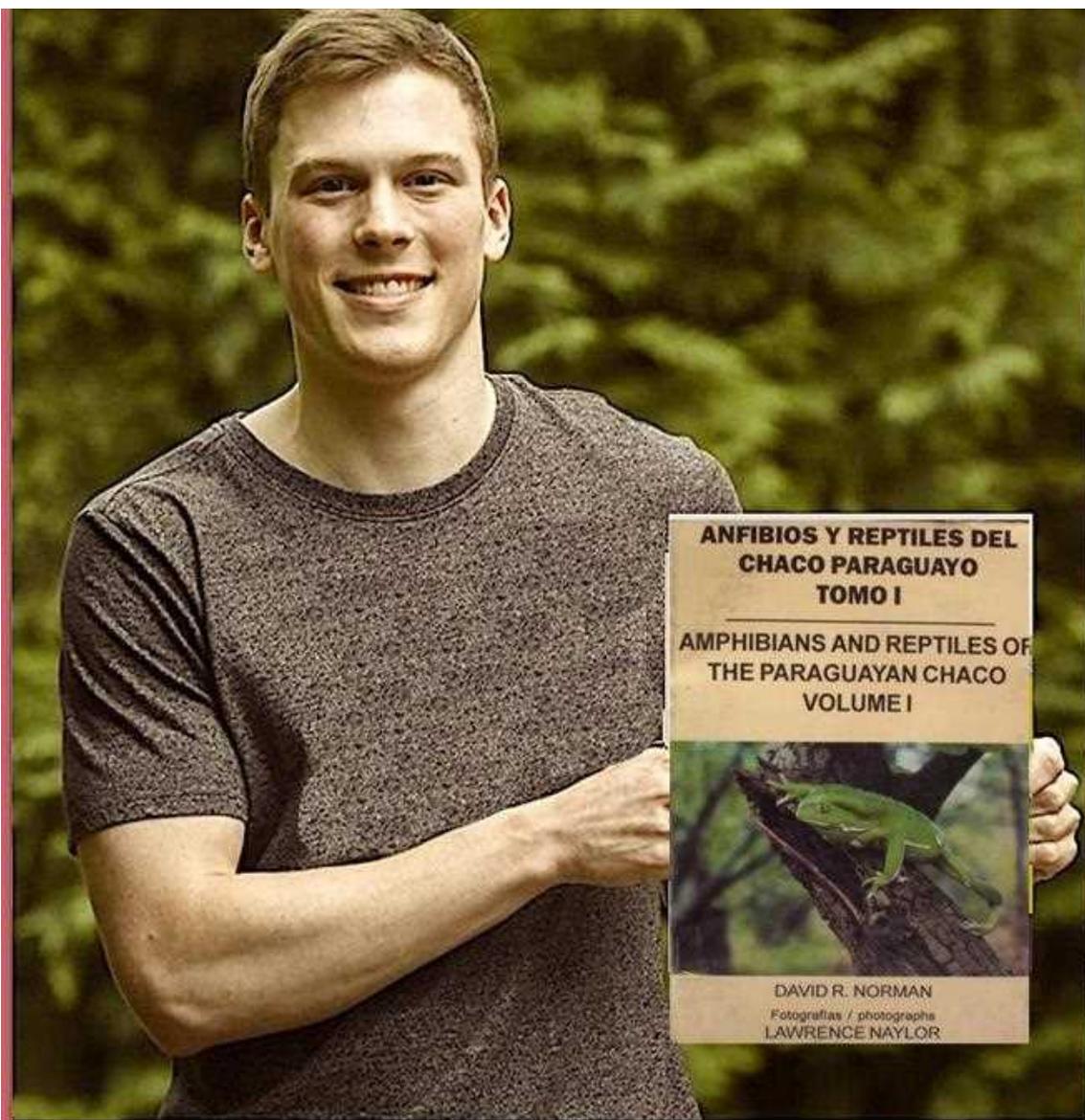
"Well, that is perhaps the ultimate biogeographic question and maybe we can take baby steps to address that ourselves. I will see whether I can identify any reptile species that is endemic to the Monte," I proposed.

"There are so many plant species to consider. I want to look at the distributions of only two, Jarillo (*Larrea divaricata*) and Cardon Grande (*Trichocereus atacamensis*). They are more or less indicator species." Von suggested.

"So I propose that we visit several localities in the Monte to Chaco transition. You survey the plants and then we will see what reptiles we find. I will particularly look at *Liolaemus* plus that magnificent *Phymaturus antofagastensis* on the boulders over there."



Trichocereus atacamensis



Bobby



Linnaeus



Phymaturus antofagastensis by Leandro Alvarez

.28. *Liolaemus* (Smooth-throated Lizards).

"This genus *Liolaemus* is really difficult. So far in our Monte explorations we have seen 11 of the 250 species, best I can tell. I am not at all sure whether any of them are truly endemic to the Monte. Some species extend westward into the Atacama, others eastward into the Chaco or the Pampa. The four species we have seen that may be Monte endemics (*L. irregularis*, *L. quilmes*, *L. scroccii*, and *L. umbrifer*) are found mainly in the rocky foothills of the Andes," I proffered.

"I am finding Cardon Grande (*Trichocereus atacamensis*) is pretty much limited to the rocky cordillera in the Monte," Linnaeus declared.

Billy spoke up. "You guys are still not seeing the big picture here. You focus exclusively on the biotic world. But things like the Monte are "ecoregions," not "biomes." and as such they are defined by a combination of biotic and abiotic features. The Monte is really just the rocky foothills of the Andes. You need greater appreciation for the physical world, such as topography and geology."

"Wow, Billybro, you are really something," was all I could muster.

"Well, Bobby, I think Billybro has an important point here. At each locality we visit, I will be identifying the plants, and you will put names on all the reptiles that we can find. How about Billy writing up the topographic and geological evaluation of the locality that can be incorporated into our final analysis in the publication," Linnaeus suggested.

Billy smiled ear to and he gave Von a big hug. I tried not to be jealous.



***Liolaemus scrocchii* by Mike Andersen**



***Liolaemus umbrifer* by Carlos Schmidtutz**



***Liolaemus quilmes* by Hugo Hulsberg**



Trichocereus atacamensis



***Liolaemus irregularis* by Luciano Avila**

29 Oxyrhopus rhombifer (Amazon False Coralsnake).

Billy found his niche in landscape interpretation thanks to Von's suggestion. As a physical bud he was very attuned to topography and geology and having his input on them added significantly to Von's understanding of the plants and my interests in the distributions of the herps.

"Bros, I know this is not Australia and there are no billabongs. But I am a waterdog and I need to find some place for at least a dip, if not a swim. I see a green patch in over in that canyon and I can get Cruiser to the rim. You guys up for a hike down into the canyon and a refreshing dip?" Billy inquired.

"You're on bro," I encouraged.

Billy enjoyed now being more in the driver's seat in two ways. As the topobro he was constantly scanning the landscape and interpreting it for us. And he drove cruiser into more remote terrain to show us interesting geological features.

We abandoned Cruiser on the rim of the canyon and set out on foot. I did not have a problem on the long hike down into the canyon, but worried I would not be able to climb back up and out. Von understood my physical limitations entirely and took to walking with me. That helped immensely.

Billy's landscape intuition was right on the mark. We hiked up the canyon and found a beautiful swimming hole and we stripped and dove it. It was a delight as we had not encountered water since we departed from the cold dreary Pacific many days ago. We spent the afternoon enjoying the water and the warm sun and decided to spend the night in the canyon.

We were were happy that several Vicuñas came to the water to drink. What delicate little camelids they are.

Billy always carried a well stocked backpack and had headlamps for a night walk. We succeeded in turning up two species of snakes, *Oxyrhopus rhombifer* and *Philodryas aestiva* (Brazilian Green Racer). I was interested that both were widespread Amazonian species clustered near this semi-topical water hole. We found one gecko species, *Homonota underwoodi* (Underwood's Marked Gecko) on the canyon walls and like other lizards we had encountered it was a species restricted to the Monte to Pampa region.

I was beginning to see that snakes and lizards had distinctly different distributional patterns in the Monte.



***Homonota underwoodi* by Damián Ganime**



Oxyrhopus rhombifer by vinicius_s_domingues



***Philodryas aestiva* by João Gava Just**



***Philodryas aestiva* by Martin Abreu**





***Oxyrhopus rhombifer* by Francisco Severo Neto**





30. *Paraphimophis rusticus* (Brown Musurana).

Linnaeus and I were beginning to come around to Billy's view that the Monte was an ecoregion defined largely by the rocky foothills of the Andes. To test this hypothesis we decided to do one last station near the foothills but out in the flats as judged from the landscape by topobro Billy, not by the plant or herps.

Billy of course took the opportunity to explore the landscape more widely. He eventually got Cruiser to the end of a ridge that jutted from the foothills far out into the flats.

On the rocky ridge we were delighted to find another species of South American "Chuckwalla" perched on the rocks. This one was a *Phymaturus extriliidus* (Dauntless Chuckwalla), much more *Sauromalus*-like than any we had seen previously. We marveled at how a large flat body is tightly linked to a plant diet and rock crevice habitat and how such incredibly similar morphotypes evolved independently in these distantly related iguanian lizards.

Linnaeus wanted to walk out into the flats until we reached the last Cardon Grande. On the walk we herped in the usual pairs, Billy with me, and Von with Rafael. As usual Rafael found most of the herps. This is a phenomenon that has always intrigued me. There are certain individuals who just have a knack for intuiting what cover will yield a herp, and Rafe definitely had the instincts.

Linnaeus took data recording the numbers of Cardones Grandes (*Trichocereus atacamensis*) and Jarillos (*Larrea divaricata*) and the estimated number of meters from the end of the ridge.

"There is a clear decrease in the numbers of Cardones and increase in Jarillos as we head out into the flats," plantbro Von announced.

"That is to be expected, as over that distance there is a soil gradation from montane rubble to fine-grained valley fill," topobro Billy declared.

At the farthest Cardon we were interested to observe two *Liolae musornatus* (Ornate Smooth-throated Lizards) that were fighting, presumedly over territory.

"I think we need to let this very spot soak into our spirits. Let's just stay right here for the rest of the day and the entire night, sitting under the last Cardon Grande, and savoring "el gran reunion de los desietos," herpbro Bobby proposed

"You're on Bobby," Linnaeus said. "You herp people are so preoccupied with "getting your hands on" another animal that you never really appreciate what you see."

Billy and Rafael just could not sit in one place for such a long time and they left for an afternoon walkabout on their own. Von and I sat close together silently under the Cardon for hours. He eventually put his arm around my shoulder and that simple little gesture said more than words.

When Billy and Rafe returned we all donned the headlamps and headed out on a nocturnal walkabout. We were about to give up for the night when Rafe found a beautiful *Paraphimophis rusticus*.

"Wow I wonder why it has such a small head?" I enquired.

"I bet the species eats mainly snakes rather mammals that are difficult for serpents to get their head round," Billy conjectured.

On the way back I caught a *Homonota horrida* (South American Marked Gecko).

"Glad you were finally able to get your hands on on a reptile," Von said with a smile.

We were four happy bros falling asleep gazing up at the "last Cardon Grande" in the moonlight surrounded by a billion stars.

Alencar, L. R., Gaiarsa, M. P., & Martins, M. (2013). The evolution of diet and microhabitat use in pseudoboine snakes. *So*



***Phymaturus extrilidus* by juanh**

uth

American Journal of Herpetology, 8(1), 60-66.



***Liolaemus ornatus* by davide berton**



***Liolaemus ornatus* by Quentin Vandemoortele**



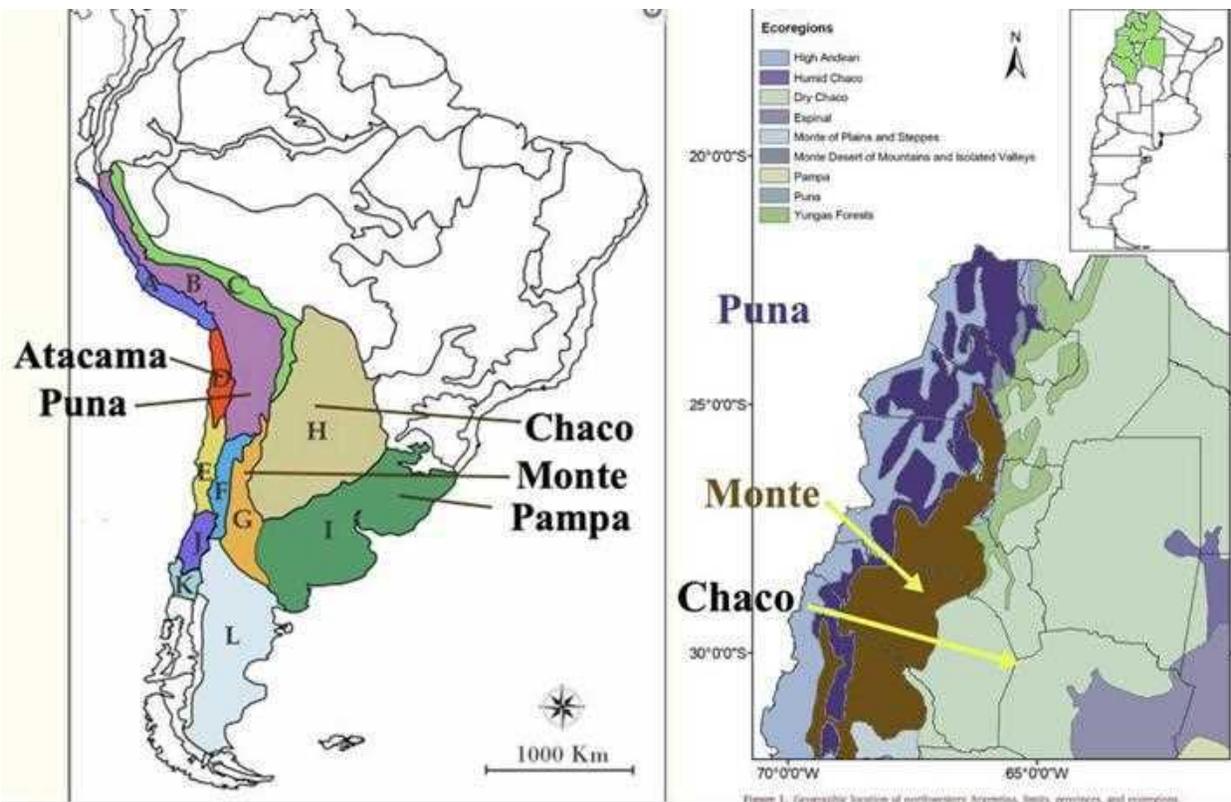
***Paraphimophis rusticus* Gonzalo Diaz**



***Paraphimophis rusticus* by Lucia Embrioni**



***Liolaemus ornatus* Mauricio Ocampo Ballivian**



31. *Bothrops jonathani* (Jonathan's Lancehead).

We said goodbye to the last Cardon Grande of the Monte. But somehow we were not ready to leave the Cordillera region. The chain had been our constant companion for months along one side of us or the other as we traversed thousands of kilometers.

TopoBilly spoke up, "O.K. bros its decision time. Are we gunna leave the Andean Cordillera and strike out across the flats of the Gran Choco. I, for one, am not ready for that yet. We have explored the Monte but not the Puna to our north. The Puna is the poorly known center of the Gran Cruce, an enormous tableland where the deserts cross the Cordillera.

"I hear ya talkin bro. We are not on any time constraints. Why should we rush out across the Chaco and the Pampa to the Atlantic? Lets explore the Puna and, Billybro, I bet you can find some bad roads there for getting your rocks off."

"The plants of the Puna are among the least known on the South American continent and I have wanted to go there my whole life," Linnaeus volunteered.

So we were off on our grand Puna adventure. Little did we know that it would turn out to be the most arid uninhabited region we had yet encountered.

"No wonder the Puna plants are poorly known, there are none whatsoever," I declared as we reached the totally barren high plateau at 4,000 meters elevation.

"I want to explore El Desierto del Diablo. With a name like that it has to be fun," Billybro announced. And he took a faint track out into the totally plant-less landscape. Soon the tracks stopped entirely, but he kept driving and driving and driving, until he reached his climax, totally bogging Cruiser down to the axel in a sand dune.

Out came the shovel and the boards and working together we got Cruiser back to tierra firma, "Well, we can walk on from here." I was not at all sure where Billy proposed to go.

Just then a kid walked up with his llama, "A donde vienen ustedes?"

Rafael spoke up, "Al Desierto del Diablo."

"Eso es todo."

When Rafe explained we were looking for lizards and snakes Rodrigo declared they do not live in the dunas, but in the oasis and he and his llama Coco could take us there.

Rodrigo cautioned us that the water at the oases was poisonous. Billy filled our canvas water bag, Rodrigo tied it on Coco, and we set out across the dunes. Rodrigo and Coco walked very fast and Billy and Rafael were barely able to keep up with him. Fortunately Linnaeus lagged back and sauntered along with me looking for plants. Rodrigo explained that it is easy to walk along the dune crests but the oasis lies in a swale at the base of the montaña and we had to cross five dunas to get there.

We arrived at a pitiful little puddle and were very happy we had brought water. But there were enough palms to provide shade and litter for flipping.

We found several *Liolaemus puna* (Puna Smooth-throated Lizards), an endemic species that looks incredibly like a *Sceloporus* (Spiny Lizards).

Also foraging among the palm litter were several *Ameiva ameiva*, (Giant Ameivas) a wide-spread Amazonian species.

Rodrigo yelled, "Yarará!," and we all ran over to see the viper. Coiled up next to a palm log was a magnificent *Bothrops jonathani*, a fairly rare species largely restricted to the Puna.

After the sun dropped behind the montaña we donned our headlamps for a walkabout. We were elated to find a *Dipsas turgida* (Bolivian Snail-eater), a Monte to Pampa species. It was out foraging and we were surprised that there was a sufficient number of slugs and snails around this little oasis in the dunes to sustain the snake. We found a *Homonota septentrionalis* (Northern Marked Gecko), another species fairly restricted to the Puna.

Rodrigo laid down in the sand with us and Rafe and he chatted about the difficulties of living in this hyper-arid region. It seems that the llamas are their only key to survival in this harsh place.

Utama: https://www.youtube.com/watch?v=QeS0_PQmfmA



Bothrops jonathani
© Rodrigo W. Soria Auza

***Bothrops jonathani* by Rodrigo Wilber Soria Auza**



***Ameiva ameiva* by claudioconsonni**



***Dipsas turgida* by jcsullivan**



***Dipsas turgida* by lucas**



***Homonota septentrionalis* by Ted Armstrong**



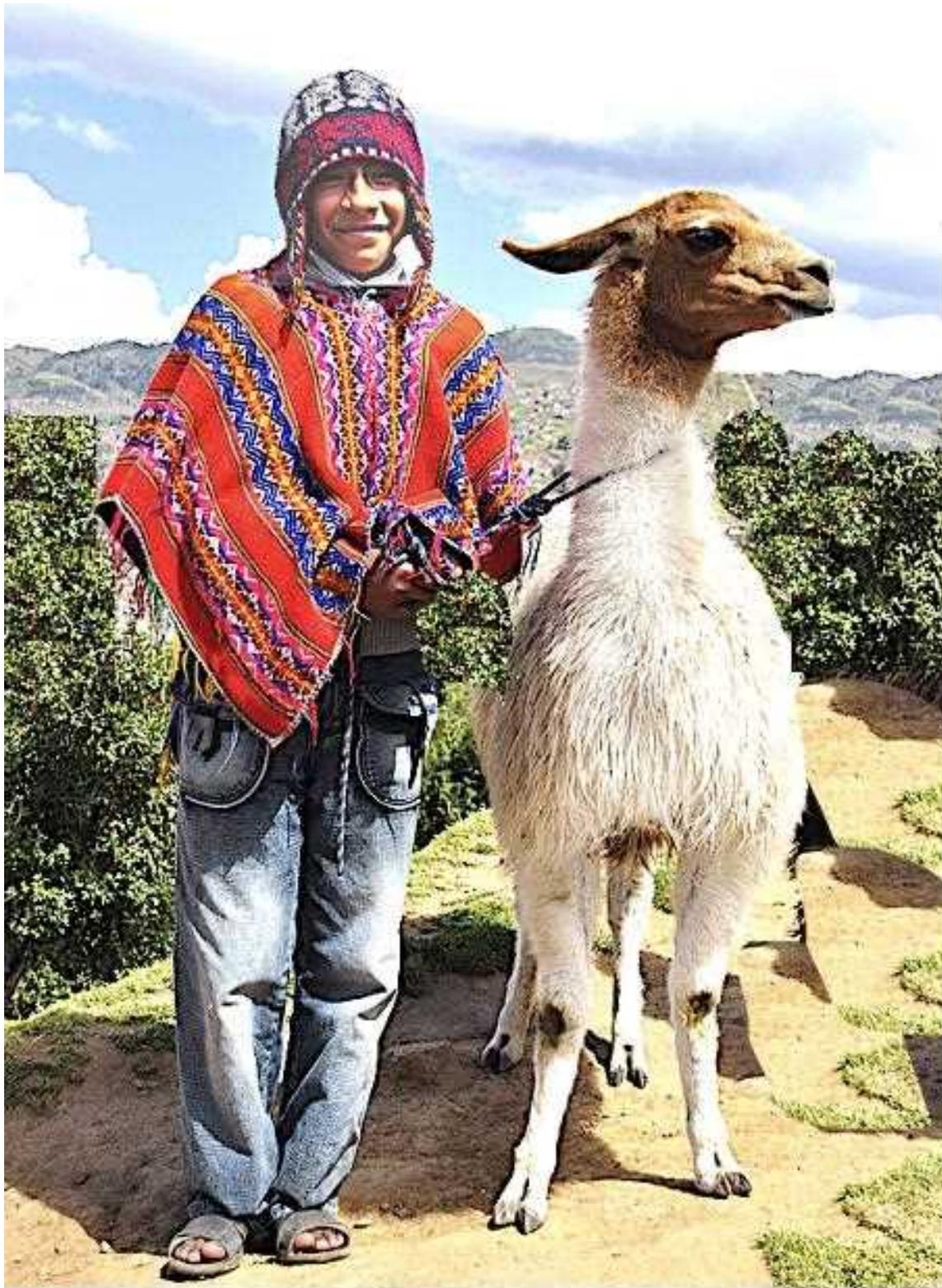
***Liolaemus puna* by Margarita Ruiz De Gamboa Astroza**



