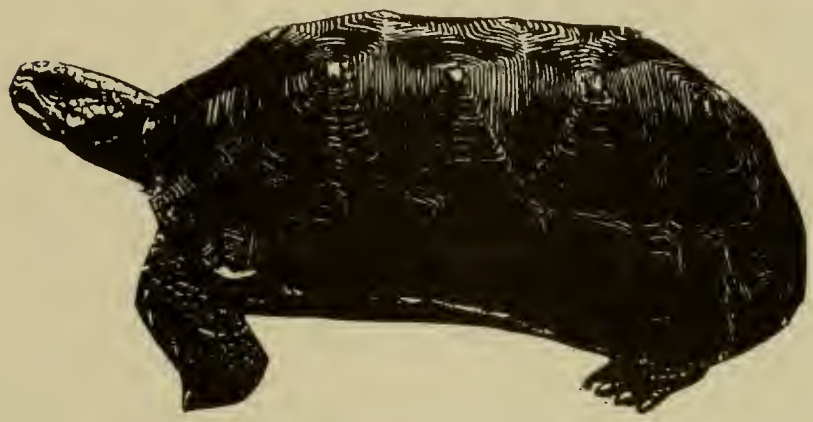
ON THE DISTRIBUTION OF CERTAIN SOUTH AMERICAN TURTLES (TESTUDINES: TESTUDINIDAE & CHELIDAE)



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COVER ILLUSTRATION. Geochelone carbonaria, from Pritchard and Trebbau, 1984, 'The Turtles of Venezuela'; reproduced with permission of the Society for the Study of Amphibians and Reptiles.

INTRODUCTION

It is a truism that no study of geographical distribution can be better than its primary data. In this respect South American herpetology has not been fortunate. Few papers published in recent years are based on ample, correctly interpreted locality records.

Difficulties with foreign languages contribute to the problem at all stages, from the first spelling of the locality in the field, to transcribing handwritten or printed names, to refereeing, and to proofreading. Lack of historical knowledge and of collateral reading add their share of errors. In some cases, unawareness of distributional patterns on a subcontinental scale and lack of personal acquaintance with ecological features lead zoologists familiar with a given corner of South America to uncritical extrapolations.

I find it necessary to discuss some recent cases of more than trivial relevance. Unfortunately, these are but examples of problems that continue to arise.

THE DISTRIBUTION OF *GEOCHELONE CARBONARIA* AND *G. DENTICULATA*

Pritchard and Trebbau (1984), in their "The Turtles of Venezuela" have attempted to place the fauna of that country in a continent-wide context. They have, among other things, compiled very extensive locality lists. These lists are certain to become standard references, but their very uneven quality has led to some unsound conclusions.

In what I consider the most important case, Pritchard and Trebbau state (*loc.cit*: 4) that "... in the discussion of *Geochelone carbonaria*, for which subspecies, though definable, have not yet been recognized, we have indulged in a more detailed geographic analysis of the entire species." It is my point that their discussion is not well grounded.

Their problems begin with the type locality (*loc. cit.*: 207): "Type locality: 'Capitary' (?), Rio Amazonas, Brazil." Spix's (1824: 23) actual statement is: "Habitat, sub cognomine 'Capitary' (?) ad flumen Amazonum" or translated: inhabits, under the appellation Capitari (?) the vicinity of the river of the Amazon. There is no place called "Capitary" in the Spix and Martius itinerary (Vanzolini, 1981). The question mark most probably refers to the application to a tortoise of the name "capitari", usually restricted to male *Podocnemis expansa*, but not infrequently applied to large males of other species. There is good reason

(Vanzolini, 1981: xxv) to consider Spix's "flumen Amazonum" as the stretch of the Rio Amazonas between the mouth of the Negro, at 03°08'S, 59°55'W, and the mouth of the Furo do Tajapuru, at 01°02'S, 51°2'W. Until sound reasons justify a restriction, I believe the type locality should be left as vague as that.

The distribution of the species in Brasil is treated by Pritchard and Trebbau in two places. First (loc.cit.: 213), as part of the general discussion: "G. carbonaria appears to be absent from the middle and upper Rio Amazon. There are no records for Peru or Ecuador, nor for the western states of Brasil (Acre, Rondônia, and Amazonas), apart from a single specimen (MZUSP 2275) from Nova Olinda, Amazonas. Conceivably, this locality refers instead to Nova Olinda in the state of Ceará, rather than Amazonas."