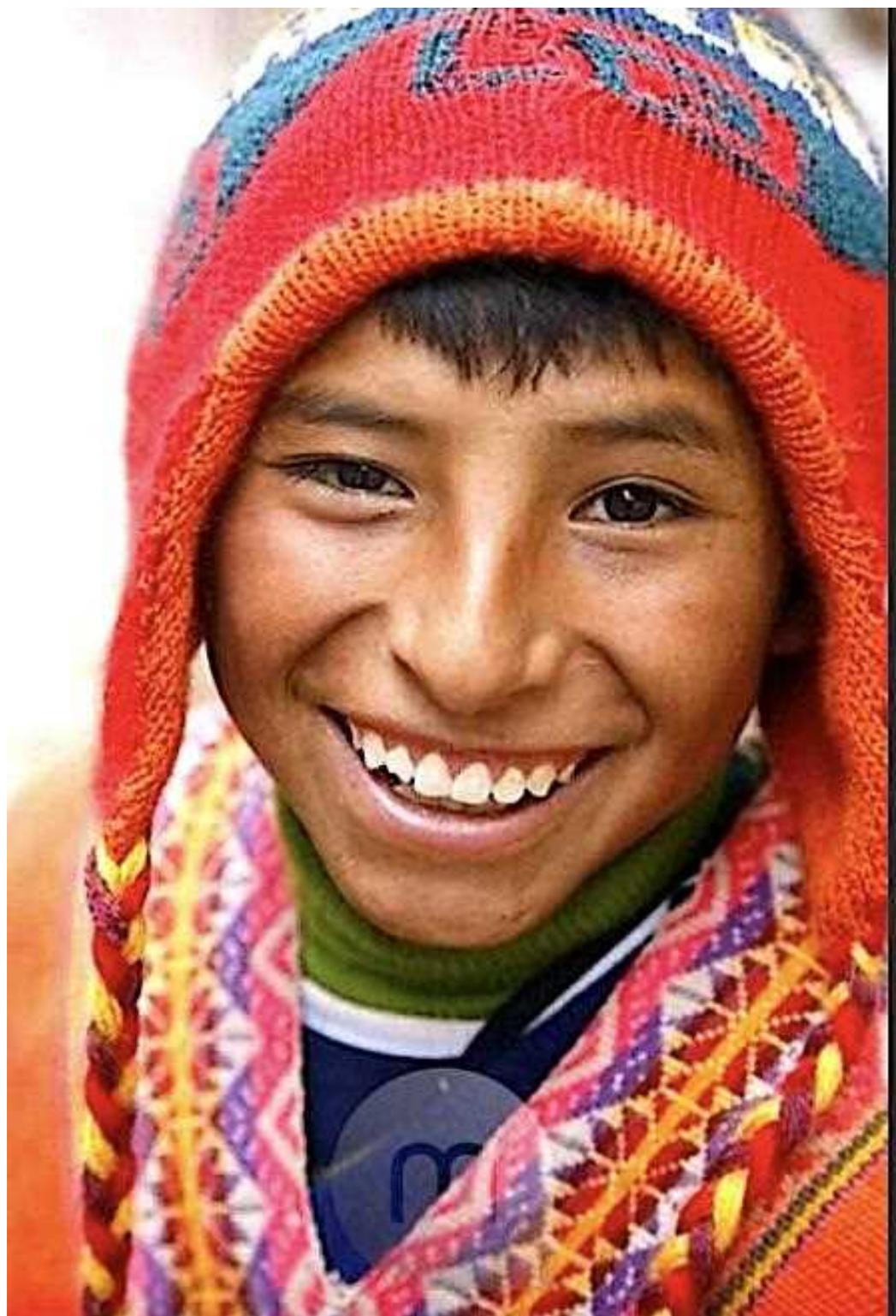
***Bothrops jonathani* by Teresa Camacho-Badani**







Rodrigo with Coco



Rodrigo

32. Tien Wei Yang.

The sun rose like a fireball out of hell and we decided it was time to say goodbye to Rodrigo in the Puna and head out into the Gran Chaco. Linnaeus wanted to study the distribution of *Larrea divaricata* (Jarillos) along our track and we stopped many times for him to look at the plants. That is the way it is in the field with botanists. They can take hours to crawl a meter as every plant excites them like an Anaconda thrills me.

We came across a jeep parked beside the track and spotted three people way out on the horizon. We smelled "biólogos" and walked out to meet them. There stood a very tall man and two youths. He turned out to be none other than Tien Wei Yang, the dean of *Larrea* and Linnaeus was shocked out of his mind..

"I am gathering *Larrea* seeds to grow on my plot in Tucson. Unless I grow the plants side by side I cannot be sure if the differences I'm seeing in the ecomorphs are actually genetic or are strictly environmental," Tien Wei explained.

We just stood there for a while and watched them in action. Tien Wei would pick a *Larrea* that his keen eyes detected as being significant and he began taking detailed notes on the bush in his field notebook with a Radiograph pen. Benicio would make an entry in the catalogue, assign the field number, record the GPS reading, and take photos of the bush beside a meter stick. Rupert put the *Larrea* seeds, flowers, and foliage samples in a paper envelope and wrote the catalogue number on the envelope and put it in his enormous backpack.

We eventually learned that Tien Wei taught at Western Reserve Academy, a prestigious college preparatory school in Ohio where Rupert was a student. Benicio was a botany student at the Universidad Nacional de Cordoba. He was collaborating with Tien Wei on several research projects involving the systematics, biogeography, and evolution of *Larrea* in South America..

Tien Wei was the most enthusiastic biologist we had ever met. His over-the-top, brimming-with-life personality and his raucous, contagious laughter swept us right off our feet. Linnaeus was in heaven as he had never before had the opportunity to be in the field with other botanists. He took a particular shine to Rupert, a fellow teen pelirrojo botanist.

It was getting to be lizard golden hour and Billy and I wandered off leaving Linnaeus and Rafael with the other botanists. We deeply felt their absence and

came to the painful realization that their youthful presence was an integral part of Billy's and my happiness.

We were surprised to find several striped lizards resembling whiptails out foraging. We photographed them and when we got back to camp Tien Wei explained that these were a seldom seen species, once called *Cnemidophorus longicauda* (Long-tailed Whiptail), that is now placed in a separate genus, *Aurivela*, due to the unique presence of a scale flap covering part of the ear opening.

We discovered that Tien Wei knew a lot about herps and had a special interest in toads. After dark we donned our headlamps and he took us to a pond to observe *Rhinella diptycha* (Cururu Toads) breeding. "This is an Amazonian species similar to the invasive *Rhinella marina* (Cane Toads) and as such it is not widely appreciated."

Harvey, M. B., Ugueto, G. N., & Gutberlet Jr, R. L. (2012). Review of teiid morphology with a revised taxonomy and phylogeny of the Teiidae (Lepidosauria: Squamata). *Zootaxa*, 3459(1), 1-156.

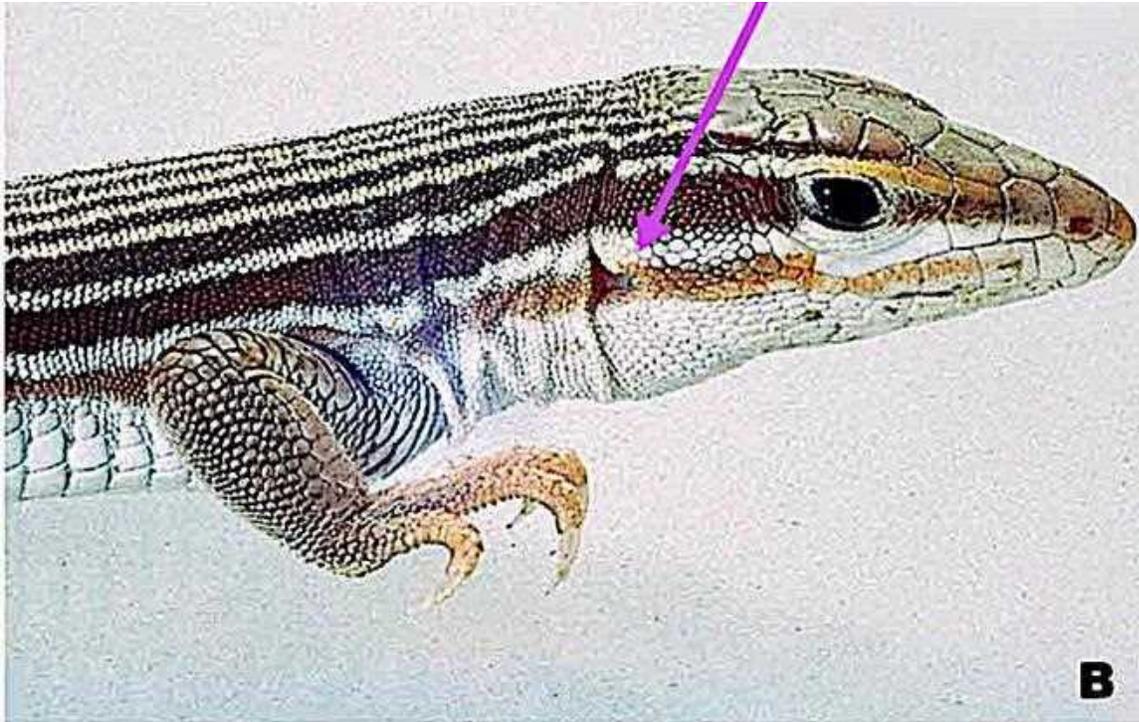
Pereyra, M. O., Blotto, B. L., Baldo, D., Chaparro, J. C., Ron, S. R., Elias-Costa, A. J., ... & Faivovich, J. (2021). Evolution in the genus *Rhinella*: a total evidence phylogenetic analysis of Neotropical true toads (Anura: Bufonidae). *Bulletin of the American Museum of Natural History*, 447(1), 1-156.

Yang, T. W. (1970). Major chromosome races of *Larrea divaricata* in North America. *Journal of the Arizona Academy of Science*, 6(1), 41-45.

Yang, T. W., & Lowe, C. H. (1968). Chromosome variation in ecotypes of *Larrea divaricata* in the North American Desert. *Madroño*, 19(5), 161-164.

Yoke, M. M., Morando, M., Avila, L. J., & Sites Jr, J. W. (2006). Phylogeography and genetic structure in the *Cnemidophorus longicauda* complex (Squamata, Teiidae). *Herpetologica*, 62(4), 420-434.

Yang, T. W., Hunziker, J. H., Poggio, L., & Naranjo, C. A. (1977). Hybridization between South American Jarilla and North American diploid Creosotebush (*Larrea*, Zygophyllaceae). *Plant Systematics and Evolution*, 126, 331-346.



***Aurivela longicauda*, modified from Harvey et al. (2012).
Arrow points to scales partially covering the ear opening**



***Aurivela longicauda* by Ailín Ayelén Gabucci**

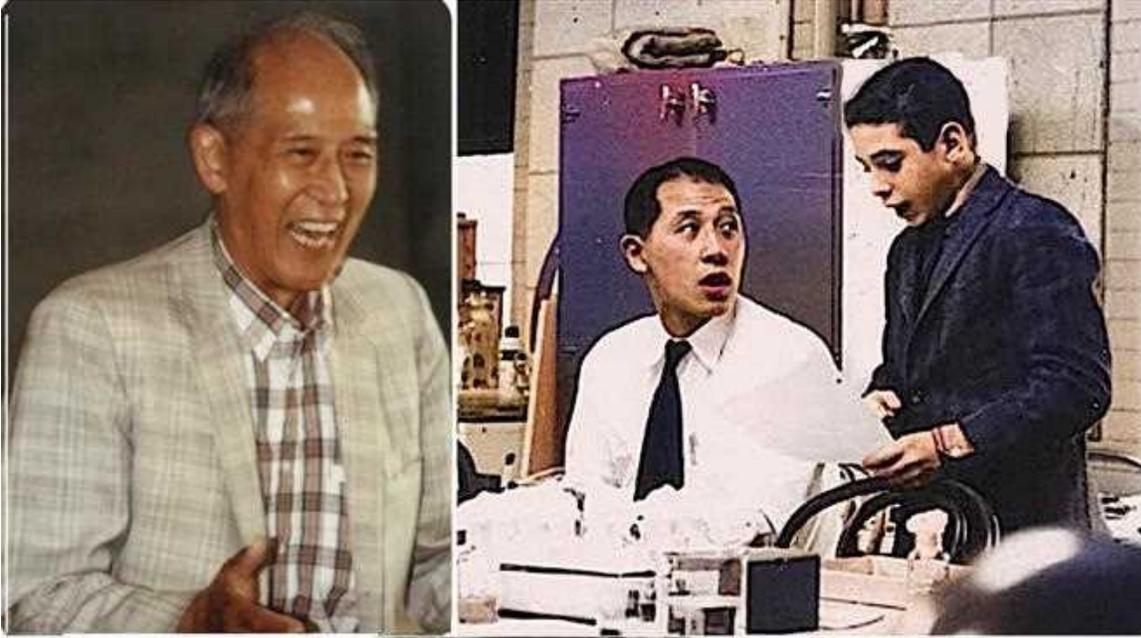


***Aurivela longicauda* by Quentin Vandemoortele**



Benicio

Rupert



Tien Wei Yang



***Larrea divaricata* (Jarillo)**





***Rhinella diptycha* by Sidnei Sampaio**



***Rhinella diptycha* by Leo Rocha**

33. *Leiosaurus paronae* (Mendoza Smooth Iguana).

It was indeed fortuitous to have met Tien Wei Yang on the edge of the Gran Chaco. He was the perfect botanical mentor for Linnaeus. As a teacher at a 9 though 12 college preparatory academy he was highly experienced at advising youths about careers and about life itself. Tien Wei talked with Linnaeus for hours about all manner of professional and personal issues.

At the end of the day Von decided to continue to explore South American deserts with Billy and me and then apply for admission at several universities that Tien Wei recommended as having prominent programs in botany. Tien Wei and Benicio offered to write letters of recommendation for Linnaeus when he applied.

And Tien Wei was a real help to Billy and me. He knew the Chaco and its herps and he advised us on various routes. He felt that to understand the Gran Chaco it would be beneficial for us to first visit the Sierra San Luis situated on the western edge of the Monte. This appealed to us all as we enjoyed exploring mountain ranges.

We were off to the Sierra San Luis. Tears were in Von's eyes as he gave Tien Wei, Benicio, and Rupert good bye hugs. They had changed the course of his life and he now saw his path forward as a botanist.

The Sierra San Luis was a knock out montaña, rugged, remote, and vast, and we loved it.

"O.k. guys. I want to really explore this range. I will find us a track deep into a canyon, then lets set out on foot for a few days. I need to use my muscles and recover from being with others humans," Billy announced.

"I hear ya talkin bro and I thoroughly understand your needs. I am not sure there is any water back in the Sierra so we will each need to carry two days water for ourself," I cautioned.

We set out at dawn on foot for our San Luis adventure. We were delighted there were no other humans anywhere. Billy and Rafael would zoom ahead in the canyon and then stop and wait for Linnaeus and I to reach their resting place.

This went on for a day and a half and I started to worry as our water supply was getting low. Billy had a real penchant for putting us into difficult situations and this was a prime example. But he was not about to turn back until he reached some imagined destination.

Eventually we completely drained our water supply and the four of us were becoming severely dehydrated and starting to struggle to put one foot in front of another. I called a halt to this crazy death march and pleaded with Billy to turn back. But he would not listen to me.

I made the painful decision to turn back and leave Billy to his death in the Sierra. Linnaeus and Rafael began discussing whether they wanted to die in the Sierra with Billy or try to make it back to Cruiser with me.

Because of his youth Rafe had keener senses than the rest of us and he saw movement way up on the canyon wall. Billy said it was probably just a Vicuña. But I got out my binoculars and was shocked to see a solo climber high on the wall.

We all started frantically shouting and waving our arms. By some miracle the person heard us and began descending the wall down into the canyon. When he finally reached us we were shocked to discover he was a gringo kid. He shared sips of his water and said that he knew the location of a tinaja.

Antonio was a solo peak bagger and had climbed many Argentine sierras. He led us to the tinaja and water never tasted so sweet. There we saw a lizard that was

totally new to our experience, *Leiosaurus paronae*, a member of an iguanian family that is endemic to South America.

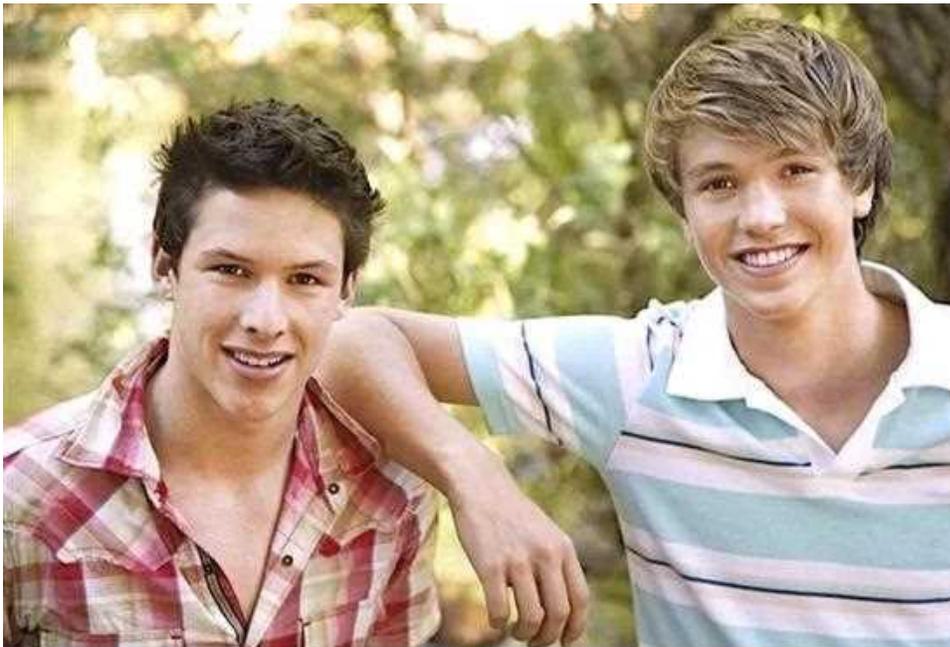
Morando, M., Olave, M., Avila, L. J., Baker, E., & Sites Jr, J. W. (2015). Molecular phylogeny of the lizard clade Leiosaurae endemic to southern South America. *Herpetologica*, 71(4), 322-331.



***Leiosaurus paronae* by Roberto Guller**



***Leiosaurus paronae* by Valentín Gonzalez Feltrup**



Bobby

Billy



***Leiosaurus paronae* by ssmuel222**



34 *Boa constrictor*.

Thanks to Antonio and his tinaja Billy, Linnaeus, Rafael, and I all made it back alive from our Sierra San Luis adventure. But my extremely painful decision to not follow Billy on his dangerous and foolish death march to nowhere had damaged our relationship, and we desperately needed some exclusive time together.

We had learned from Tien Wei the location of a remote small lake in the Dry Chaco that no one ever visits and we headed for Lago Escondido. As I rode along admiring Billy driving cruiser down the muddy track to the lake we began to heal.

Lago Escondido was absolutely delightful and totally devoid of other humans. It was large enough for swimming and, of course, Billy immediately declared, "Last one in is a rotten egg," and we all stripped and dove in.

It was good for me to see how much Billy loved swimming in the lago. His love of moving his muscles was an important part of my attraction to him. And it was tightly linked to his lack of fear and his enjoyment of life-risking adventure.

Billy and I headed out on a little walkabout to rediscover each other. Communication is everything and I listened to his declarations that he needed to live in a more physical way than I.

"I hear ya talkin bro. I have never wanted to constrain your need for physical adventure. But lets set up a code to deal with extreme danger. I will never use it when I am just 'worried.' But when I clearly see you questing after adventure that is truly life-threatening, I will just say, 'Billy, Please stop this now. I love you.'

Billy and I sat together gazing out at Lago Escondido, until the sun set, the full moon arose, and we rekindled our relationship..

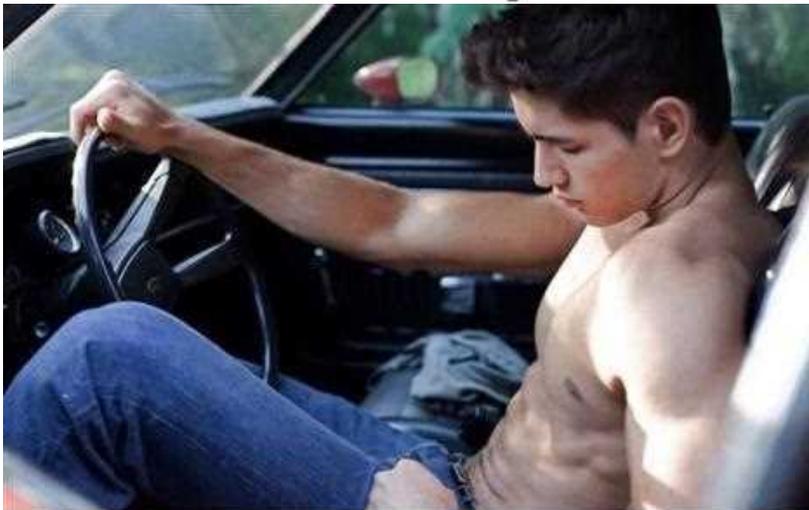
Afterwards we went on a headlamp walkabout and were delighted to encounter bro's favorite snake, a Boa Constrictor.

"This clenches it. The Dry Chaco is not a true desert but a thin thornscrub derived directly from the Amazonian forests," I declared.

"You got it, Bobbybro, an gave me a goodnight hug.



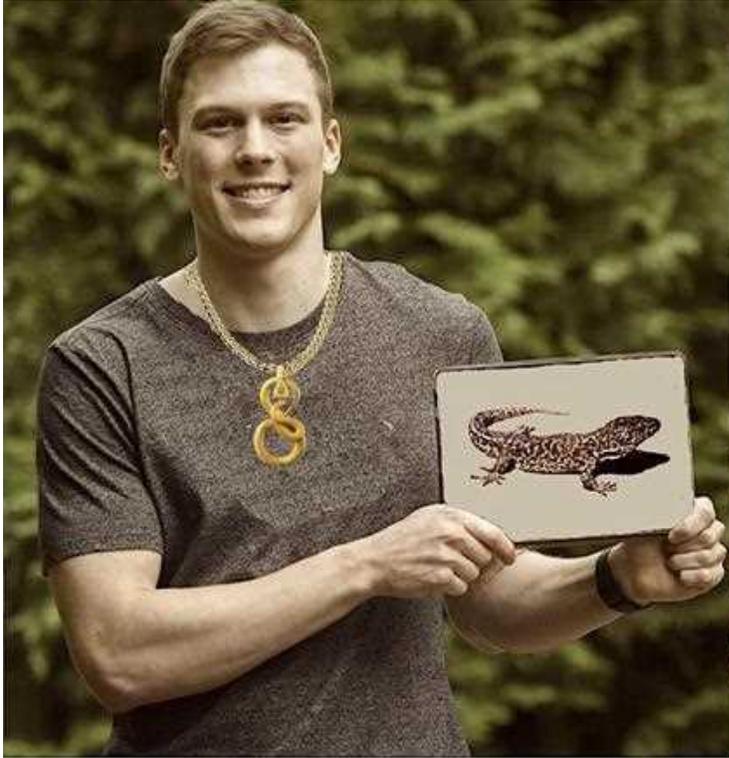
***Boa constrictor* by claudioconsonni**



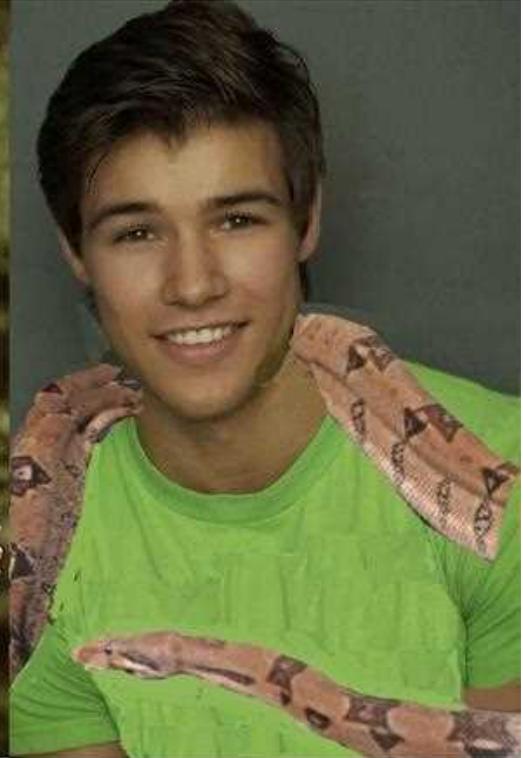
Billy



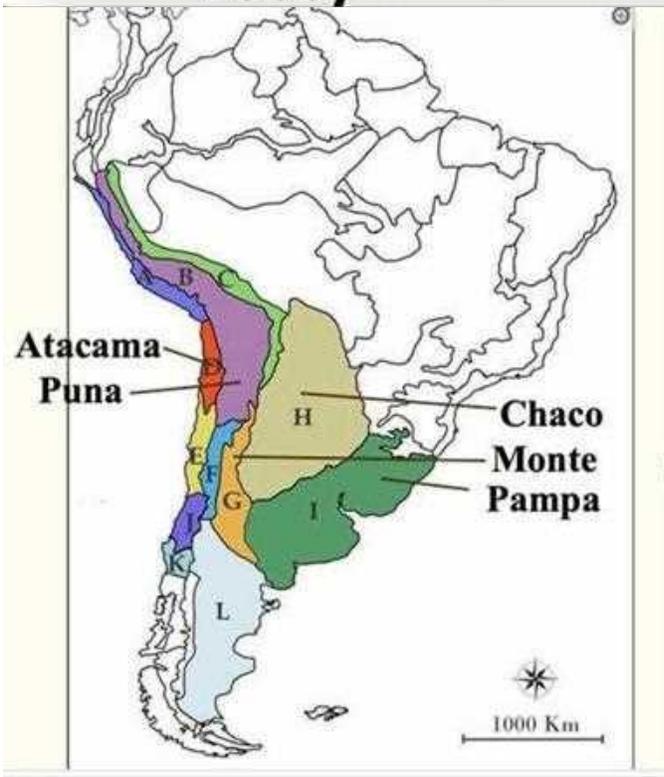
Bobby



Bobby



Billy







35. *Pediolagus salinicola* (Chacoan Mara).

We continued to be delighted with Lago Escondido and decided to spend several days there getting to understand the Dry Chaco and its a variety of biotic communities. And of course the afternoon swims helped keep Billy from getting the itch to move on.

In the evenings we watched the mammals come to drink from the lake. The most peculiar was *Pediolagus salinicola*, a caviomorph rodent that is convergent with North American Jackrabbits.

Campo, D. H., Caraballo, D. A., Cassini, G. H., Lucero, S. O., & Teta, P. (2020). Integrative taxonomy of extant maras supports the recognition of the genera *Pediolagus* and *Dolichotis* within the Dolichotinae (Rodentia, Caviidae). *Journal of Mammalogy*, 101(3), 817-83.



***Pediolagus salinicola* by Clayton Burne**



***Pediolagus salinicola* by cesar pizarro rios**



***Pediolagus salinicola* by Miguel Montenegro Avila**



Bobby

Billy



Linnaeus

Rafael





T

36, *Tropidurus etheridgei* (Etheridge's Lava Lizards).

We headed out our first real day of herping in the Dry Chaco, Billy, Von, and I following Rafe. We now fully recognized that the boy had a real talent for finding reptiles and also was a skilled stalker, nooser, and grabber with incredibly fast reflexes.

In the cool of the morning we walked the open desert and found many lizards basking and foraging on the ground, tree trunks, logs, and rocks. There were six species in all, belonging to four genera related to Lava Lizards.

"I wonder why there are no large species here of this iguanian group?" I pondered.

"That's easy. The large *Phymaturus* (South American Chuckwallas) and *Leiosaurus* (Smooth Iguanas) we saw in the Monte lived on massive boulders, and all we have here are a few small rocks with their Lava Lizards," Billy answered.

"Wow, Billybro, you always hit the nail right on the head."



***Tropidurus spinulosus* (Spiny Lava Lizard) by Gabriela Löwen**



***Stenocercus gallardoi* (Gallardo's Steppe Iguana) by Patricia Mancilla Iglesias**



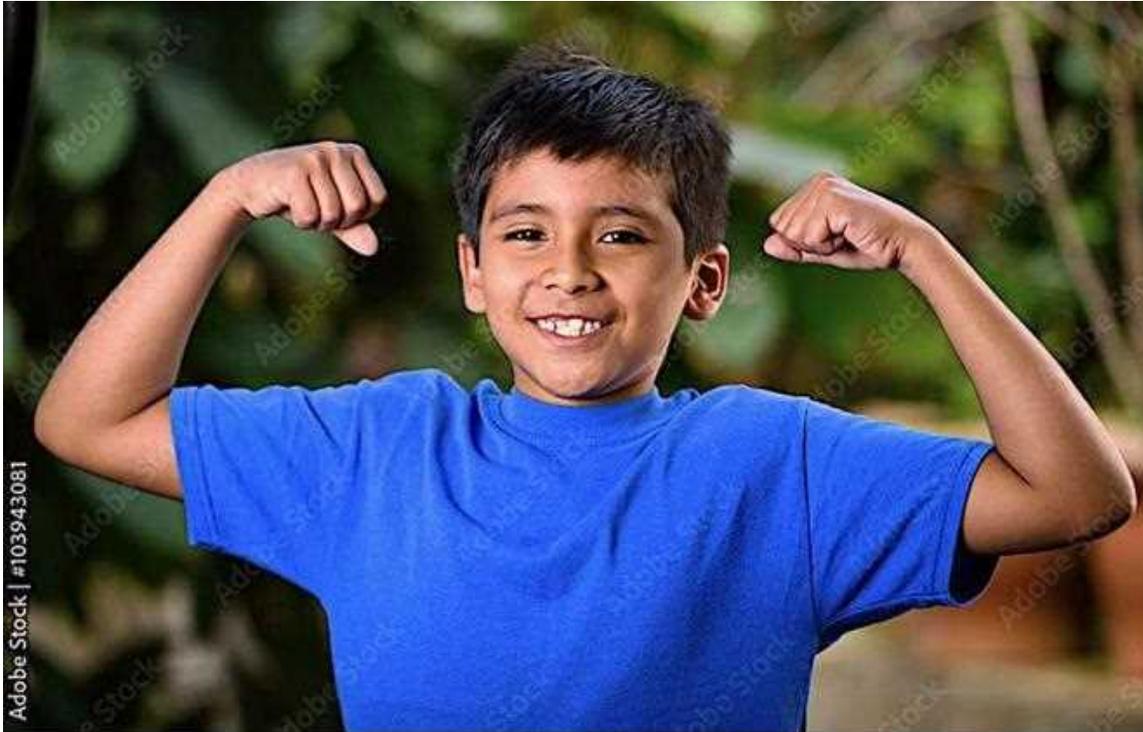
***Tropidurus etheridgei* (Etheridge's Lava Lizard) by Damián Ganime**



Liolaemus chacoensis (Chaco Smooth-throated Lizard) by Facundo Chieffo



Liolaemus wiegmanni (Eastern Smooth-throated Lizard) by Ignacio_hernandez



Rafael, Ace Herper



37. *Ameiva ameiva* (Giant Ameiva).

After our early morning walkabout turning up six species of iguanians, we figured we had pretty much seen the lizard diversity here near Lago Escondido. It was getting hotter than she-it and we began thinking about a dive in the lake. But we persisted in herping and the heat brought the teiid lizards sallying forth like

gangbusters. we were delighted to see four species including a Red Tegu preying on a bird.

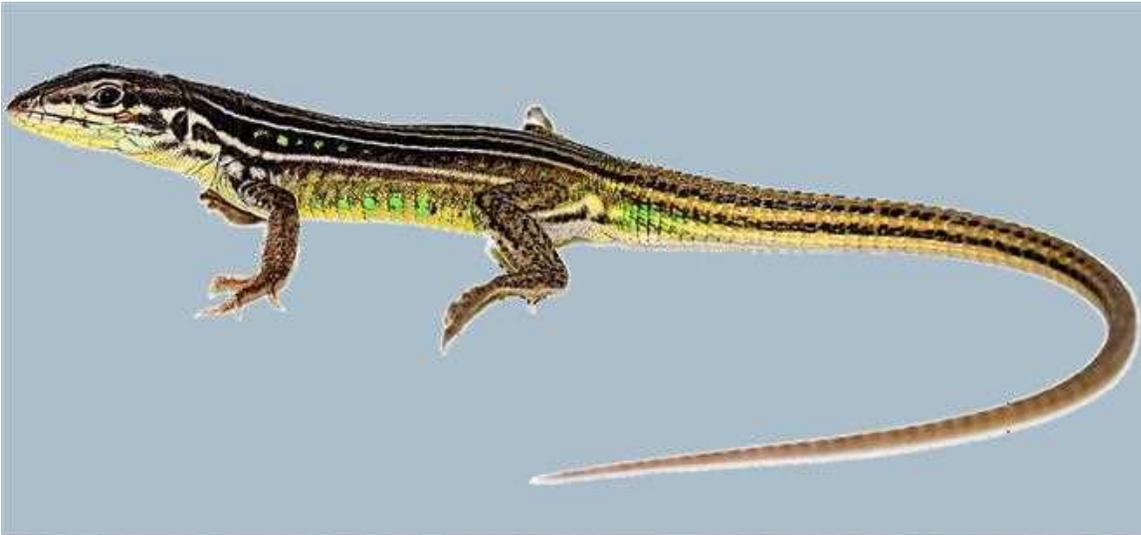
When we got back to the lake we found Billy had a surprise for us. He had rigged ropes from tree limbs to swing out into the lake. He had found a great way for us all to have fun together.



***Kentropyx viridistriga* (Green Kentropyx) by rinnyl**



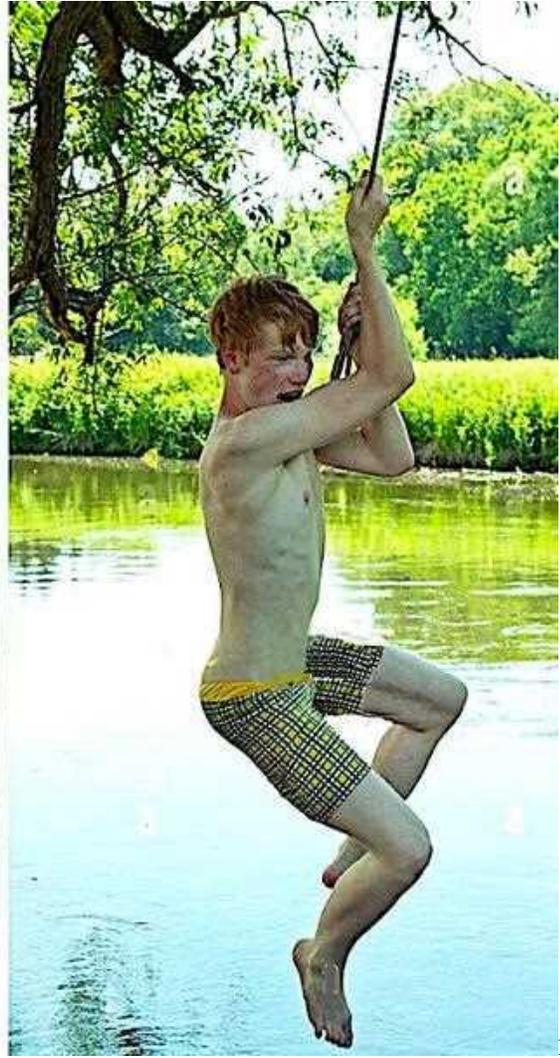
***Salvator rufescens* (Red Tegu) by Carlos David Ortega**



***Ameivula abalosi* (Spotted Whiptail Lizard) by Nicolás Pelegrin**



***Ameiva ameiva* (Giant Ameiva) by moisearthur**





muscles and we had a ball.

38 . *Catagonus wagneri* (Chacoan Peccary).

Billy woke up at dawn full of vim and vigor and sprung into action:

"O. K. bros, we are gunna do something other than only herpin today. Rafe wants to photograph mammals coming to the lagoon to drink and to do that we need blinds. I think it would be fun if we all could participate in his new interest and so lets construct four blinds along the edge of the mesquites, all with wide vistas of the shore of the lagoon.

"We want our blinds to be made of natural materials that blend into the landscape and that will disintegrate after we leave here. I like building things and will be in charge of the construction project. I have a small hand saw to cut the mesquite limbs. We can strip long fibers from the edges of the palm fronds that can be used to tie the mesquite limbs together to form the skeleton of the hut. The palm fronds can be tied to the skeleton with the palm threads to form the thatching of the roof.

I had never seen Billy so enthused before. I could plainly see he loved building things. He was also a good teacher and would gently show each of us how to select mesquite limbs of the right length and how to get the longest palm fiber strings for the ties. Billy selected a site for the blinds that was a very long way away from our water swings as the two activities were not compatible. He put each of us in charge of constructing our own blind.

By early afternoon we had the blinds built and Billy declared it was water rope time. And it was sure a lot of fun once again. Rafe climbed with his bare feet high up in the trees, swung far out over the water, and did a flip. At puesta del sol we took up our blind stations and were soon rewarded by the sight of several Chacoan Peccaries coming to drink and Rafe got lots of good photos of them.

I was shocked by their large heads and by how different they seemed from the Collared Peccaries I grew up with in the Sonoran Desert.

After mammal time we went on a little headlamp walkabout and found two species of geckos (*Homonota borellii*, Borelli's Marked Geckos, and *Homonota fasciata*, South American Marked Geckos).

Cacciali, P., Morando, M., Medina, C. D., Köhler, G., Motte, M., & Avila, L. J. (2017). Taxonomic analysis of Paraguayan samples of *Homonota fasciata* Duméril & Bibron (1836) with the revalidation of *Homonota horrida* Burmeister (1861)(Reptilia: Squamata: Phyllodactylidae) and the description of a new species. *PeerJ*, 5, e3523.

Gongora, J., & Moran, C. (2005). Nuclear and mitochondrial evolutionary analyses of Collared, White-lipped, and Chacoan peccaries (Tayassuidae). *Molecular phylogenetics*



***Homonota fasciata* by Toby Hibbitts**



***Homonota borellii* by Damián Ganime**



***Catagonus wagneri* by Allison F.**



***Catagonus wagneri* by Guillermo Menéndez**



***Catagonus wagneri* by Dimitry**



***Catagonus wagneri* by lillstugan**



39. *Epicrates alvarezi* (Argentine Rainbow Boa).

Billy's rope swings turned out to be a major turning point in our life. After we had exhausted ourselves having fun with them we had a four-bro deep talk. We were surprised that young Rafe led it off:

"You bros think I am you pet ace herper kid. But we kids do change and I want to start a project of my own. I like the mammals here in the Dry Chaco and would like to set up a blind and use the telephoto lens to capture images when they come to the lago to drink in the evening."

"You got it Rafe. And I can see you changing and growing in every way right before my very eyes."

Then Von spoke up:

"And I want to use the macro lens to get images of the flowers, fruits, and leaves of tall the plants of Lago Escondido. There is no definitive flora available for this whole region and I want to make developing a 'Gran Chaco Flora' website my 12th year capstone project."

"And I hope to produce a definitive website for the herpetofauna," I added.

Billy chimed in, "This is one of the reasons I set up the rope swings. My need to use my muscles to drive Cruiser is one of the reasons we keep moving constantly. Now that we all can have fun swinging into the lago, I can enjoy staying here a long time."

"O. K., gangbusters, I hear ya talkin loud and clear. Lets just settle down right here in this mesquite grove and set about doing a definitive work on the biota of Lago Escondido."

After the puesta del sol brotalk we all donned our head lamps.

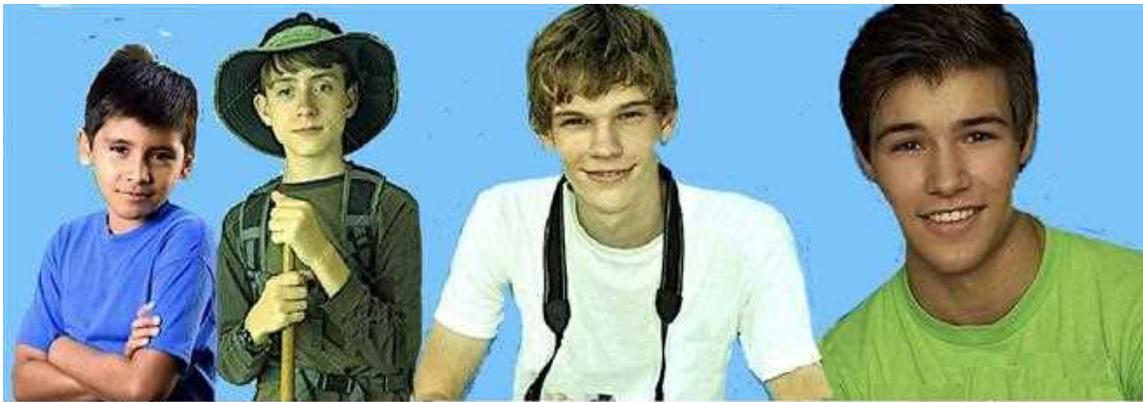
"Hot dog!! Rainbow Boa!!" Billy sang out.

Holy shit ' a magnificent *Epicrates alvarezi*!" I exclaimed.

We shared a wonderful four-bro hug.



***Epicrates alvarezii* by victorpardo**



Rafael

Linnaeus

Bobby

Billy



***Epicrates alvarezi* by Alfredo Sabaliauskas**



***Epicrates alvarezi* by Alfredo Sabaliauskas**

40. *Myrmecophaga tridactyla* (Giant Anteaters).

"O. K., bros, if we are gunna publish a website on the biota of Lago Escondido we'll have to shift gears and not just skim the easy-to-find species off the surface. We have seen 10 species of conspicuously active iguanian and teiid lizards. Herpin all day and all night can lead to rapid burn out. I propose we use our new more diverse activities to sustain our herpin to add to that list.

"Let's go flippin in the mesquite groove until it gits hotter'n she-it and then its water rope fun time, followed by mammal watching, and then a nocturnal walkabout," I proposed.

"And when you want a break from herpin you can help me get photos of the plants for the website," Linnaeus chimed in.

In the hot humid tropics flippin is not easy. But, with the water ropes as a reward we were able to do it all through the morning and into the early afternoon. As usual Rafe was the ace at identifying cover in the mesquite grove that was likely to yield a herp. With his intuition we managed to find two species of tiny gymnophthalmids, *Vanzosaura rubricauda* (Red-tailed Lizards) and *Cercosaura schreibersi* (Schreibers' Lizards).

"Wow, it is mindboggling to think these tiny lizards are members of the clade that is the nearest relative of the Teiidae containing the huge Tegu," I remarked.

"Last one in is a rotten egg," Billy yelled as we peeled off our sweat-soaked shirts and swung out into the cool refreshing water of Lago Escondido.

That evening in the blinds we were treated to a most exciting view as Giant Anteaters came to drink.

"Wow, together with armadillos and tree sloths these are members of Xenarthra, an ancient mammal clade with modified joints for digging and climbing," I announced.

We were about to give up finding any additional species on our nocturnal walkabout when Linnaeus almost stepped on a *Crotalus durissus* (Neotropical Rattlesnake) coiled next to a log.