Second, in Appendix A, "Locality records", they say (loc. cit.: 391): "Note: All Amazonas records are suspect. There are no recent records for Manaus, and Manaus was for years an exporting center for wildlife from a very large area of Brasil. Villa Bella is a town in Departmento Beni, Bolivia. "Amazonas" probably refers to the river system rather than the state. MZUSP 2275, reportedly from Nova Olinda, Amazonas, is probably from Nova Olinda, Ceará."

MZUSP 2275 was bought by me on 21 February 1972, for the expedition's (EPA: Expedição Permanente da Amazônia) kitchen, at Nova Olinda, on the Rio Madeira (03°53'S, 59°06'W). Its field number is 72.0417. Routinely questioned, the seller said that he had caught the animal in his own plot of land, near the town. Were he lying, the possibility is still remote that the specimen was imported from Nova Olinda, Ceará, more than 2,500 km to the east and not on the Amazon river system.

I find it curious that Pritchard and Trebbau (who could have settled the matter with a letter to me) chose to question the locality, rather than the identification. According to them, denticulata would be normal in the Madeira; as a matter of form, I checked the identification.

MZUSP 2275 consists of the shell and head, the latter in alcohol; this is our routine for chelonians used as food. The original identification was made by Regina Lucia Spieker, who curates our chelonians. There are at times difficult specimens of Geochelone, but the present one, examined against Williams's 1960 paper, came out as perfect carbonaria on all counts, even to the constriction of the carapace characteristic of males.

At the same station on 20 February 1972, we collected a specimen of Phrynops nasutus wermuthi, MZUSP 2639. This specimen is cited by Pritchard and Trebbau (loc. cit.: 388) with no reservations as to the locality. In fairness, I do not think they would advocate the presence of P. n. wermuthi in Nova Olinda, Ceará.

We have another specimen of G. carbonaria from the same general area. MZUSP 2896 (field number 75.0899) was also bought by myself for the kitchen on October 30, 1975, from Mundurucu Indians, at their village Coatá (also spelled Quatá, 04°13'S, 59°16'W) on the Rio Canumã. It is a female and had nine large and six small eggs. Again the head and shell are preserved, and they perfectly fulfill Williams' criteria for carbonaria.

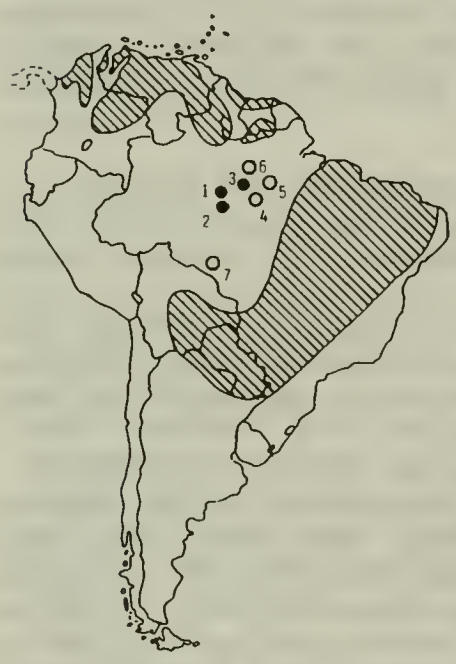
On November 17, 1984, a Museum party collected one female G. carbonaria (MZUSP 3086) crossing the road close to the town of Colorado d'Oeste (13°06'S, 61°24'W) in Rondônia.

Considering the extraordinary growth of the city of Manaus in the last 30 years, this locality will not be discussed here, but it remains to consider the MCZ specimen from Villa Bella cited by Williams (1960). Villa Bella, as Pritchard and Trebbau very properly state, is the name of a town in Bolivia. Meaning approximately "Pleasantville", it is also the name of a few dozen other localities in Latin America. Thus, the path of its identification should be not through simple reference to current gazetteers, but through the pedigree of the specimen. This specimen was donated by the Rev. J.C. Fletcher (E.E. Williams, pers. comm.), therefore the locality is in the Lower Amazon (see text and notes in Kidder and Fletcher, 1941). The locality, an important one, then known as Villa Bella is now Parintins (02°37'S, 56°44'W).