Delsuc, F., Cteflis, F. M., Stanhope, M. J., & Douzery, E. J. (2001). The evolution of armadillos, anteaters and sloths depicted by nuclear and mitochondrial phylogenies: implications for the status of the enigmatic fossil Eurotamandua. *Proceedings of the Royal Society of London. Series B: Biological Sciences*, 268(1476), 1605-1615.

Adrian Quijada-Mascareñas, J., Ferguson, J. E., Pook, C. E., Salomao, M. D. G., Thorpe, R. S., & Wüster, W. (2007). Phylogeographic patterns of trans-Amazonian vicariants and Amazonian biogeography: the Neotropical rattlesnake (*Crotalus durissus* complex) as an example. *Journal of biogeography*, 34(8), 1296-1312.



***Vanzosaura rubricauda* by Jose Luis Navarro**



***Vanzosaura rubricauda* by Mina Zaki**



***Cercosaura schreibersi* by arazizamia**



***Cercosaura schreibersi* by vinicius_s_domingues**



***Crotalus durissus* by Alexandre Curcino**



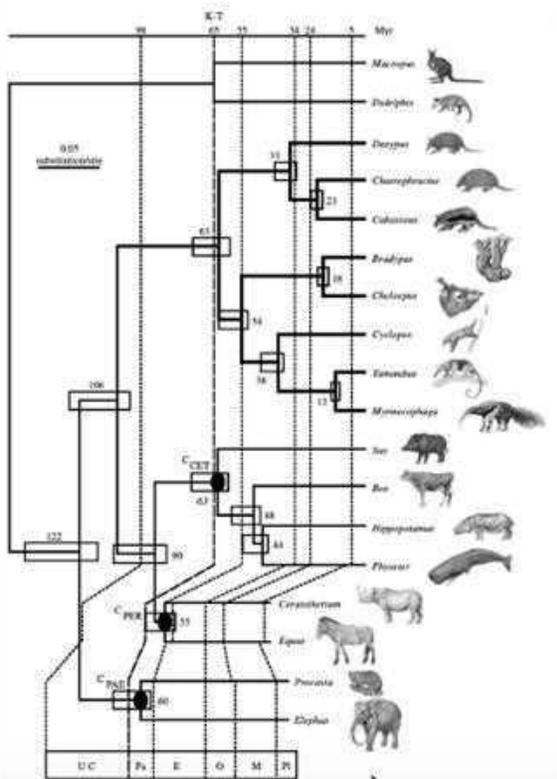
***Myrmecophaga tridactyla* by Melissa Alzate-Gaviria**



***Myrmecophaga tridactyla* by Lawrence Rabelo de Almeida**



***Myrmecophaga tridactyla* by Dudley Zoo**



From Delsuc et al. (2001)

41. *Lama guanicoe* (Guanacos).

We had concluded that Lago Escondido was uninhabited until Carlito came wandering into camp one morning. He said he was on his way to "El Centro," wherever that was.

Rafe swung into action and chatted with Carlito for a long while.

"I can't quite figure it out. It sounds like perhaps a mission or something. Carlito keeps mentioning 'las mujeres' and I suppose they could be some sort of missionary nuns. He says we can walk with him there, if we want. Lesgo bros and see what this is all about," Rafe enthused.

It was a three hour walk with Carlito to "El Centro." When we saw the structure we were even more puzzled as it had very strange architecture. We followed Carlito inside where we met Abril and Camila. They turned out to be antropólogas from the Universidad Nacional de Cordoba working with indigenous people in the Gran Chaco.

They both had very charismatic personalities and swept us away. Camila carried forth in a hyper-animated grand style:

"Here in Argentina we have less than 3% of the population that self identify as indigenous, and this tiny remanent of human culture is in grave danger of disappearing from the face of the Earth forever. Language is thought to be the great preserver of culture, but that hypothesis is seldom directly tested.

"We are studying the effect of the retention of the Qom's Guaicuruan language, called 'qom l'aqtaqa,' on the persistence of various elements of their culture. Almost all Toba Qom today are bilingual, but they differ extensively in their levels of usage of their original native language, particularly at home. Our data largely support the hypothesis that language retention is the most critical element in survival of the culture."

Abril introduced us to some of the Qom. She was interested in plants as well as anthropology. I could see she took to Linnaeus in a major way and the two were soon completely off in a botanical world of their own. Hours later Von announced that he and Abril were going to conduct an ethnobotanical research project.

"The subject of ethnobotany is extensively studied in places like Amazonia, but virtually nothing is known about it in less isolated cultures like that of the Qom here in the Gran Chaco. Since we already have extensive data on language usage and culture retention, it would be perfectly feasible to examine their knowledge of particular plants at the same time," Abril proposed.

We could plainly see that Abril was enamored with Linnaeus and the two worked very close together as they interviewed the Qom about their knowledge of plants. But we could also see that one particular Qom, Juan Daniel, was of most interest to Von.

Abril and Camila were disappointed that we did not want to spend the night at "El Cento" and preferred to return to our camp. Abril seemed particularly crestfallen that Von invited Juan Daniel to come spend the night with us.

We arrived back at cruiser in time for a late afternoon water rope time. Juan Daniel turned out to be quite a gymnast and we all liked looking at him doing acrobatic flips into the lago.

When we went into the blinds, Juan Daniel was very happy to share Linnaeus'. Soon we were delighted by the sight of several Guanacos arriving to drink. They were clearly more heavy-bodied and less delicate than the little Vicuñas we had seen in the Monte.

Juan Daniel felt we were missing a big part of the herpetofauna, the frogs and toads. He led us to some ponds near the lago and we were pleasantly surprised by the large, diverse, raucous chorus. We slogged through the mud photographing anurans for many hours and found an astounding 15 species in five families breeding in the ponds.



"El Centro"



***Ceratophrys cranwelli* (Cranwell's Horned Frog) by tille**



***Elachistocleis bicolor* (Two-colored Oval Frog) by Alfredo Sabaliauskas**



***Phyllomedusa sauvagii* (Waxy Monkey Treefrog) by Josh Vandermeulen**



***Lama guanicoe* by Ezequiel Racker**



***Lama guanicoe* by Alan Nicolas Berniger Lacoste**



***Lama guanicoe* by María Belén Serra**



Carlito



Juan Daniel

Linnaeus

***.42. Ophiodes intermedius* (Silver-lined Worm Lizard)..**

Von's core being was wrapped up in botany and he headed back to El Cento looking forward to gathering more data with Abril.

She was really glad to have Von back and they began in earnest interviewing many more Qom. Linnaeus took each participant outside to show them particular plants and asked a few standardized questions about each species.

Abril and Linnaeus tabulated and analyzed their data. Not surprisingly older participants had more knowledge of plants than youths, and females knew more than males. But otherwise botanical knowledge was not correlated with other measures of language and cultural retention.

From the research project Linnaeus concluded he did not enjoy ethnobotany as much as plant biogeography. Abril invited him to spend the night, but he gently declined, and walked alone back to the Cruiser and gave Billy, Rafael, and me a big hug.

While Linnaeus was at El Centro we flipped like maniacs and were thrilled to find lizards of two families we had not previously photographed at Lago Escondido: a scincid, *Mabuya frenata* (Cope's Mabuya) and an anguid, *Ophiodes intermedius* that looked like a combination of *Anniella* (North American Legless Lizards) and *Anniella* (Glass Lizards).

As we headed out for water rope time, Billy announced, "Bobbybro, you are the only one who has not done any flips. I am gunna teach you once and for all how to be more physical," he declared.

And after a lot of encouragement and physical help I got the knack of it. And the best part was the hug Billybro gave me after my first flip.

At mammal time in the blinds we were absolutely thrilled to see a Maned Wolf (*Chrysocyon brachyurus*) the largest South American carnivore. It looks like a long-legged cross between a wolf and a fox, but DNA evidence indicates it is not closely related to either.

On our nocturnal walkabout Linnaeus turned up a beautiful *Micrurus pyrrhocryptus* and I gave him another "welcome back hug."

Coelho, L., Romero, D., Queirolo, D., & Guerrero, J. C. (2018). Understanding factors affecting the distribution of the maned wolf (*Chrysocyon brachyurus*) in South America: spatial dynamics and environmental drivers. *Mammalian Biology*, 92, 54-61.

da Silva Jr, N. J., & Sites Jr, J. W. (2001). Phylogeny of South American triad coral snakes (Elapidae: *Micrurus*) based on molecular characters. *Herpetologica*, 1-22.

González, S., Cosse, M., del Rosario Franco, M., Emmons, L., Vynne, C., Duarte, J. M. B., ... & Maldonado, J. E. (2015). Population structure of mtDNA variation due to Pleistocene fluctuations in the South American maned wolf (*Chrysocyon brachyurus*, Illiger, 1815): management units for conservation. *Journal of Heredity*,

106(S1), 459-468.



***Ophiodes intermedius* by Samuel_luka_valverde_alanes**



***Ophiodes intermedius* by Hugo Hulsberg**



***Micrurus pyrrhocryptus* by Damián Ganime**



***Ohiodes intermedius* by Samuel Luka Valverde Alanes**



***Chrysocyon brachyurus* by Bruno Rennó**

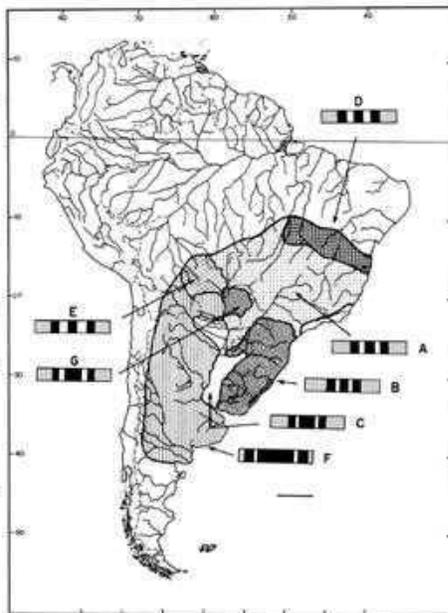


FIG. 1.—Generalized distribution of *Miranorhina fossilis* complex, with other patterns (gray shading = null; “diagonal” the following recognized taxa: A. *Miranorhina f. fossilis*; B. *Miranorhina f. albivittata*; C. *Miranorhina f. subangulata*; D. *Miranorhina fossilis*; E. *Miranorhina f. diana*; F. *Miranorhina p. pygmaeorhina*; G. *Miranorhina p. tricolor*).

From da Silva and Sites (2001)



Linnaeus

Abril



Some of the participants in the ethnobotany research project

43. *Chelonoidis chilensis* (Chaco Tortoise).

We had become quite attached to Lago Escondido, but we all felt it was time to move on. Before we headed to the Wet Chaco I wanted to explore the herpetofauna

at a Dry Chaco locality that lies farther south that might have more austral temperate species.

Tien Wei had recommended a site in the southern Dry Chaco and we headed for it. Intrepid driver Billybro got us to a very remote pond and we set up camp with mammal blinds and a rope water swing. I really liked this region and came to realize that I prefer the temperate edge of the tropics.

On arrival we were greeted by a *Chelonoidis chilensis* and later were totally blown away by the strangest mammal we ever saw *Chlamyphorus truncatus* (Pink Fairy Armadillo).



***Chelonoidis chilensis* by Hugo Hulsberg**



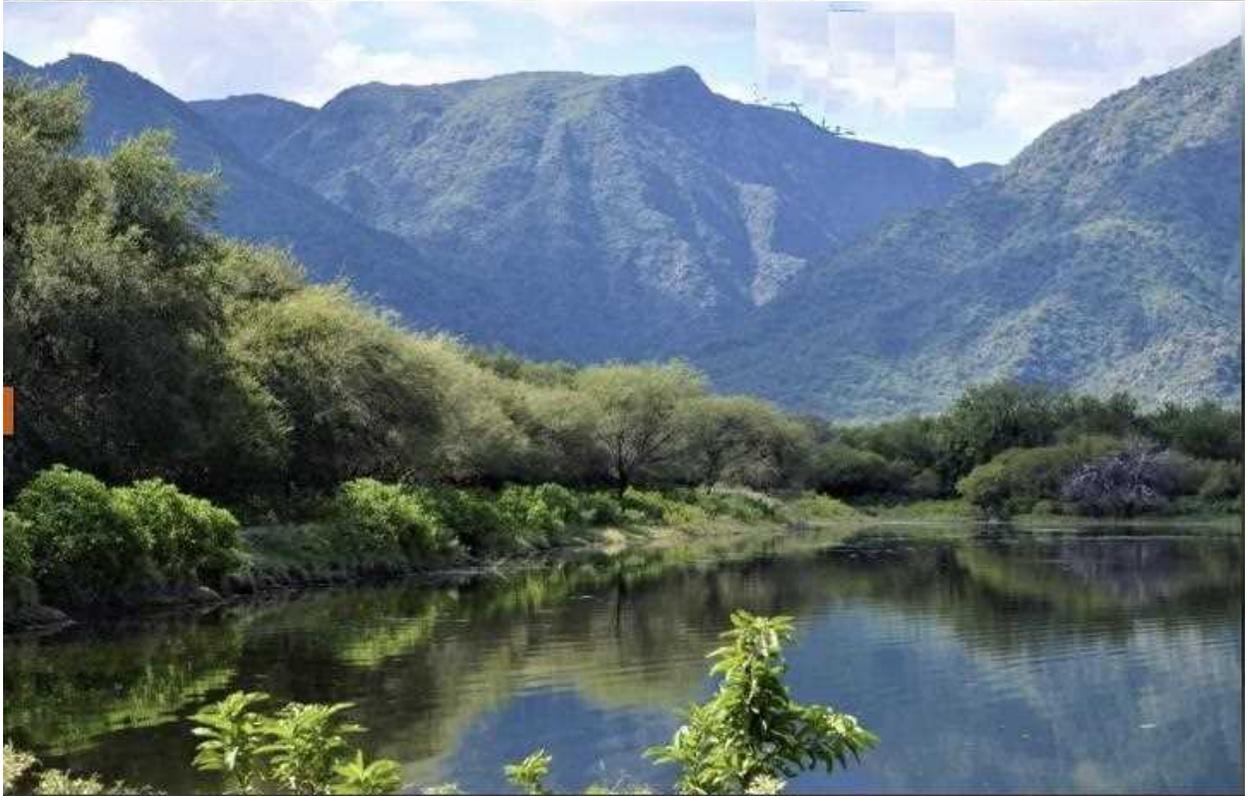
***Chelonoidis chilensis* by Hugo Hulsberg**



***Chlamyphorus truncatus* by Mariella Superina**



***Chlamyphorus truncatus* by Mariella Superina**



44. *Bothrops diporus* (Painted Lancehead).

At dawn two boys came wandering into camp. That is always a big plus for us because kids are by far the best herpers and we enjoy their boundless enthusiasm. Feliz and Chulo were no exception. They were an absolute delight and knew the area and the reptiles well.

They first led us to their favorite Lagartija Colorada (Red Tegu, *Salvator rufescens*). The huge reptile seemed to recognize the boys and Feliz picked a fruit from a bush and fed it to the lizard and then gently picked the Tegu up.

The day warmed and the Choco Whiptails (*Contomastix serrana*) came out like gangbusters. Among all the striped lizards one seemed to have larger keeled scales. It turned out not to be a whiptail at all but a Graceful Iguana (*Liolaemus gracilis*).

"Last one in is a rotten egg," Billy called out. We were very happy that the boys joined in our water fun and were quite good on the ropes.

At puesta del sol we went in the blinds and were soon rewarded by the sight of a Three-banded Armadillo (*Tolypeutes matacus*) coming to the pond to drink.

Feliz and Chulo went with us on our night walkabout and showed us a magnificent *Bothrops diporus* (Painted Lancehead).



***Salvator rufescens* by Holger Braun**





***Liolaemus gracilis* by Hugo Hulsberg**



***Contomastix serrana* by a_f_r**



***Leiosaurus paronae* by ssmuel222**



***Tolypeutes matacus* by cesar pizarro rios**



Feliz

Chulo

45. *Oxyrhopus rhombifer* (Amazon False Coralsnake).

With the help of Feliz and Chulo we were able to find many species and get an understanding of the herpetofauna here in the southern dry Chaco. The fauna was quite similar to that at Lago Escondido in the northern dry Chaco, and there were no species that we could clearly identify as being “Austral Temperate.” The reptiles here in the south that were not present in the north were Monte species not Austral Temperate. I came to fully appreciate that as one proceeds southward toward Tierra del Fuego, the Monte biota reaches the Atlantic due to the rapid tapering of the continent.

Chulo really liked our nocturnal walkabouts with the headlamps and was an ace snake finder. We with his keen eyes we found five species of snakes in one night: *Boiruna maculata* (Mussurna), *Xenodon pulcher* (Banded Hognose Snake), *Pimophis vittatus* (Banded Pampas Snake), *Oxyrhopus rhombifer* (Amazon False Coralsnake), and *Adelpostigma occipitalis* (Spotted Ground Snake).

The next morning Chulo asked if his sister Selena and her friend Xolo could visit and play with us on the rope swings. Selena and Xolo arrived without the boys in late afternoon, stripped, and swung on the ropes out into the water. Billy and I found their well-appointed bodies were very sweet eye candy.



Adelphostigma occipitalis by marcosdantasvs



Boiruna maculata by Jake Scott



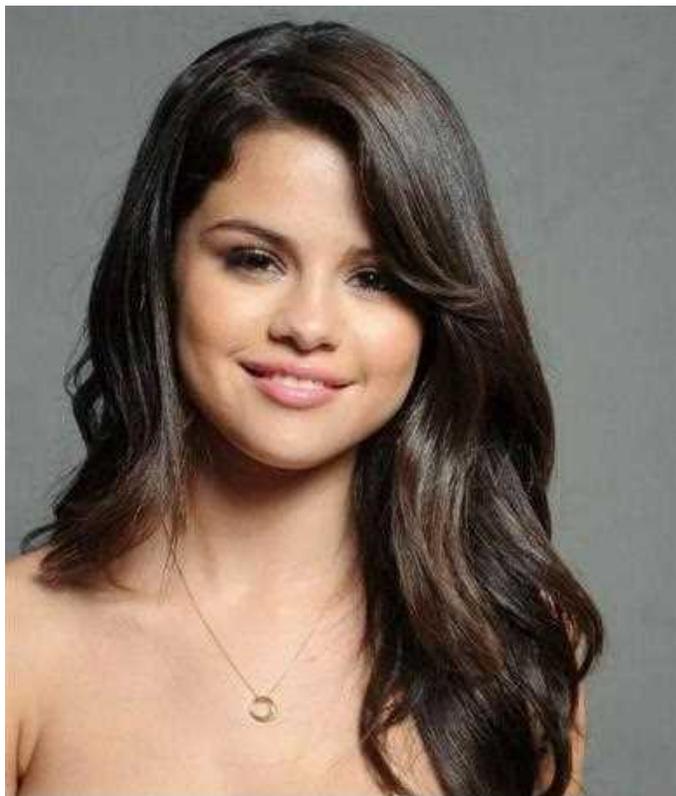
Pimophis vittatus by Toby Hibbitts



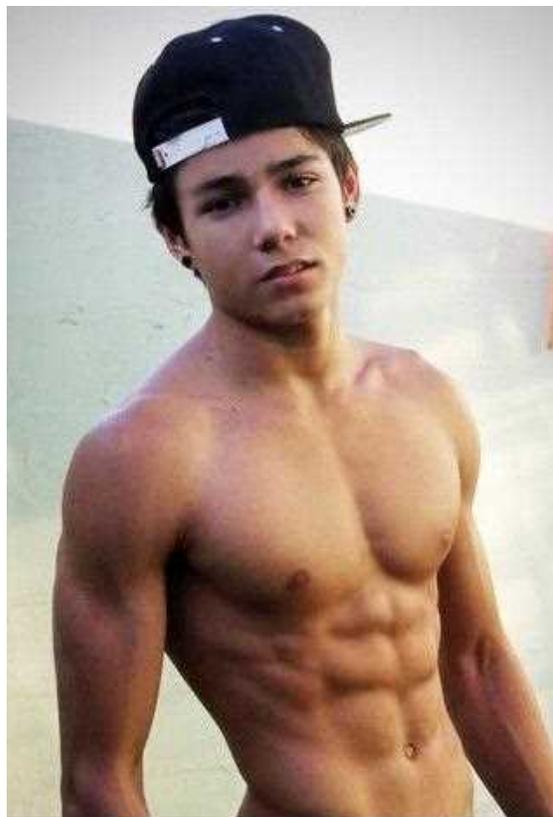
***Bothrops diporus* by Leandro Bareiro Guiñazú**



Oxyrhopus rhombifer by ssmuel 2222



Selena



Xolo

46. *Tapirus terrestris* (Lowland Tapir).

The sudden transition from the semi-arid Dry Chaco to the tropical Gran Chaco was totally shocking to Billy and me. The vegetation was so impenetrable we had trouble exploring the forest. And the vines sprawled over everything making it impossible to flip logs and other cover, and the mosquitos were having an absolute feast.

“There is only one solution for this and its called H two O and we stripped and dove in. That cool water soothed our mosquito bites and put us both in a much better mood.

“Let’s swim across the lake,” Billy proposed.

“I do not think I can swim that far.”

“Ah, come on, Bro. give it your best try and I will give you a hug half way across.”

“You got it, Billy, that is a reward you know I can’t resist.”

And the Lake Bonito midway hug from Billy was most memorable. On the far shore we hauled our weary bodies on to land and sat arm in arm for a long bro time.

We were shocked when a gal in boots and field clothes walked up. We were a bit shy about being naked.

“Not to worry, dudes, we swim here in the buff all the time.

Mo had an outgoing charismatic personality and was obviously a physical type and she appealed to us both. She stripped and dove in and we joined her in the cool refreshing water. She was a wildlife biologist studying the large mammals of the Gran Chaco. In extremely enthusiastic animated style she described her research on Tapirs, Armadillos, and Jaguars.

Eventually her student volunteers arrived, stripped, and dove in to join us. Mo invited us to join her and the students in their research that night.

“But we have no clothes,” I replied.

“We are clothes-optional researchers and I can lend you rubber boots, that is all you need really.”

And it turned out to be a most memorable all-nighter. They had camera traps set up all over in the forest and a pair of students was assigned to check each and record if the image of a large mammal had been captured.

Juan Daniel and Zoomer came galloping back and announced there were a group of Tapirs at their camera. We all went running off to their blind and were thrilled by the sight of the huge Lowland Tapirs (*Tapirus terrestris*).



Lowland Tapir (*Tapirus terrestris*)



Lowland Tapir (*Tapirus terrestris*)



Mo



Adobe Stock | 7885996444

Lucia

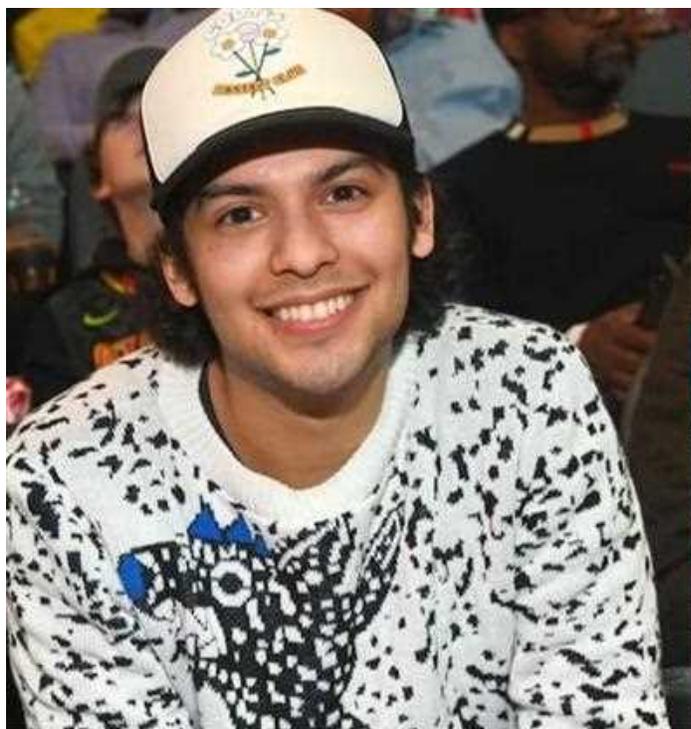
Olivia



Juan Daniel



Zoomer



Xolo



Marino



Omar



Donatello

**Zorion****Giotto****Juanito****Zander**

49. *Boa constrictor.*

Mo announced that it was time to visit the people.

“Watcha mean. We are the only humans for hundreds of kilometers around here. Who are you gunna visit?” Billy inquired.

“Well you do not see them, but this whole region is inhabited by the Ayoreo people who have lived and hunted in the Chaco for thousands of years,” Mo explained.

“My mission is to conserve this part of the Chaco for these indigenous people and their biota.”

It was a several hours walk to the Ayoreo village. Of course Billy wanted to walk at a fast pace to keep up with the more physical teens. Rafael was quite happy sauntering along with me. He wanted to bro talk about his personal problems as he

intuited I had walked the walk. He was very attached Omar and his feelings were reciprocated to some degree, but not as much as he would like. Æ

We had a deep talk about bro relationships and about how physical and emotional attractions are closely linked in some people but not at all in others. I was really touched that the youth trusted me to confide his intimate feelings/

When we reached the Ayoreo village I was impressed by the uniqueness of the people and their culture. Mo was totally fluent in their Zamucoan language and they considered her to be one of them. She sat on the ground in the shade of a giant Ciba tree and soon all the adults joined her for a meeting. I of course could not follow the conversation but later Mo filled Billy and me in about the meeting.

Mo had been working with private and governmental agencies in Paraguay to try to halt the invasion of Mennonites into Ayoreo land. It had been a most difficult task but she had made substantial progress and she discussed how she had successfully linked the fate of the Ayoreo with that of the Chaco endangered large mammals with Paraguay governmental powers. The World Wildlife Fund people were now aboard also.

What was totally shocking to me is that several of the students were connecting with the people in a completely different way. They felt that the path forward for the Ayoreo lay not exclusively with the wildlife but also with art. The students introduced Billy and me to Adán who was home for a holiday from UNA (Universidad Nacional de Asunción) where he was majoring in anthropology and art.

Adan explained that his people had a tradition in art and weaving but it had become nearly extinct and he was trying to revitalize it. One their themes in the art was symmetrical designs. He constructed mandalas on the computer at UNA and printed them out for the kids to paint.

The other artistic tradition among the Ayoreo was weaving with the fibers of *Bromelia hieronymi*, the Dajudie plant. Adan was working with the women to incorporate the mandala-like designs into their weaving. The items they wove were selling for very high prices in Asuncion.

Billy noticed a boy holding a large Boa constrictor and with the help of Mo he asked the kid about the snake. Evan said it was his pet that he had caught at “Escondido” deep in the forest. Billy and Mo asked the people about Escondido.

The men knew it well as they visited it on hunting walkabouts and they reported it had many snakes and Tigres.

That did it. The idea of a hidden place with a good population of *Panthera onca* (Tigres or Jaguars) got Mo's juices flowing. She asked if we could go there and the men said that Rudy could lead us there tomorrow.



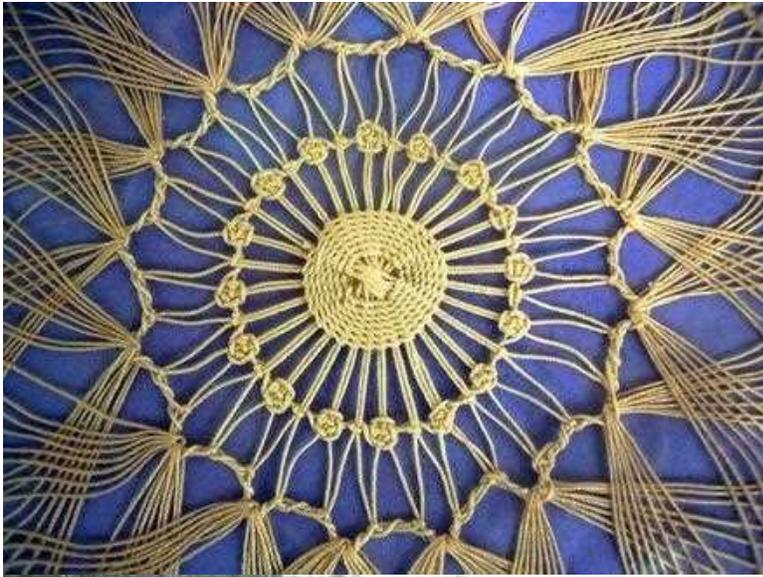
***Boa constrictor* by machadomichel**



Evan with *Boa constrictor*



Mo























50 . *Drymarchon corais* (Yellow-tailed Indigo Snake).

At dawn we all were really excited as Rudy led us away out the village into the forest. Escondido was much deeper into the forest than the students or even Mo had ever been. I was delighted that Rafael continued to walk with me while the others zoomed ahead. I had become his “big bro” and this was a role I had never played with a youth before. I suddenly saw the parallels between my being emotionally admired by this youth and Billy’s addiction to others admiring his body.

Mo and Rudy were enjoying being the pack leaders. They were both physically very fit and set a fast pace to give the youths a workout. She took the opportunity to talk with the students about the concept of “personal best” challenges rather than physical competition with others and she was happy they heard her loud and clear.

I could see that Mo and Rudy were physically attracted to one another and I liked looking at them as much as they liked displaying their muscular bodies. They zoomed ahead of even the most fit students and would lay down in the rocks to

wait for the rest of us to catch up. They had come upon a large Yellow-tailed Indigo Snake (*Drymarchon corais*) that Mo was able to run down and catch. Mo let me hold the snake for a while.

By puesta del sol we reached Rio Escondido. Rudy said we should camp very quietly and without lights or fire so as not to frighten away the tigras. He seemed pleased that Mo sat close to him when Billy and I were sharing bro time.

Shortly after dark we heard it. The snarling and screaming of the jaguar was truly awe-inspiring and I realized why these cats were feared. Rudy spotted the mother and her cubs coming down to the river to drink. Mo got out her night vision scope and we were all thrilled to see these magnificent cats. Mo gave Rudy a big hug and I could see he found that as thrilling as she did the jaguars.



***Drymarchon corais* by John Sullivan**



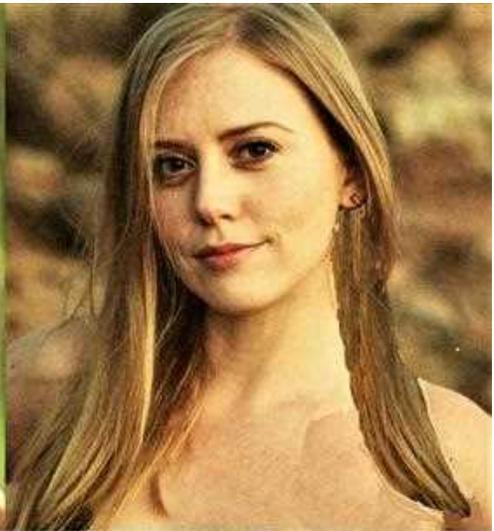
Bobby with *Dymarchon corais*



Mo with *Drymarchon* ———



Rudy



Mo



Panthera onca

51 . *Epicrates alvarezi* (Argentina Rainbow Boa).

Mo and Rudy began to talk more seriously about the future of his people. They were beginning to envision an Ayoreo conservation and arts center with tourist guests and guided walks into the forest. Mo was quite knowledgeable about ecotourism and could see the possibilities.

“There are many people out there with plenty of money who are looking for adventure. After their little overly constrained tour in the Amazon, they begin to wonder whether there is any real adventure left in the world. Here in the Gran Chaco we have the largest tropical forest in this hemisphere outside the Amazon, complete with tigers and many other endangered species. We can invite wealthy adventure-seeking tourists to judiciously experience it for a high price. And the Ayoreo fiber art will be a unique part of the experience and that could be coordinated by Adan.”

Rudy mentioned there are also the large snakes and Mo called Billy and me over to help evaluate the situation. From his description we concluded the large snakes were not Boa Constrictors but Anacondas. He said there was a pantano down river where the large snakes lived together with cocodrilos. That perked Mo’s interest because *Caiman latirostris* (Broad-snouted Caiman) was one of the species she was working with the “powers” to conserve.

Mo and Rudy decided we should walk down river to the pantano to see the Anacondas and Cocodrilos. The students were excited as this was the Gran Chaco wilderness adventure that they had dreamed of when they originally volunteered with Mo but they were yet to experience. We all were very excited to set out to reach and explore El Pantano de Rodolfo.

Rudy had hunted in this area and from Escondido he had reached the pantano in a day by following the river downstream, but he and the other hunters were of course very fit. He recognized that some of us would not be able to keep up that pace and he estimated we could get there in two days.

At dawn Mo and Rudy led the way, stopping every three hours to rest and to allow me and some slow students to catch up. There was no trail, but Rudy was very proficient with the machete and his muscular body seemed never to tire. I was happy that Rafael continued to walk with me and I liked chatting with him about all manner of things.

At puesta del sol we stopped for the night. No one used any lights and we were thrilled to again hear the growling of the tigers. Mo and Rudy joined Billy and me for bro time. Mo was really excited to see some rare monkeys, Pale Titis (*Plecturocebus pallescens*), and Billy and I found a beautiful Argentina Rainbow Boa (*Epicrates alvarezi*).



***Epicrates alvarezi* by Alfredo Sabaliauskas**

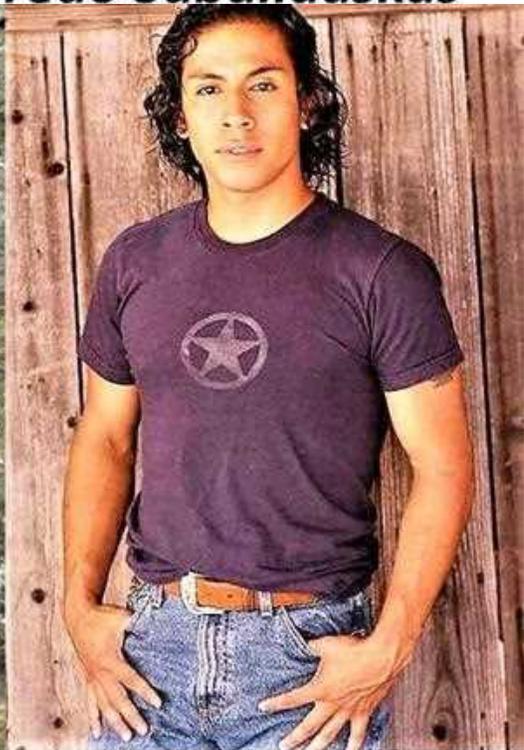
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Epicrates alvarezi by Alfredo Sabaliauskas



Mo



Rudy



Plecturocebus pallescens



Plecturocebus pallescens

52. *Eunectes notaeus* (Yellow Anaconda)

Mo announced, "Rise and shine all you herpers, today is the day that your Anaconda is gunna come. I have been consulting with Rudy and he knows big snakes. There is a back bay a short distance away where the Anacondas hang out. We will form a human chain across the opening of the bay and will baby step in our bare feet into the bay. When you feel a large snake under your feet, reach down and grab it and for she-it sake don't let go."

We were all excited more than I can explain to members of the human species who do not herp. When we were forming the chain I carefully chose my position with Rudy on my left and Billy on my right. I had the physical contacts that make me feel secure and happy.

We proceeded very slowly, baby step by baby step. About half way up the bay my feet felt it, huge, muscular, and scaly.

“Well, it’s now or never Bobby to prove you are a real herpetologist. I sank down to my feet and grabbed the powerful Anaconda. It bit the she-it out of my arm but I held on for dear life. As I emerged from the water with the huge Yellow Anaconda (*Eunectes notaeus*) Rudy and Billybro gave me rib-crushing hugs and I was in absolute ecstasy.





53. *Bothrops alternatus* (Urutu Lancehead).

Mo took out the first-aid kit from her large back pack and swung into action.

“There are several Anaconda teeth broken off and lodged deep in Bobby’s arm. I will have to cut them out so they don’t fester. Zorion, you have a bit of medical training, and I would like you to serve as my assistant during the surgery.

“Billy, you and Rudy are in charge of the photo shoot. You two have the muscles to control the Anaconda and hold its head so no one else gets bitten.”

Mo gave me an injection of a strong analgesic and that helped enormously to ease my pain. I gazed up into her beautiful eyes as it took affect. I also liked looking into Zorion’s very hypnotic eyes and he seemed to reciprocate my feelings and gave me one of his rare smiles.

Mo injected lidocaine around each of the embedded teeth before cutting them out. She seemed to enjoy being a surgeon and barking out her equipment requests to Zorion who happily handed her the scalpel, syringe, disinfectant and other items. For my part I liked being a herp patient wounded while capturing the largest snake I had ever seen. And I thoroughly enjoyed being cared for by both Mo and Zorion.

One of the teeth was so deeply imbedded that Mo had to do a fair amount of cutting to extract it and then suture the incision. After Mo and Zorion had stitched me back up I drifted off to sleep.

Mo consulted with Rudy and the two of them decided we would stay at his pantano for a few days while I recovered. It was a magnificent wetland teeming with wildlife and we needed some time to appreciate it.

Rudy and Mo stripped and dove into the water. Billy and Zorion wandered off to herp and were delighted to find a beautiful Urutu Lancehead (*Bothrops alternatus*). Even without my presence to encourage him, Billy did not give in to his danger-seeking addiction and managed to resist doing a tail grab to show off to young impressionable Zorion.



Eunectes notaeus

Rudy

Billy



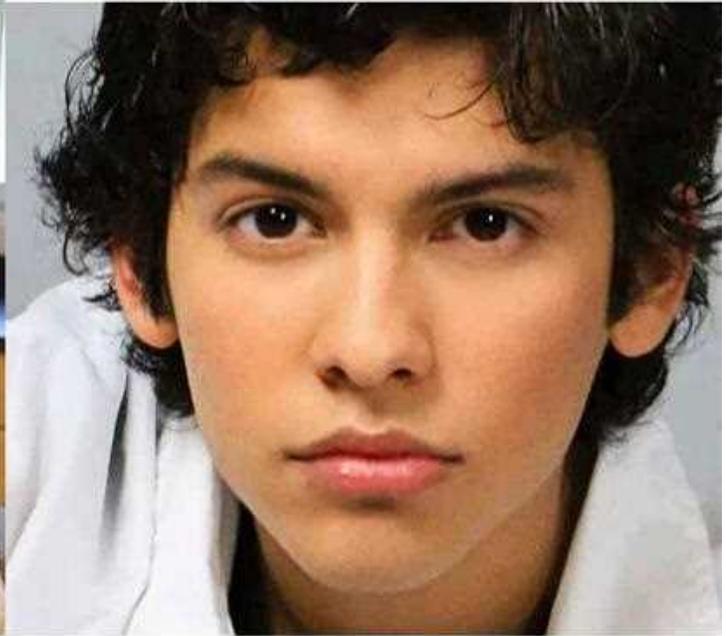
Bothrops alternatus by Carlene Gomes



***Bothrops alternatus* by Eduardo Medina**



Mo



Zorion





54. *Micrurus pyrrhocryptus* (Argentina Coralsnake).

Our days at Pantano de Rodolfo were idyllic and Mo, Rudy, Billy and the students spent most of the day in the water. Rudy showed them how to make a spear and get fish. At midday they roasted the fish and the added protein was helping me recover.

We had a campfire at noon for grilling the fish but otherwise we had no lights that might scare the mammals. And the diversity of the mammal fauna was absolutely incredible. We observed seven mammal species coming to the pantano to drink.

Mo wanted to see the cocodrilos as *Caiman latirostris* was of conservation interest. Rudy said they lived in a bay on the other side of the pantano and we could swim there tomorrow. I was not sure I had recovered enough to make it all the way across the large expanse of water. Billy said he and Rudy could carry me part way if needed. That was just what a guy like me loves to hear.

Orion was serious type, the opposite of Billy in personality, but he was learning to lighten up. The two had become close herping bros and I was thrilled when they showed me a beautiful Argentine Coralsnake (*Micrurus pyrrhocryptis*).



***Myrmecophaga tridactyla* (Giant Anteater)**



© Michel Gunther / Biosphoto

***Cabassous chacoensis* (Chaco Naked-tailed Armadillo)**



***Hydrochoerus hydrochaeri* (Capybara)**



***Blastocerus dichotomus* (Marsh Deer)**



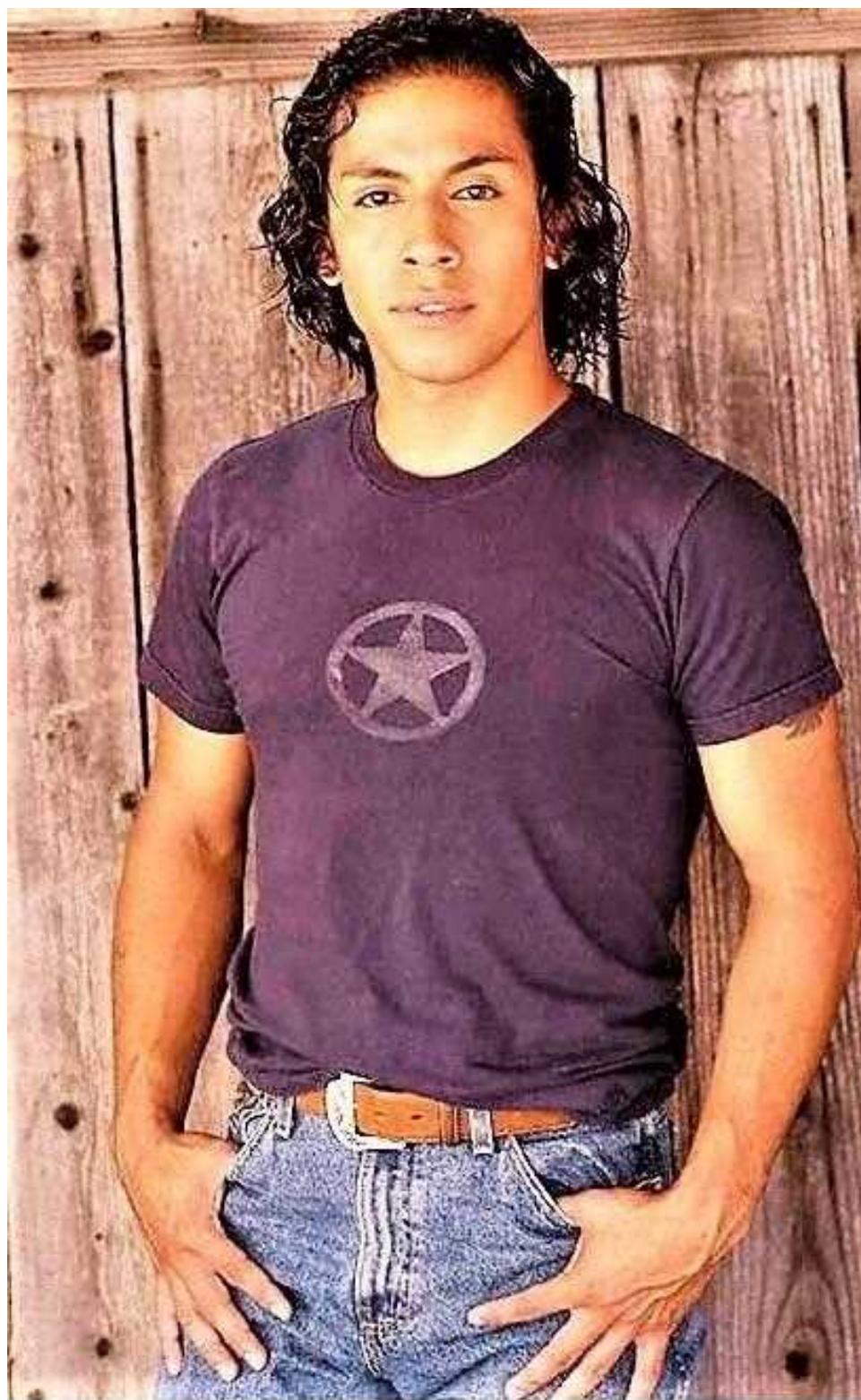
***Micrurus pyrrhocryptus* by tille**



***Catagonus wagneri* (Chaco Peccary)**



***Pteronura brasiliensis* (Giant River Otter)**



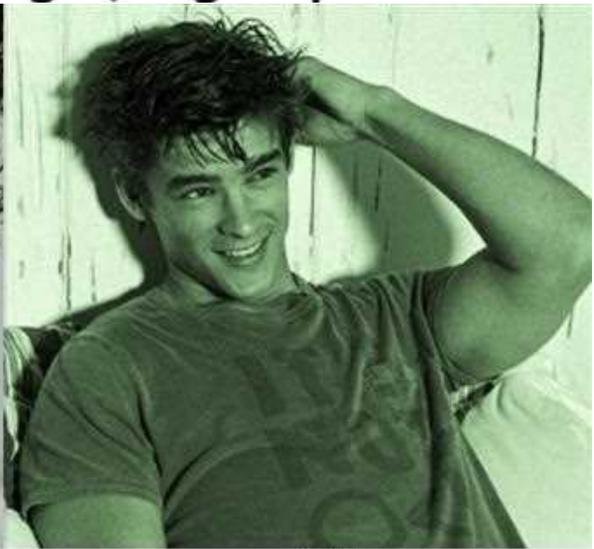
Rudy



***Panthera onca* (Tigre, Jaguar)**



Zorion



Billy

55. *Caiman latirostris* (Broad-snouted Caimans).