There are thus at least three specimens of Geochelone carbonaria, both old and recent, from the state of Amazonas, and one from Rondônia; Pritchard and Trebbau's tenet cannot be upheld. One wonders what would have led them to take such an extreme position, dismissing so readily data from two collections known as reliable. It would seem that only a strong theoretical point or a very ample empirical basis would justify such an action. A theoretical approach is of course justified in the case of restricted distributions in Amazonia, but none is expounded in the text. On the other hand, an examination of the locality records indicates that the empirical basis is poor.

I have plotted (Map 1) over Pritchard and Trebbau's figure 36,

"Distribution of Geochelone carbonaria in South America", the four localities discussed above, plus eleven others, of specimens in the MZUSP collection accepted and cited by Pritchard and Trebbau as proper G. carbonaria. It is easy to see that figure 36 does not correctly portray the evidence contained in the text. These eleven localities, not challenged by the authors, fall outside the area they assign to G. carbonaria, but fit very well with the questioned records.



MAP 1. Distribution of Geochelone carbonaria. Base map, Pritchard and Trebbau's (1984) figure 36. Solid circle, localities cited by Pritchard & Trebbau. Open circle, new localities: 1, Nova Olinda; 2, Aldeia Coatá; 3, Parintins, (former Villa Bella); 4, Monte Cristo, Aveiro & Fordlandia; 5, Santarém & Taperinha; 6, Lago Jacaré, As Pedras & Boca do Cuminá-Miri; 7, Colorado d'Oeste.

This disturbing conclusion, i.e, that Pritchard and Trebbau did not make proper use of their own distributional data, is strengthened by an examination of their Appendix A, the list of all localities used in preparing the distributional maps. This appendix is extremely heterogeneous, and errors of all types abound. Taking into account substance rather than form, I shall leave aside mistakes in accentuation (e.g. "Orteguazá"), cedille (e.g. "Araça" for Araca), change of letters (e.g. "Placida de Castro" for Plácido; "Araca" for Araçu), which annoy the orderly mind and undermine confidence in the work, but do not really cause excessive trouble in identifying the locality. I shall leave out also mistakes that prevent the precise identification of the locality, but not of the general area. For instance, "Outian Rio Uneuixi, near Tapurucuara (EPA 73.0854)" (Podocnemis expansa) contains a misreading of a handwritten name: Outian is actually Antran. But the Uneuixi is a short river and, on the geographical scale used, the information is valid.

Taking into account, then, only errors that really put at risk the mapping of species distribution, I still find too many of them in Pritchard and Trebbau's list. Here are some examples:

"Brasil, Goiás. Basily Lampiere (MN 53)". (Podocnemis expansa). Basily Lampiéri is the collector (U. Caramaschi, in

litt.). The mistaking of collectors' names for localities is too common an error in specimen lists. For instance, Raul de los Rios, a Peruvian who contributed to the collections of the American Museum of Natural History, has been more than once honored as a place name.

"Brasil: Goiás: Rio Panauá, Rio Acati-Paraná (R. Mittermeier, pers. comm.)". The Paraná do Panauá runs into the Auati-paraná at 02°00'S, 66°11'W in the state of Amazonas, not Goiás. (Podocnemis unifilis).

"Brasil, Pará: Igarapé, Belém (MZUSP 2693)". This is not, as suggested, an igarapé (creek) in or near the city of Belém, Para. It is an igarapé called Belém, at 03°55'S, 69°37'W, in the state of Amazonas, near the Colombian border, about 21 degrees of longitude from Belém. (Platemys platycephala).

"Brasil, Amazonas: Lagoa Silva, Saracu (MCZ 2601)". The correct locality is Lago Saracá, Silves (Dick, 1977). (Rhinoclemmys punctularia).

"Brasil, Goiás: Maripasoula (ZSM unnumbered)". Maripasoula (03°38'N, 54°02'W) is in French Guiana, on the right bank of the river Marouini (=Marowijne).