It was a cool dawn but the fireball from hell soon rose above Rudy's Pantano and warmed the shallow waters. Mo was flying high and in her strong take-charge mode.

"OK all you bros, today is our cocodrilo drill. Wur gunna swim across Rudy's Pantano to see the Broad-snouted Caimans (*Caiman latirostris*). Bobbybro is still feeling weak and he may not make it all the way so Rudy and Billy may have to carry him part way."

The swim started out as a walk in the shallow water. I was delighted that Rafael, my sensitive artistic bud, walked with me.

"You know I too would like to help you get across the pantano, Bobbybro, but I know you prefer strong Rudy and Billy."

"Rafe, for she-it sake, you still don't get it. I have no reason to choose between you or those two muscular dudes, or Mo, or anyone. You all make my heart sing and I enjoy you all. And I want to tell you right here and now that your walking with me is every bit as helpful as their carrying me."

I did better on the long swim than I had expected. Thanks to Mo's announcement everyone was focused on my weakness, and I sopped up all the attention big time. But I didn't want to pass up this opportunity and I was delighted Billy and Rafe took turns carrying me the last few miles.

When we got to cocodrilo bay I could not believe my eyes. The population of *Caiman latirostris* was absolutely incredible. Mo climbed a tree to get an aerial view and counted 56 Caimans in the bay. Marino and Zoomer quietly swam out among them to get some closeup images.

Mo announced, "This is the icing on the cake. I will definitely put Zoomer's photos to good use next time I go to Asunción where I will see to it that Pantano de Rodolfo is added to the official list of Chaco *Caiman latirostris* reserves," Mo exclaimed.

Rudy and Billy wanted to have a contest to see who could wrestle a Caiman the quickest.

Mo swung into action. “No way, José, am I gunna let you two muscle dudes molest these magnificent crocodilians that have been around since the Mesozoic. I want to spend the night here watching the Caimans and swim back to the other side tomorrow morning while it is still cool.”

We all sat up late watching the Caimans. Then we heard the tigre scream and there it was subduing and dragging a very large *Caiman latirostris* up out of the water. It was the most impressive predation any of us had ever witnessed and Zoomer got lots of great photos.

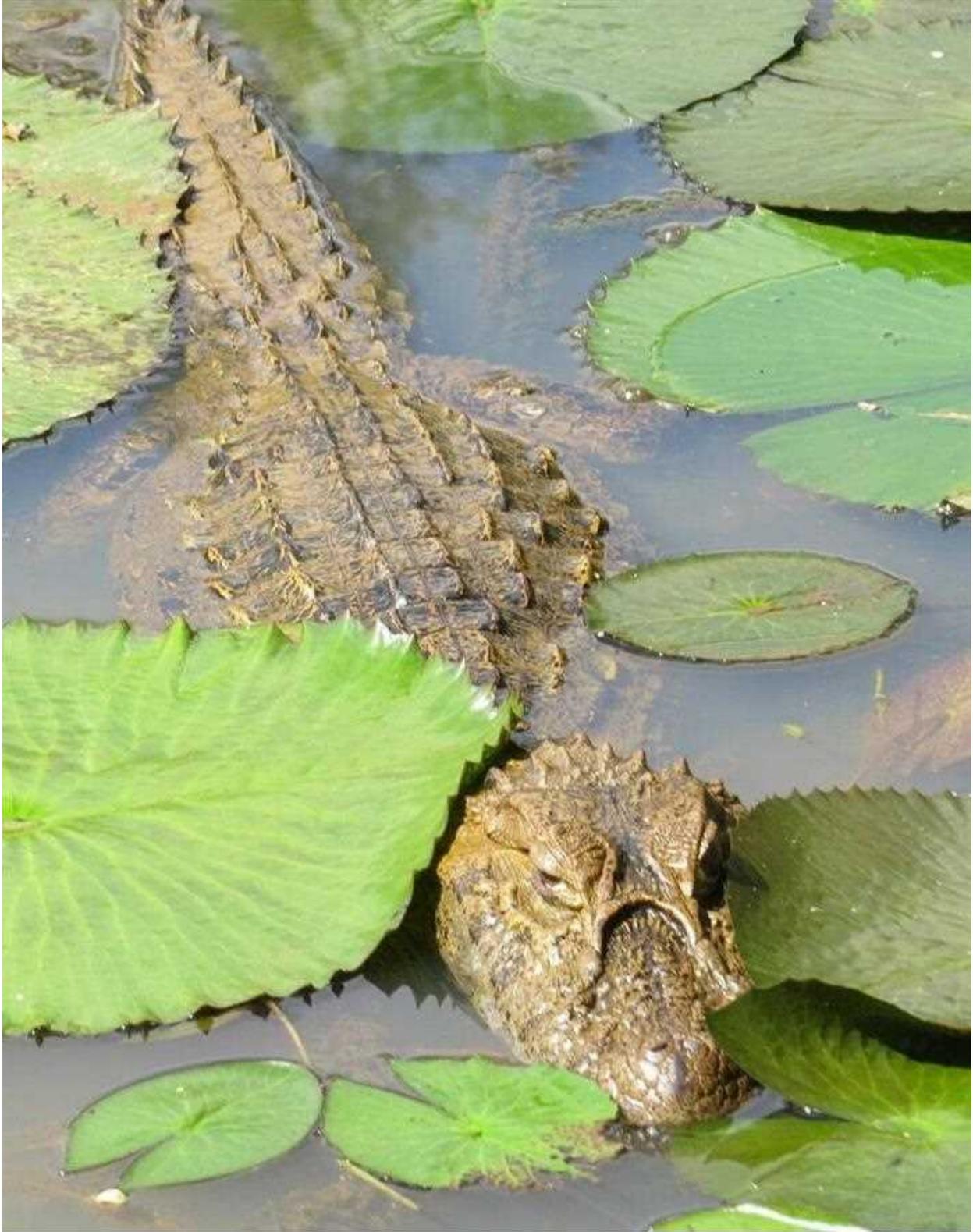


***Caiman latirostris* by Ingo Arndt**

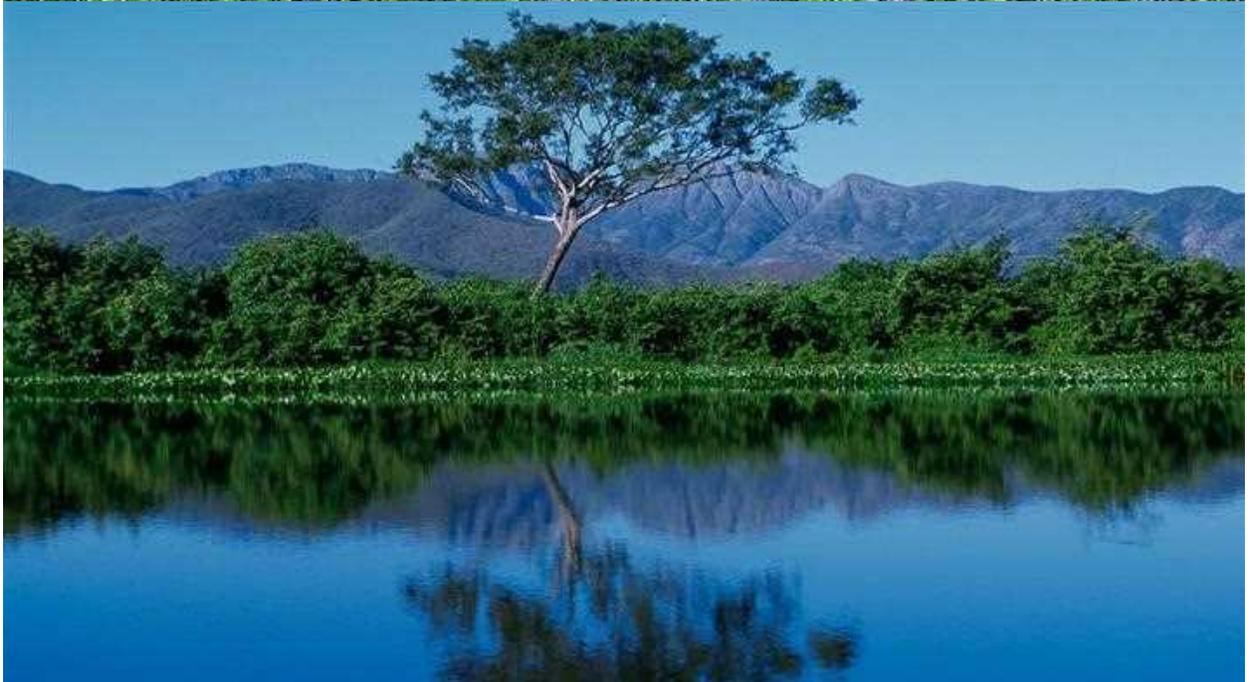
eat photos.

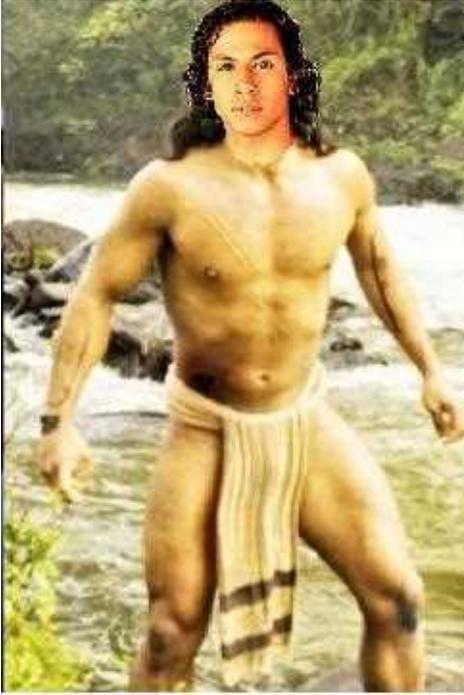


Mo

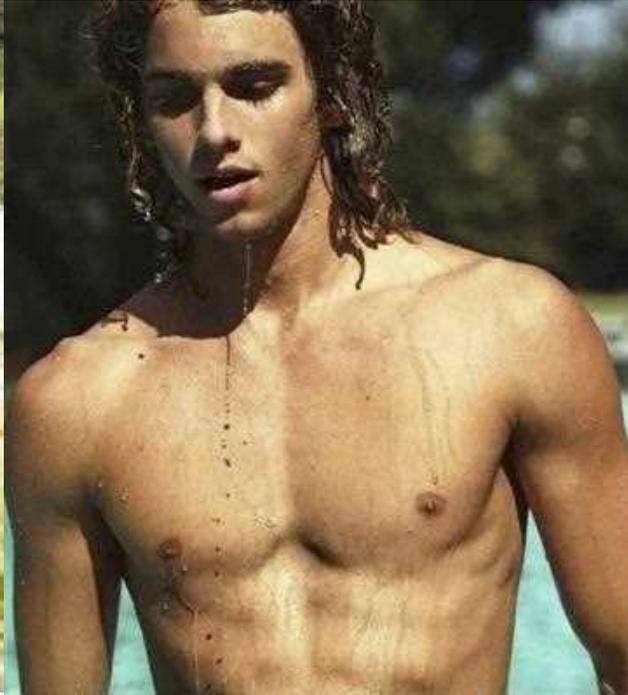


***Caiman latirostris* by jackestive**





Rudy



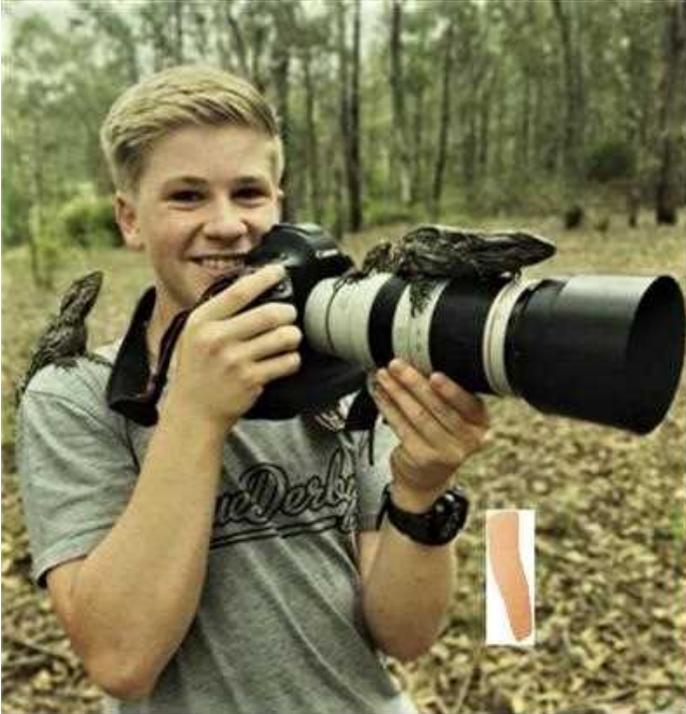
Billy



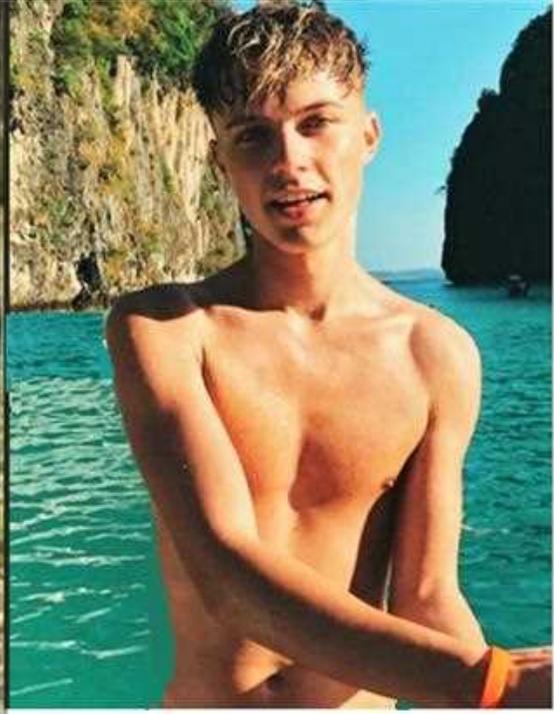
Bobby



Rafael



Zoomer



Marino

56. *Bothrops ammodytoides* (Pampas Lancehead).

We made it back across the water to our initial pantano camp and this was to be our last day in the wetlands. I had bounced back enough to go herping with Billybro. He of course did all the flipping and I just looked and grabbed. We were about to give up for the morning when he uncovered a magnificent Patagonia Lancehead (*Bothrops ammodytoides*). Billy was really excited as this was the third species of *Bothrops* he had found at the pantano. I was very happy he did not try to do a tail grab.

We devoured the midday feast of fish on a skewer and then settled down for a siesta. After we woke up Billy and I stripped and dove in the water. At Puesta del Sol Billy sat with his arm around me for a good long while and rekindled our bro feelings that had lapsed while I was recovering.

This was to be our last night at the pantano and a fun time was had by all.



Bothrops ammodytoides by nicochimento



Bothrops ammodytoides by Alexander Guñazu

**Mo****Rudy****Olivia****Lucia**

57. Animalia

“Billybro I do not understand why I feel so attracted to Mo. Do you get it?”

“Yes I do, Bobby. She is a bro field biologist and does not do gender roles. Out here in the wilds of the Gran Chaco we are totally free from social constraints and we can enjoy being the animals we are. This includes freedom from gender roles, and that is something I find very attractive about Mo.”

“Well, Billy, we have had this conversation many times and I conclude there is plenty of individual variation as well as sexual dimorphism in this behavioral trait. You are a physical guy and oriented toward the external world and that includes the bodies of others. I live in an imaginary world and I like just scrolling through the rich and diverse image collection in my mind while I please myself better than anyone else can.



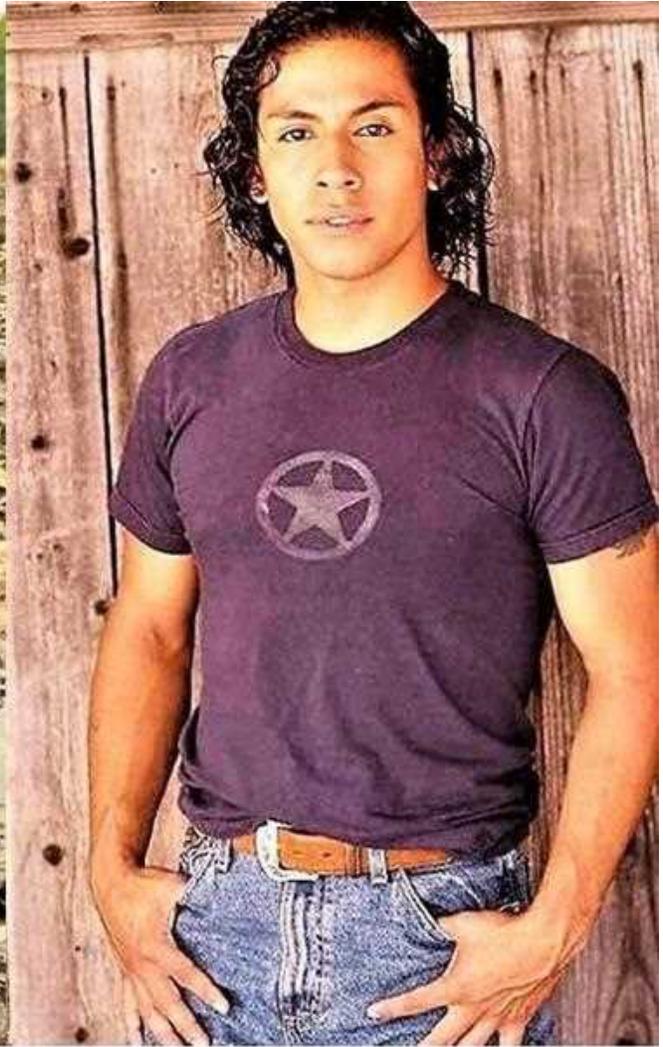
Zorion



Donatello



Mo



Rudy



Bobby

Billy

8. *Paraphimophis rusticus* (Brown Musurana).

“We gots ta move on. The Gran Chaco is in the rear-view mirror now and here we are in the Pampa and it looks like just a big cattle ranch.”

“Well, cattle have to have water so let’s see if we can find a tank to have a dip in. I see an estancia over there and the casa looks abandoned. Let’s explore.”

And as usual Billy’s instincts for water and fun were right on the mark. It was a wonderful tumbled down estancia and the windmill still churned away, pumping water up into the tank.

“Last one in is a rotten egg,” Billy declared as we stripped and dove in. Afterwards we sat on the wall of the tank, arms around each other, the warm afternoon sun on our backs. The tortillas and peanut butter were a come down from the Chaco fish feasts but were a welcome return to our standard base camp fare.

It was not easy to withdraw from the Chaco experience with Mo and her students and refocus on my feelings for Billybro, but I was starting to get there. Looking at the youths was addictive, and their upbeat enthusiastic personalities, broad smiles, and hormone-induced eye-candy bodies were difficult to withdraw from.

Billy and I had a deep brotalk and then donned our headlamps and headed out on a night walkabout just like old times. Right off the bat I spotted a Brown Musurana (*Paraphimophis rusticus*).

Zoomer had taught me to get more esthetic images and that took a long while. But Billy had taken up letting his head contact mine while we photographed, and I liked that very much. Maybe I was starting to get the hang of this physical fun.

After the Musurana we decided to turn in for the night. As I lay on my sleeping bag next to Billy, gazing up at a billion stars, feeling the warm night breeze on my body, and scrolling through my collection, I declared, “Bro, it’s you and me forever.”



Paraphimophis rusticus by Alfredo Sabaliauskas



Paraphimophis rusticus by Alfredo Sabaliauskas





59. *Homonota darwini* (Darwin's Marked Gecko).

At the tumbled down estancia Billy and I were startled by the arrival of four youths on horses. Liam and Elijah were Americans in their teens, Mateo and Lucas were Argentines about twenty and we instantly took to all four. Lucas was totally fluent in English as well as Spanish and explained that he and Mateo led horseback trips from the Buenos Aires region to FitzRoy on the Pacific of Tierra del Fuego. They camped every night at a different abandoned estancia, and this was one of them.

By and by Lucas revealed that their clients were mainly youths with diverse orientations who wanted a secure situation for traveling. While Argentina enjoys very liberal laws and attitudes about orientation, in many countries it can result in imprisonment or death.

Their parents want the teens to be able to travel but with older guys who can assure their safety. Lucas and Mateo were part of a world-wide network that specializes in travel for youths with diverse orientations, sometimes humorously dubbed “Bros Without Borders.”

We were blown away when Lucas opened an outbuilding, took out the barbecue, and plopped six T-bone steaks on the grill. Just looking at the steaks brought Billy and me to ecstasy as we had not eaten any red meat in months.

Afterwards we all had a little siesta and then stripped and dove into the water tank. I made brave to relay to Lucas I was not exactly enamored with the Pampa. He suggested we might like to join them on the horseback trip to FitzRoy as he could show us the wild places..

“What would we do with the Landcruiser?” Billy asked.

“Well, it is a very marketable commodity this far out in the Pampa and I know a rancher who is looking for a good four-wheel vehicle.”

“Bobby and I will talk it over and let you know tomorrow. We’re gunna do our puesta del sol bro sit and then head out on a nocturnal snake walkabout with our headlamps.”

I had come to enjoy mentoring teens and was happy Liam and Elijah joined Billy and me for bro time and they asked if they could come with us on the headlamp walkabout.

And the two turned out to be enthusiastic herpers and caught many *Homonota darwini* (Darwin's Marked Geckos). The plan struck me to get tissue samples of this species at each camp between here and FitzRoy for a DNA study of the genetic structure of geckos in the southern cone.

After we turned in for the night Billy and I discussed Lucas' proposal. And the new more instinctual Bobbybro declared, "I think it would be great fun to travel by horseback and I really like these guys."

"You got it, Bobbybro," and he gave me a wonderful goodnight hug.

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Roca-Rada, X., Politis, G., Messineo, P.G., Scheifler, N., Scabuzzo, C., González, M., Harkins, K.M., Reich, D., Souilmi, Y., Teixeira, J.C. and Llamas, B., 2021. Ancient mitochondrial genomes from the Argentinian Pampas inform the early peopling of the Southern Cone of South America. *Iscience*, 24(6), p.102553.





Homonota darwini by Martin Arregui

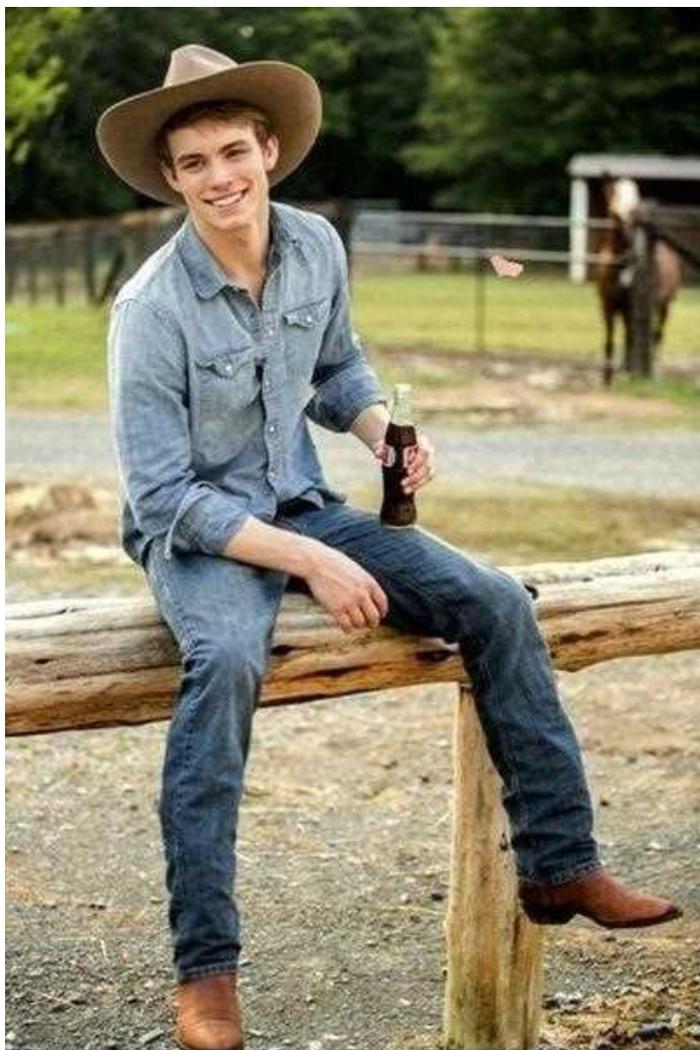
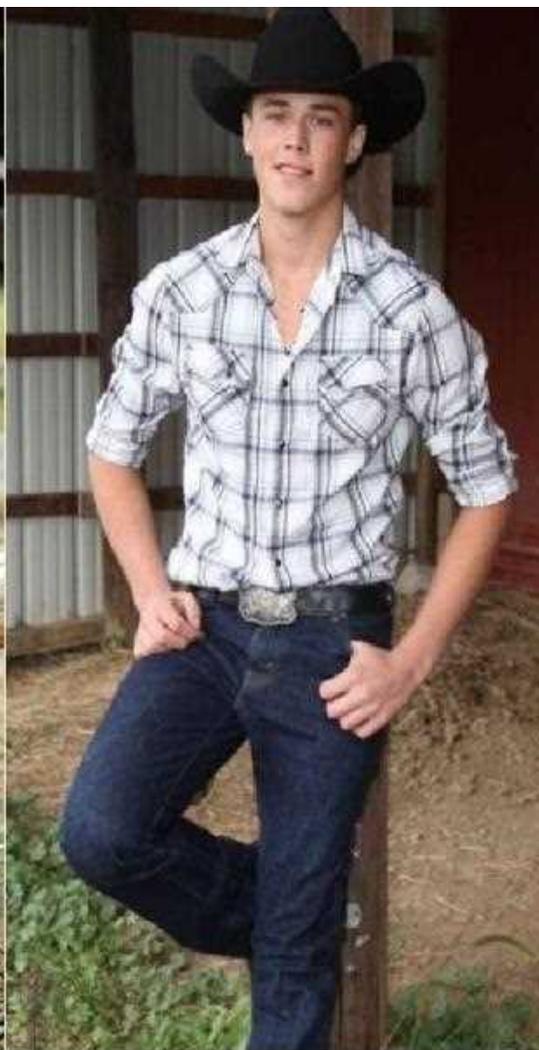


Liam



Elijah



**Lucas****Mateo**

60. *Bothrops ammodytoides* (Patagonia Lancehead).

Lucas was delighted that Billy and I would be joining him, Mateo, Liam, and Elijah on the thousand kilometer horseback adventure into the southern cone.

We drove to an estancia where Lucas knew the dueño was looking to buy a Landcruiser. He snapped up the cruiser and gave us more money than we had paid for the vehicle in Lima. The estancia was way too posh for Billy and me and we declined his invitation to lodge there for the night. No way, José, were we gunna sleep in a bed.

As part of the deal with the dueño, Lucas made arrangements for Billy and I to obtain horses for the trip. This turned out to be an adventure in itself. The horses were managed by the gauchos who lived separately from the dueños. This was our first experience with the gaucho culture and we had mixed feelings about it. We liked the cowboys in the Southwest as they are focused on cattle roping and such. The gauchos here were also very experienced horsemen, but there were distinctly “macho” overtones to their culture that we did not like.

Lucas was quite skilled at interacting with the gauchos. I was not sure whether they were aware of the orientation of the teens who were his clients, but they seemed to accept us all. Billy has much more Spanish than I and he and Lucas laughed and joked with the gauchos and had a great time. Argentina produces some fine wines that were very tempting, but we chose to remain alcohol-free.

Liam also was pretty good with Spanish and became friends with some of the gaucho youths. It turned out one of the teens, Joaquín, was struggling with orientation issues and wanted to bro talk. Joaquín felt trapped by the macho culture of the gauchos and was desperate to escape. Liam figured out that the youth was a good student and gave him a lot of encouragement to apply to universities in Buenos Aires where he would be free.

The horse selection was not easy. The criollo horses have been native to the pampa since the 1500's. They are sturdy and hardy, but can be a bit spirited due to their wild ancestry. We tried riding several and, as totally predictable, Billy easily handled them all, but it was a struggle for me. Billy coached me on having the self confidence needed to control my horse. We settled on two horses that were attached to one another so that mine would just follow Billy's.

We were off on the criollos at dawn heading out across the pampa to gather reptile tissue samples over a thousand kilometers in the southern cone.

Billy kept his feet in the stirrups and used his strong leg muscles to cushion himself as his horse trotted along. I just sat in the saddle and bobbed along like a sack of potatoes.

We came across a Patagonia Lancehead (*Bothrops ammodytoides*) coiled beside the trail. Our horses became nervous, and I got bucked off. Everyone dismounted and we got some good photos. I could tell Billy wanted to show off to Liam and Elijah by doing a tail-grab. Fortunately my, “I love you bro,” did the job and we all settled for admiring the beautiful snake unhandled.

Billy made brave to voice a concern of his to Lucas.

“I hope there is a water tank at our camp tonight.”

“I hear ya loud and clear, bro, and not to fear, water is the “sin qual non” for our nights. The horses need to drink and we could never fall asleep at night without our dip in the cattle tank,” Lucas assured.

We eventually arrived at an abandoned estancia and we all stripped and dove into the tank even while the horses were still guzzling. Liam and Elijah joined us for bro sit and headlamp walkabout. Elijah was an ace herper and I was becoming quite fond of him.

Elijah and Liam were only a bit younger than Billy and I, but we came to appreciate that in some ways they were members of a different, younger, more progressive generation when it comes to orientation. They were totally relaxed about it, viewed it as somewhat flexible, a great way to enjoy physical and emotional intimacy with both genders, and a relatively trivial component of peoples’ complex and unique personalities.



Bothrops ammodytoides by Alexander Guñazu



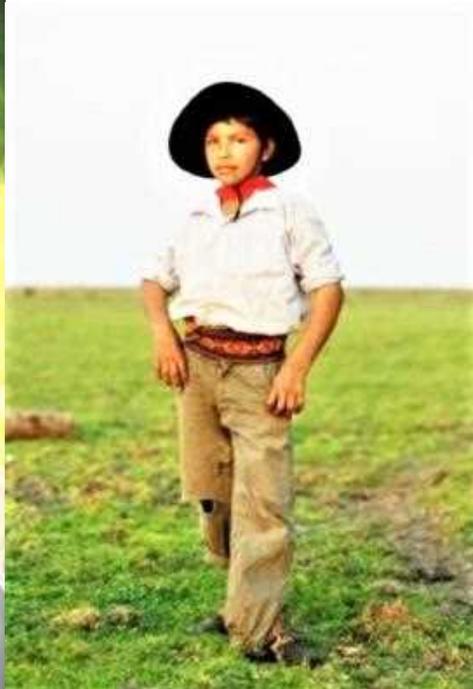
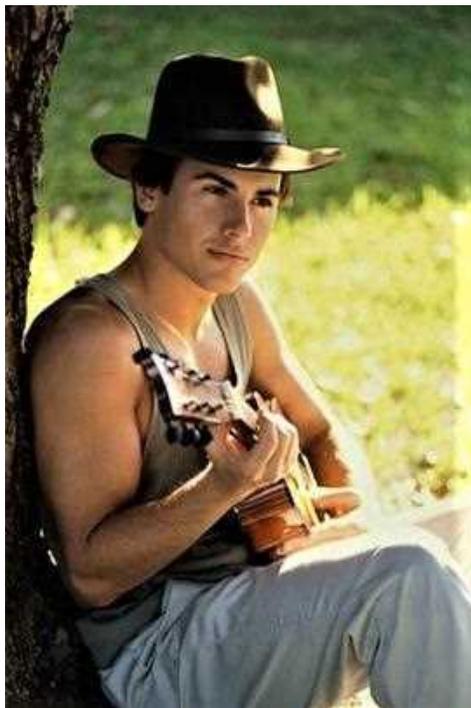
Bothrops ammodytoides by micaharkes



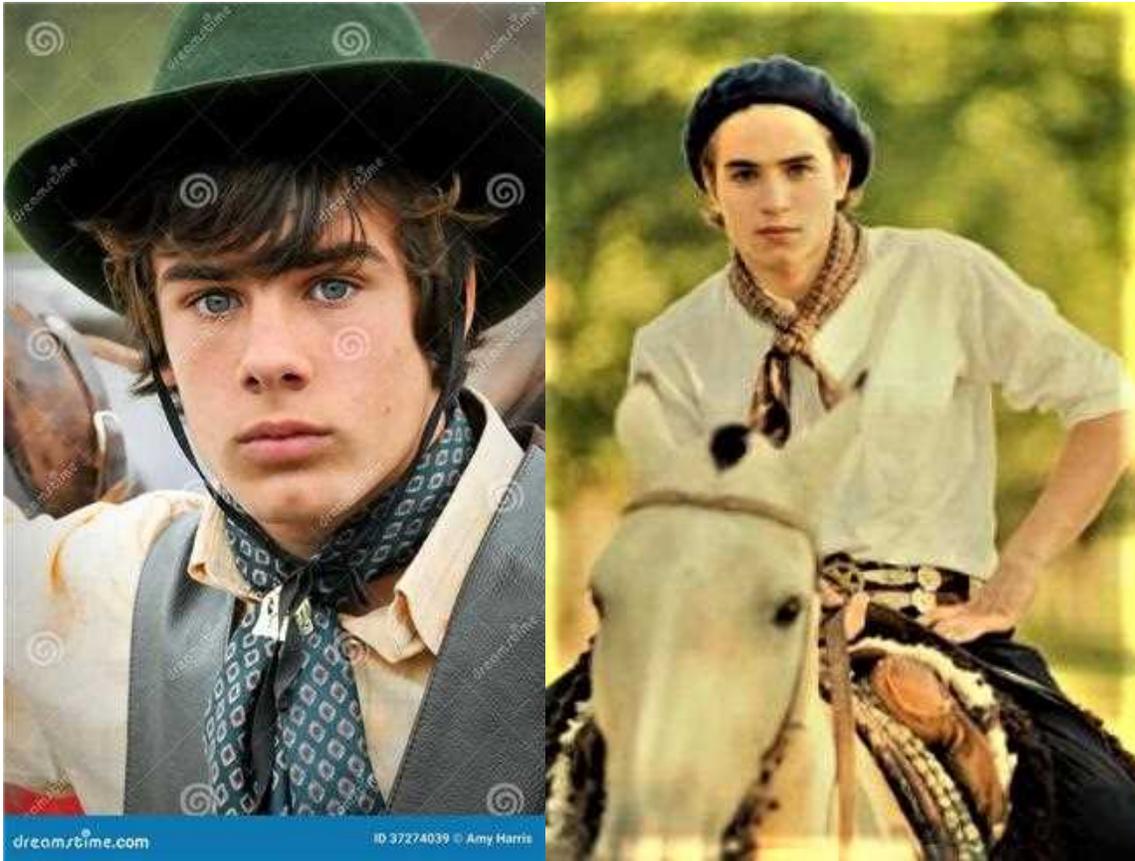




Joaquín







61. *Erythrolamprus sagittifer* (Arrow Ground Snake).

In many ways Billy and I are not a good match and riding horses was just another example. Bro found it easy and fun whereas it was quite difficult for me. But he did not give up on me and proceeded to try to teach me to ride like he does. He adjusted my stirrups so that my legs were slightly bent, and he taught me to flex a particular muscle to reduce the impact of my horse's steps. I liked the physical contact and all the attention he was giving me.

I was very tired and sore when we finally reached the next abandoned estancia for the night. Fortunately the water in the tank was quite warm and I spent a long time in it soaking my tired muscles.

Afterwards Elijah and Liam sat with Billy and me for puesta del sol bro time and then joined us on the night walkabout. I was slowly coming to realize that Elijah had a serious interest in herping. His shy personality was so eclipsed by the charismatic out-going Liam that I had failed to adequately focus on him.

And this night was no exception. He quickly caught several *Homonota darwini* (Darwin's Marked Geckos) for me and I got tail tip samples for my study of DNA in the species in the southern cone. And his keen eyes soon located two wonderful snakes, *Erythrolamprus sagittifer* (Arrow Ground Snake) *Tachymenis trigonatus* (False Tomodon Snake).



Erythrolamprus sagittifer by ignacio_hernandez



Tachymenis trygonatus by Marianela Astudillo



Adobe Stock | #126390619



62. *Liolaemus* (Smooth-throated Swifts).

As we set out on our day's horseback trot I found that I was starting to get into being an active rider. Billy had managed to convince me that my leg is controlled by several different muscles that can be contracted independently. Maybe endomorph Bobby can learn something from his mesomorph bro.

As we rode southward into the cone, the mountains and their snow-pack came closer and closer. Billy liked the cold air that slid down the bajada, but I did not. And I regretted that the herpetofauna was becoming more and more impoverished as we rode into the cooler climate.

But when I was about to sink into frigid despair, Elijah yelled, "Holly she-it" and dove off his saddle and came up with a beautiful Red Tegu (*Salvator rufescens*). He was in absolute ecstasy as he held the magnificent large reptile for a very long while.

The Red Tegu perked up Elijah's interest in lizards. He borrowed a very long telescoping rod and became proficient at noosing from the saddle. He found four species of *Liolaemus* (Smooth-throated Swifts) in the area and became interested in studying the differences in their habitats. His might qualify as only herpetological study conducted exclusively from the saddle.



· *Liolaemus kingii* by Rafa Lara



Liolaemus boulengeri by Emily Christain



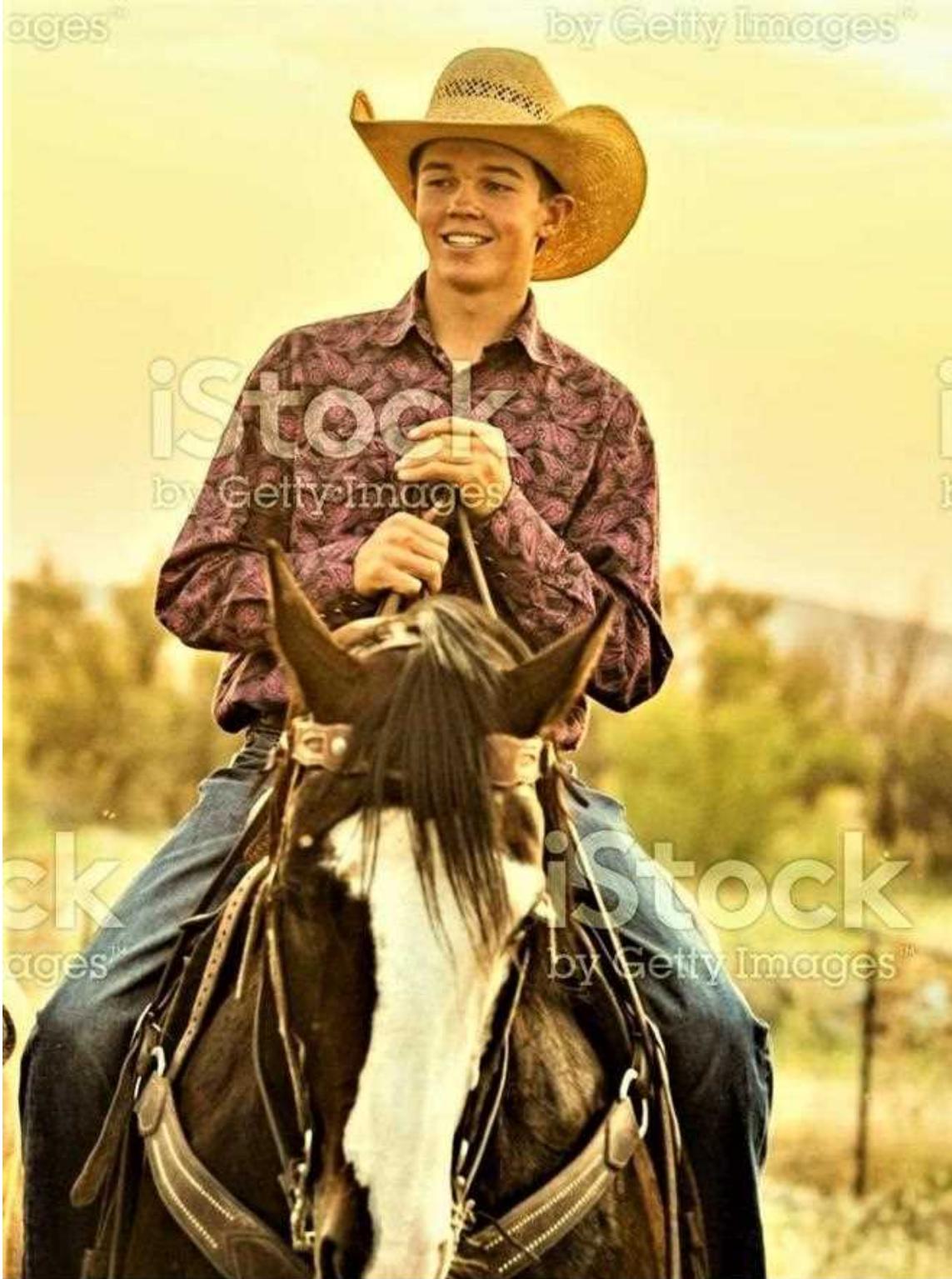
Liolaemus fitzingerii by f35



Liolaemus petrophilus by Hugo Hulsberg



Salvator rufescens by Alexander Guiñazu



Elijah



63. The cowlick.

Lucas and Mateo disappeared for a while as they sometimes did. Two gaucho youths came riding into the estancia and were surprised to see Elijah, Leon, Billy and I camped there.

Xavier and Sebastián retrieved several bottles of Cabernet from their saddle bags and invited us to join them. Billy and I preferred to remain alcohol-free and declined their generous offer, but Leon and Elijah accepted.

The four of them guzzled the wine and it loosened everyone up in a big way. "Please call me SeaBass," he requested. "Sebastián is the patron saint of gays."

That led Leon to prod that topic a bit further and ask if he knew Joaquín. SeaBass said he did and that Joaquín had gone off with his boyfriend Miguel to Buenos Aires. He threw in a derogatory word to make sure we did not mistake him for having that orientation.

After they all were pretty much plastered, Leon asked, “What do you guys do for fun here in in this abandoned estancia on Saturday night?”