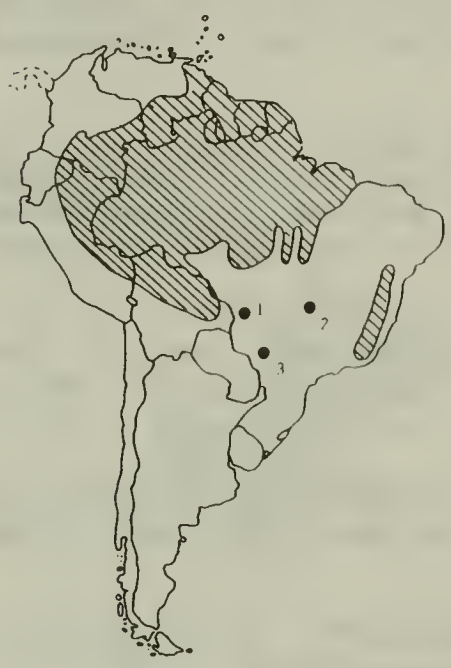
"Brasil, Pernambuco: Pacao (UMMZ 103242)". The locality is Poção (08°11'S, 36°43'W). (Kinosternon scorpioides).

The faulty map of G. carbonaria and these mistakes in the general list of localities make it necessary to examine the treatment of denticulata by Pritchard and Trebbau. In this regard there are also serious problems. Three localities cited on the list are omitted from the respective map (their figure 40): Anápolis in Goiás, Descalvado in Mato Grosso and Nioaque (old spelling Nioac) in Mato Groso do Sul. As it can be seen in my Map 2, and will be commented below, the inclusion of these localities considerably changes the general picture.

Pritchard and Trebbau (loc. cit: 226) state that the "easternmost limit of the Amazonian distribution appears to be reached at the Serra do Tiracambú, Edo. Maranhão, and the Serra Dourada, Goiás".

In fact, the easternmost limit of the distribution of G. denticulata coincides with the easternmost limit at the hylaea itself, a little to the east of the Rio Gurupi, on the Pará-Maranhão border, close to two MZUSP localities cited by Pritchard

and Trebbau: Aldeia Araçu (not "Araca", 02°35'S 46°05'W), on the Igarapé Gurupi-Una, and Chatão (02°18'S, 46°21'W) on the Rio Gurupi. The Serra do Tiracambu (03°15'S, 46°30'W) is an unimportant mesa, some 40 km long and 300 m high, not known to play any biogeographical role. I do not know that it has ever been explored zoologically.



MAP 2. Distribution of Geochelone denticulata. Base map, Pritchard and Trebbau's (1984) figure 40. Localities: 1, Descalvado; 2, Anápolis; 3, Noaque.

As to the Serra Dourada, it is hard to understand how it ever entered the picture. It is some 300 km north of Anápolis and is not known for any biogeographical peculiarities. Additionally, neither locality has anything to do with Amazonia, both being located in the heartland of the savanna-like cerrados (Ab'Saber, 1977).

Descalvado (16°43'S, 57°42'W) is on the northern reaches of the Mato Grosso Pantanal, a seasonally flooded complex tectonic depression of peculiar ecology (Correia-Filho, 1946; Schaller, 1983). Nioaque (21°14'S, 55°49'W), the southernmost record, is on the southwestern edge of the cerrados, approaching the southern Pantanal.

Finally, the citation of Barra do Corda, Maranhão, is a mistake. The good series (23 specimens) that I collected there in 1955 contains all G. carbonaria.

Summarizing, I have the impression that Pritchard and Trebbau did not actually try to plot their non-Venezuelan localities. If they had, the too numerous errors would have become evident and would not have been used as support for sweeping statements. As it is, the distributional maps and the respective comments contradict one another, Pritchard and Trebbau wrongly criticize responsible locality records and, most importantly, they fail to emphasize the main point in the distribution of the two species.

This point is that they are not bound to major morphoclimatic domains, but that the two tortoises occur in both open and forested formations and that there are no other apparent regularities. This

point was first stressed by Williams in his 1960 paper, and no novel contribution has been made since to the matter. There are thus two problems to consider: the topo-ecological distribution of the forms in the open formations and the rationale of their overall distributions. Whether both species of Geochelone follow an Iguana iguana model (Trajano and Ghiringhello, 1978), equally at home and with no apparent morphological differentiation in the forest and in open, even semiarid situations, or are limited in the latter to gallery forest or wooded enclaves, is a matter to be settled by so far nonexistent field work.

On the other hand, this independence from morphoclimatic domains has been well discussed by Heyer (1979) for species of Leptodactylus. These have been shown by serological methods (Heyer and Maxson, 1982) to be old, mid-Tertiary species, immune to Quaternary cycles of speciation related to climatic events. I would guess that the two Geochelone in question tend to follow this model. However, a study of their geographical differentiation demands collections covering the entire area with samples amenable to statistical treatment. This is clearly not the present situation.

PHRYNOPS GEOFFROANUS IN AMAZONIA

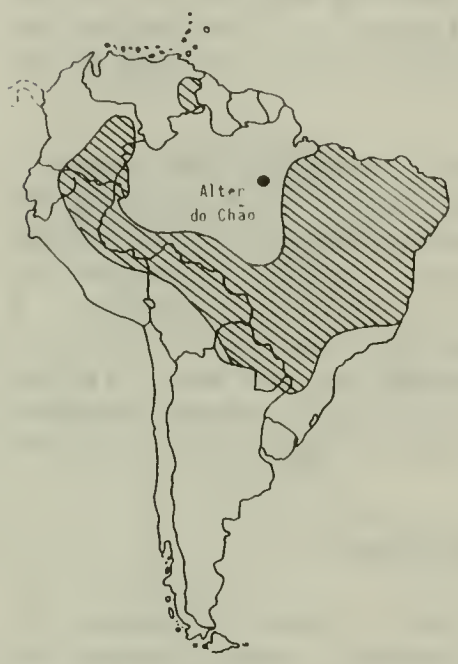
Pritchard and Trebbau (loc. cit.: 115) in their figure 19, "Distribution of Phrynops geoffroanus", show a wide hiatus in Brasilian Amazonia. We have one specimen, MZUSP 2682, collected (19 September 1969) at Alter do Chão (02°32'S, 54°57'W), Pará on the Rio Tapajós (Map 3). I captured this specimen at night on a beach; the late Fred Medem, my companion on that field trip, autopsied the turtle, a female with ripe eggs, and kept notes.

The importance of this find is not so much the range extension itself, but the indication that the species is rare or hard to find. The Tapajós has been very thoroughly collected by many herpetologists, and this is the only specimen so far. In these conditions, negative distributional evidence must be used with much discretion.

TYPE LOCALITY OF PLATEMYS RADIOLATA AND COMMENT ON P. SPIXII

Rhodin, Silva and Mittermeier (1984), in a study of the distribution of Platemys radiolata and spixii (both now Acanthochelys) cite the type locality of the former as São Paulo: Sebastianopolis (= São Sebastião) (23°45'S, 45°25'W)". This

interpretation is a grave error. "Sebastianopolis" used to be the erudite name of the city of São Sebastião do Rio de Janeiro, Rio de Janeiro, in the state of the same name, and the latter is the proper type locality of type locality of Emys radiolata Mikan, 1820.



MAP 3. Distribution of Phrynops geoffroanus. Base map, Pritchard and Trebbau's (1984) figure 19.

Another confusion, though with no taxonomic or nomenclatural consequence, occurs with regard to an A. spixii locality: "São Paulo: Rio Ypanema, near Moji-Guaçu Lake (22°20'S, 46°55'W): Siebenrock, 1904: 28".

The actual Siebenrock quotation, in his paper on the Brasilian turtles in Vienna, is: "Rio Ypanema, aus den Seen bei Mogiguaiú, Provinz São Paulo". Both Rio Ipanema (modern spelling) and Mogi Guaçu (corrected spelling) are good Natterer localities, but they are 135 km apart. I consulted Dr. Franz Tiedemann, Naturhistorisches Museum Wien, who gave as his opinion that "Rio Ypanema", "aus den Seen bei Mogi Guaiu" and "Provinz Sao Paulo" are three independent localities. In fact, examination of Siebenrock's table (loc. cit.) shows that indeed he used commas to separate individual place names; e.g., "Rio Negro bei Marabitanos, Barra do Rio Negro, Rio Solimões", are undoubtedly three localities, not an explicitation of a single locality (Hydraspis rufipes). His use of the indication Provinz in the case of A. spixii, however, makes it probable that only two localities are involved, both in the then Province, now State, of São Paulo: the Rio Ipanema (enters the Sorocaba from the south at 23°34'S, 47°36'W) and some pond near the city of Mogi Guaçu (coordinates of the city correctly given by Rhodin et al.).

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