“After we polish off at least one more bottle we will show you,” SeaBass managed to say.

They staggered into an out-building and SeaBass picked up a well licked salt block that he kept inside away from the cattle except for Saturday nights.

He took out his knife and shaved some of the salt into his tin cup, splashed in some wine, and stirred the concoction for a long while. When it was ready, he stripped and applied the wine brine solution to his body and laid down in the cattle trough. Leon took out his camera and video recorded the whole thing.

SeaBass posted the video on the net and it went viral globally. And Lucas was completely puzzled why the number of applications for his southern cone adventures suddenly skyrocketed.



Sebastián and Xavier



64. *Philodryas trilineata* (Mousehole Racer).

Elijah turned out to be a jewel hidden right under my nose and I was becoming quite fond of him. He was a natural born herper and was rapidly morphing into a herpetologist. The teen shared my interests in habitats and biogeography and injected a huge amount of youthful enthusiasm in the process.

I had come to the sad realization that at 20 I was over the hill. A guy's testosterone level peaks about 17 and life is all downhill from there. But mentoring a young teen like Elijah gave me the illusion of being young again.

And at bro time Elijah opened up about his personal life. While he and Liam sometimes enjoyed fun together, they did not consider themselves to be a pair. Based on my long and complex relationship with Billybro I attempted to advise him a bit. Mainly I just encouraged him to keep his options open and relax and enjoy all the fellow travelers he encountered walking the long winding road of life.

I decided to try something different, and Elijah and I went on a midday herp walk, just the two of us. That was a good move because he was more in tune with me when Billybro was not in the picture.

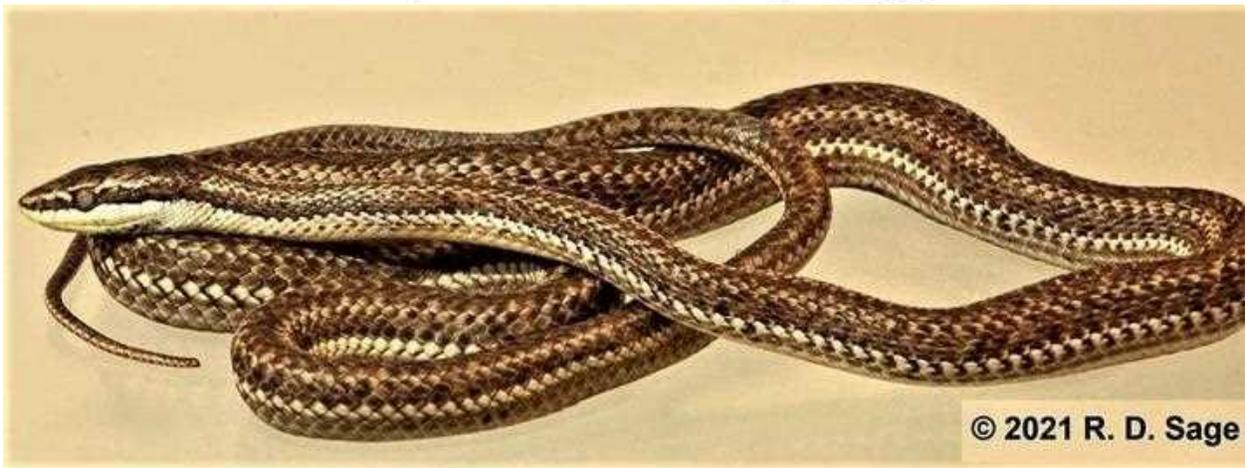
Herping is all about catching animals. Regardless of whether a bro does or does not remove animals from nature, "getting my hands on it" is the basic instinct that underlies all herpetology.

It was hot at midday and there were fast moving racer-like snakes streaking in everywhere in the grass and shrubs. Elijah's excitement level was high and he began wildly chasing down the racers, running around like a chicken with its head cut off.

Eventually he caught six snakes of two species, *Philodryas patagonienis* (Patagonia Racers) and *Philodryas trilineata* (Mousehole Racers). Just like *Nastycophis* they bit the she-it out of him. Blood was running down his arm and he painted his face with it and rubbed it in his hair. He was definitely my kind of bro if there ever was one.



Philodryas trilineata by a_f_r



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Philodryas trilineata by R. D. Sage



Pilodryas patagoniensis by fredtravaes









Elijah

65. *Leiosaurus bellii* (Southern Smooth Iguana).

The camps at abandoned estancias rolled on one after another. Although the herpetofauna was becoming more and more depauperate as we ventured deeper into the cold southern cone I remained intrigued as herping with Elijah was just plain fun. I had become thoroughly addicted to the youth's enthusiastic responses to every reptile we encountered.

Elijah really liked seeing the Patagonia Lanceheads (*Bothrops ammodytoides*) we encountered and here on our last day he began sitting very close to me as we admired the beautiful vipers.

He noosed all four species of *Liolaemus* (Smooth Throated Swifts) in our area and then he spotted a larger lizard in a bush. He stalked it very slowly, carefully maneuvered the noose through the thorny branches, and eventually slipped it over the lizard's massive head. It was his first Southern Smooth Iguana (*Leiosaurus bellii*) and he was in ecstasy, enjoying the feeling of the large smooth lizard in his hands, and he gave me a hug.

Elijah and I went on the last night walkabout together while Billy and Liam wandered off separately. Elijah was able to quickly catch the *Homonota darwini* (Darwin's Marked Geckos) for my study and he sat very close to me getting the tail tip samples.

Afterwards we wandered on and he was thrilled to find a beautiful Ringed Hognose Snake (*Xenodon semicinctus*), his first, and he gave me another, longer hug.

When we got back to the estancia I asked Billy if he would take a walk with me.

"I need to come to grips with Elijah. I have tried to keep my distance and guard my heart from the beginning but I guess I failed. Today our herping together included obvious signs of affection on his part. I think it best if I keep my distance as he is quite young."

"Ah, not to worry Bobby, teens are like that. They form these strong attachments before they even know what they are. But his bro Liam is like me and more immune from such things and he saw this coming. He and I have discussed it thoroughly. Liam is confident that he can help Elijah rebound when we all part in FitzRoy. And I know you Bobbybro like my hand and it is not possible for a romantic like you to guard his heart. But I will stand by you and help piece you back together."

And Billybro gave me one of his strong embraces that heal my broken heart. I replied, "Bros are forever."



Xenodon semicinctus by Alexander Guiñazu



***Leiosaurus bellii* by Julián Rolando**





***Leiosaurus bellii* by Alicia Sersic**



Eljah

66. The last lizard.

Separating from Eljah in FitzRoy was not as painful as I had anticipated. We both shed a few tears, but he clung to Liam as he walked aboard the vessel that was bound for the U S. As usual I was the one who found the separating most painful, but Billy knew just how to help me rebound.

“Well, Bobbybro, let’s explore Tierra del Fuego. Even if there aren’t many herps down here, it’s a truly spectacular landscape.”

“I know this is your kinda place even if its it’s way too cold for me to enjoy. ”

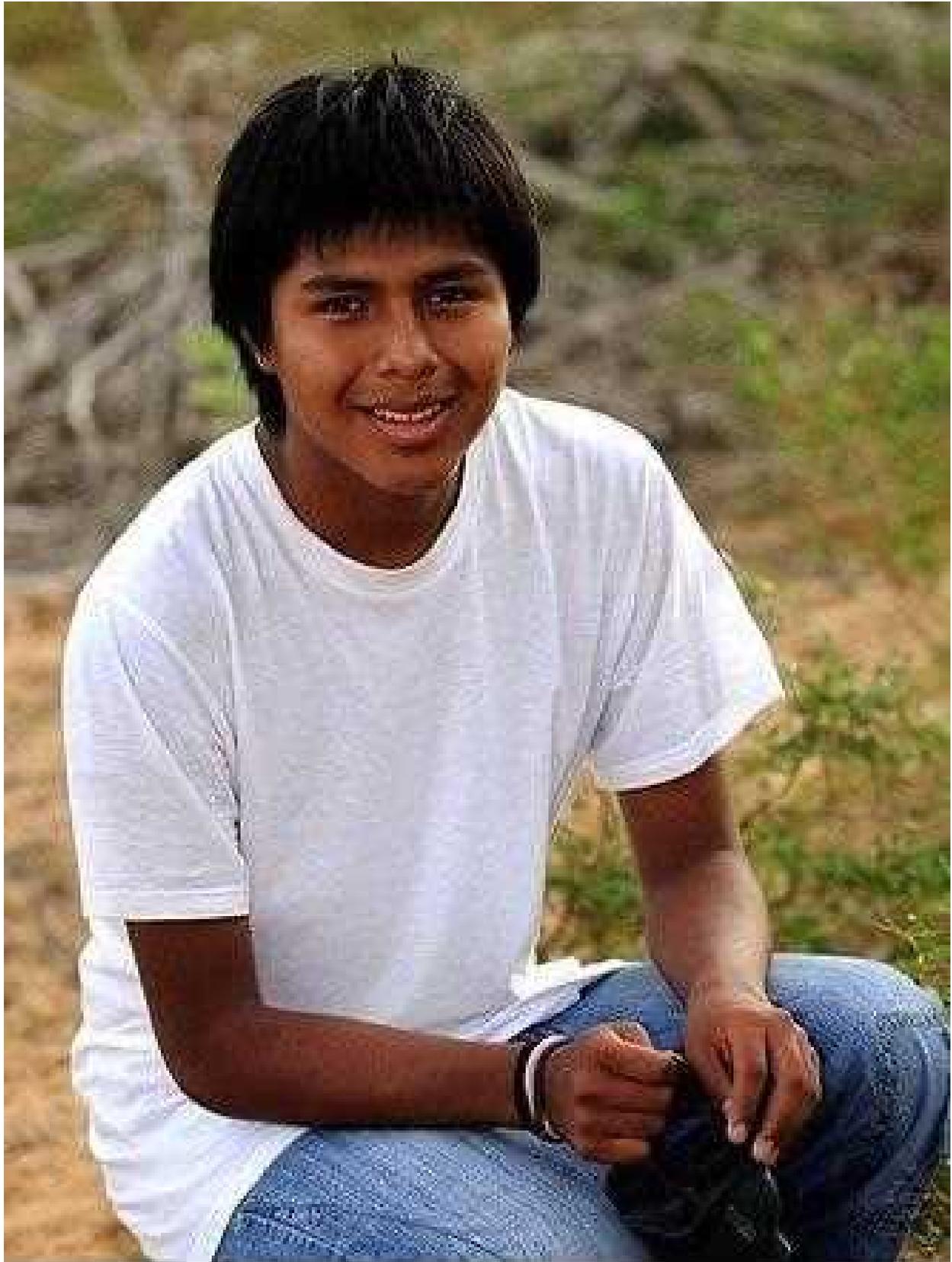
“I want to try and climb Monte FitzRoy.”

“I can maybe make it to the base, then you are entirely on your own, Billybro.”

And I did make it to the base and there we met Tonito who was exploring Tierra del Fuego. He joined us for a very cold nocturnal walkabout and was able to find a Darwin's Marked Gecko (*Homonota darwini*), the southern-most tissue sample for my DNA analysis of the species down the cone at the bottom of the continent.



***Homonota darwini* by Rafa Lara**



Tonito



67. The last snake.

The view of Monte FitzRoy was absolutely daunting. But Tonito said he had climbed it before and could lead Billy to the top. I was petrified at the thought of bro attempting the climb. But I had to let him go. I promised myself and him I would never put him in chains,

It was cold and lonely sleeping at the base of Fitzroy. I tried to take my mind off the situation by herping and was surprised to find a Patagonia Racer (*Philodryas patagonensis*) this far south.

The third day a boy wandered into camp. Nacio was an indigenous Argentinian but spoke some English and we spent the day together chatting. I asked him what he thought about FitzRoy and Jemmy Button.

He was very blunt. “That kidnapping reflects the fates of all the indigenous peoples of the Western Hemisphere. We were kidnapped and exterminated claiming it was because we do not wear your clothes or worship your god. But it was all just a ruse to steal our land.”

I did the only thing I could think of and gave Nacio a hug.

By the fifth day I was beginning to lose hope of ever seeing Billybro again. I spent the day scanning the slopes with binoculars. About noon I spotted two tiny dots high up in the snow. At dark Billy and Tonito staggered into camp and I cried with joy and gave them both a very long hug.



***Philodryas patagonensis* by Daniel Dias**





***Philodryas patagonensis* by Juan José Bonanno**



Nacio



Jemmy Button



Robert FitzRoy

68. The conclusion.

I wanted to spend our last couple of days in South America visiting the Nothofagus forest of Tierra del Fuego, And it turned out to be the perfect antidote to Monte Fitzroy and my fears of Billybro would die climbing its sheer icy peaks. I really liked this cool moist forest and I felt at home here. I spent much of the time just sitting close to Billybro pondering this relict forest of the ancient connection of the vast South America continent with Antarctica, New Zealand, and Australia.

Billy found a large *Plerurodema bufonium*) (Four-eyed Frog) m and we were thrilled to see a leptodactylid this far south.

We were surprised to come across a botanist in the forest. Catalina had been a student of Tien Wei Yang and was very interested in the biogeography of the plants in the South American deserts. She asked me to summarize my findings about the herpetofaunas of the deserts of this content. That was a very difficult task, but I did my best to at least describe our experiences:

“The Atacama is low in species richness due not only to the fact that it is the driest desert, but also due to its geography. Clinging to the very narrow Pacific shelf it has always been isolated from other herpetofaunas except for a tenuous narrow contact in the far north. As a result, few lineages have evolved desert adaptations. The Monte is a bit richer as it lies on the Atlantic side of the Cordillera and has many species derived from the rich Amazonian herpetofauna. The Chaco is really not a true desert but a thronscrub with many Amazonian species. The Pampa is somewhat depauperate as herps are poorly adapted to temperate grasslands.” Catalina was finding many parallels with desert plants. We became close friends and colleagues and over the years we published several papers together on the biogeography of the South American deserts.

As Billy and I boarded our flight we did not feel the sadness that we had felt when we departed from Australia or East Africa. We had enjoyed our South America adventures and felt a degree of satisfaction, but not a longing to remain there. I guess I would just call it a feeling of “been there and done that” and we never returned.

Knapp, Michael, Karen Stöckler, David Havell, Frédéric Delsuc, Federico Sebastiani, and Peter J. Lockhart. "Relaxed molecular clock provides evidence for long-distance dispersal of *Nothofagus* (southern beech)." *PLoS Biology* 3, no. 1 (2005): e14.

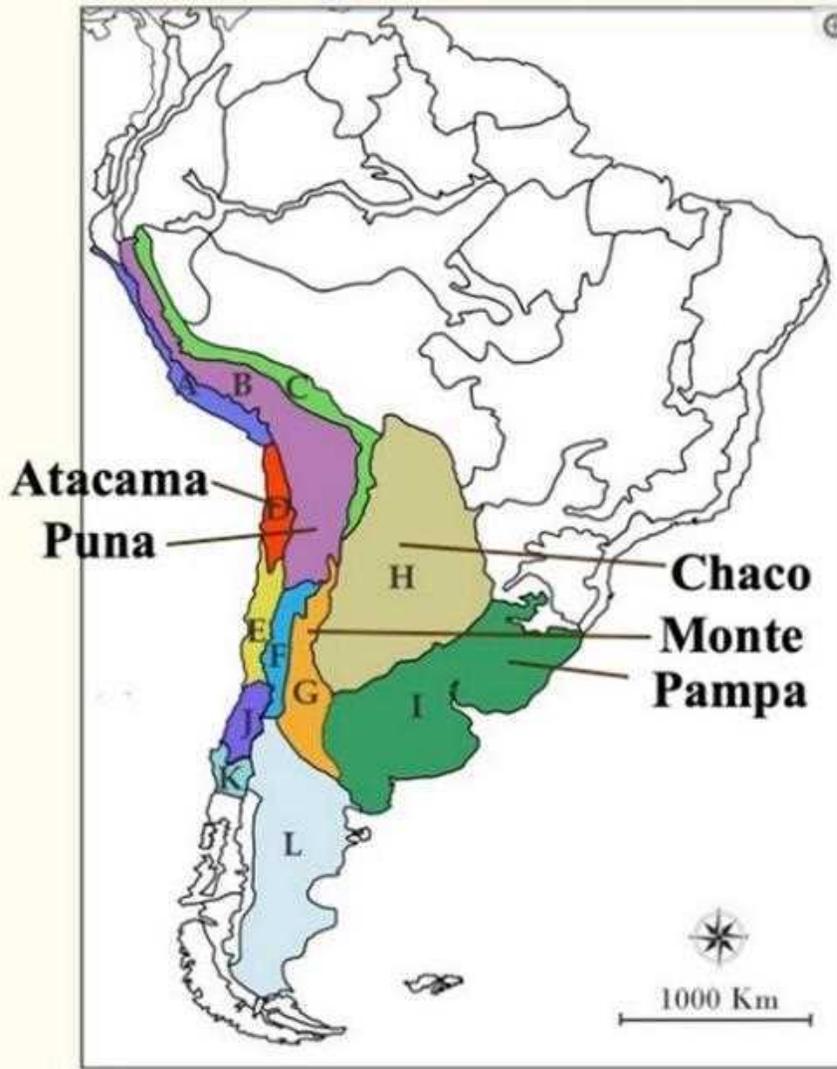


***Pleurodema bufoninum* by Ignacio Hernández**

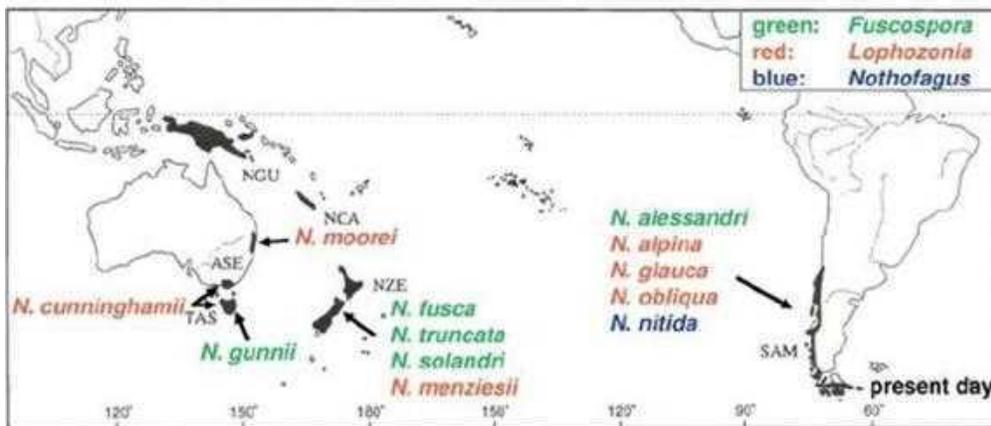


***Pleurodema bufoninum* by Ignacio Hernández**

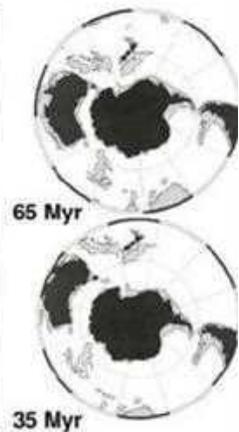




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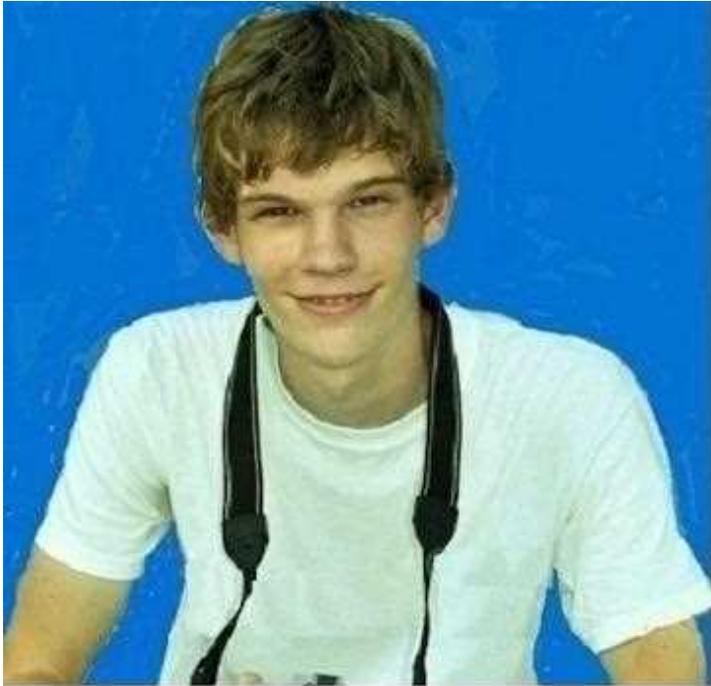
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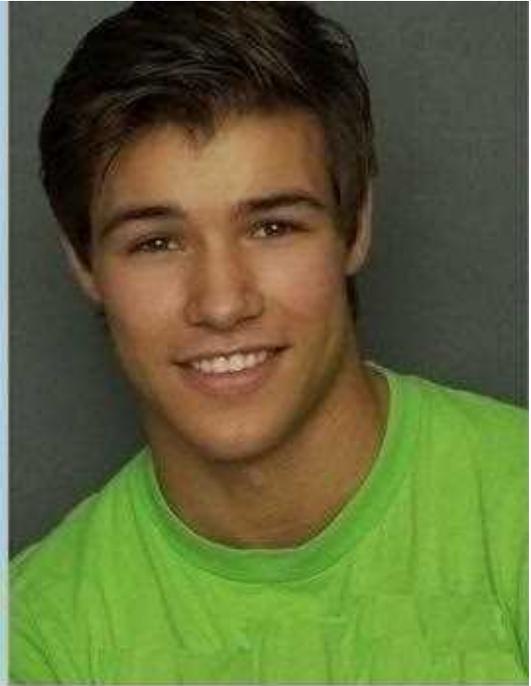
Distribution of the species of *Nothofagus* (from Knapp et al. 2005)



Catalina



Bobby



Billy