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Existential Natural History: Artist-Ornithologist Survived Possible Bite from Black Mamba (*Dendroaspis polylepis*, Elapidae) at Remote African Field Site, Died in New York Car-train Wreck

As a teenager, I read Schmidt and Inger's lavishly illustrated (1957) *Living Reptiles of the World* many times and knew that later in the year of its publication (on my 12th birthday), Karl P. Schmidt died from the bite of a captive Boomslang (*Dispholidus typus*, Colubridae; Pope 1958). Until recently, however, I missed their allusion to an earlier tragic tale that spans herpetology and ornithology, one that contrasts dangers of exotic fieldwork with those in our supposedly safer lives back home:

“THE UNPREDICTABLE NATURE OF SNAKE BITE IS VIVIDLY ILLUSTRATED BY THE EXPERIENCE OF LOUIS AGASSIZ FUERTES, THE FAMOUS ANIMAL ARTIST, WHILE IN ABYSSINIA [ETHIOPIA] ON HIS LAST EXPEDITION. WHILE ON HORSEBACK HE SHOT A LARGE SNAKE AT THE ROADSIDE, FIRING THE AUXILIARY CARTRIDGE AND DUST SHOT USED FOR COLLECTING BIRDS. HE WAS FAMILIAR, OF COURSE, WITH THE WIDE-HEADED RATTLESNAKES AT HOME IN THE UNITED STATES AND WITH THE EQUALLY BROAD-HEADED COMMON PUFF ADDER OF AFRICA; AND SEEING THAT THE SNAKE HE HAD SHOT HAD A VERY SLENDER HEAD AND NECK, HE DID NOT THINK IT COULD BE VENOMOUS. HE DISMOUNTED AND PICKED IT UP, AND THE SNAKE, WHICH UNFORTUNATELY TURNED OUT TO BE A MAMBA AND NOT YET DEAD, TURNED AND BIT HIM ON THE FINGER, PUNCTURING THE SKIN WITH A SINGLE FANG. THE ASTONISHING RESULT WAS THAT NO SYMPTOMS OF POISONING DEVELOPED! EITHER THE SNAKE HAD SOMEHOW EXHAUSTED ITS VENOM, OR THE FANG WAS STOPPED UP WITH DIRT, OR FOR OTHER REASONS UNKNOWN NO VENOM HAD BEEN EJECTED WITH ITS BITE. THE SNAKE WAS PROPERLY PRESERVED, AND IT DOCUMENTS THE STORY AS SPECIMEN NUMBER 12738 IN THE CHICAGO NATURAL HISTORY MUSEUM'S [NOW FIELD MUSEUM OF NATURAL HISTORY, FMNH] RESEARCH COLLECTIONS.”

—SCHMIDT AND INGER 1957:237–238

Peck (1982) and Brest van Kempfen (2006) briefly recounted the mamba encounter as well as Fuertes' accidental death shortly after returning to the U.S, but additional, sometimes contradictory details are available which I summarize here. As

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it happens, FMNH 12738 (Fig. 1) documents even more than Schmidt and Inger realized.

Louis Agassiz Fuertes was indeed a distinguished explorer-naturalist; a beloved teacher, colleague, friend, and family man; and an exceptionally talented, still widely renowned illustrator of birds and, to a lesser extent, mammals (Anonymous 1927; Osgood 1927; Chapman 1928; M. F. Boynton 1956; Peck 1982; M. Boynton 2013). At least once, while in the Big Bend region of Texas, he painted a non-avian reptile, the Greater Earless Lizard (*Cophosaurus texanus*, Phrynosomatidae), referring to it in a letter to his family as “a glorious little translucent creature” (Peck 1982:64). The snakebite, on April 5, 1927, was not mentioned in his obituaries and only barely in two of three book-length biographies (M. F. Boynton 1956; Peck 1982; but not M. Boynton 2013). Four months later, on August 22, in Onadilla, New York, some 70 miles from his Ithaca home, a load of hay obscured the railroad crossing and Fuertes was killed instantly when a train struck his car. He was 53 years old.

In fact, despite Schmidt and Inger's (1957) statement (likely based on conversation with FMNH mammalogist-expedition leader Osgood and a catalog annotation that the snake “bit Mr. Fuertes in finger without any effect!”), field notes by Osgood and Fuertes for April 5th, as well as later correspondence between them, do not state the artist was actually bitten. He could have, e.g., incidentally grazed a finger with a fang tip, which could account for the lack of envenoming:

“AT ONE POINT THE GUIDE STEPPED BACK STARTLED AND POINTED TO A LARGE SNAKE, WHICH F. SHOT AT SIX FEET, AND WE SKINNED IT ON THE SPOT. IT SEEMED TO HAVE SMALL FANGS, BUT F. GOT A PRICK FROM ONE OF THEM WHICH CAUSED NO HARM.”

—OSGOOD, IN FUERTES AND OSGOOD 1936:218

“A LITTLE LATER ON, OUR GUIDE, JUST AHEAD OF ME, STOPPED SHORT, SUCKED IN HIS BREATH, AND POINTED, BUG-EYED, AT THE TRAILSIDE, AND THERE, GLIDING SLOWLY AND SILENTLY ALONG, WAS THE FIRST SNAKE OF OUR TRIP, A GRAY-GREEN SMOOTH-SCALED ONE OF SOME SEVEN-FEET LONG AND A HALF TO ONE AND THREE QUARTERS INCHES IN DIAMETER. I SHOT IT IN THE NECK WITH SMALL BIRDSHOT, STOPPING BUT NOT KILLING IT. WE ACCOMPLISHED THAT, HOWEVER, WITHOUT MUTILATING IT, SKINNED IT,



FIG. 1. Lateral (upper), dorsal (lower left), and radiographic (lower right) views of the head of a Black Mamba (*Dendroaspis polylepis*) collected by Louis Agassiz Fuertes near Lake Tana, Ethiopia (FMNH 12738); originally catalogued as *D. angusticeps*, the latter long since recognized as a distinct species (Branch et al. 1995). Note external versus radiographic views of the anterior-most neck wound, and in the latter image a single shotgun pellet at the base of the skull (indicated by arrow). Photos ©Field Museum of Natural History, Amphibian and Reptile Collection; radiograph ©Field Museum of Natural History, Geological Collections; both licensed under CC-BY-SA 4.0.

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FIG. 2. Left, top to bottom: .22 and .22 magnum with dust shot, .410 shotgun, and 12-gauge cartridges, the last for which the shotgun is chambered. Right, auxes for the three smaller cartridges, such that they could be fired from either or both chambers of this double-barreled (side-by-side) 12-gauge shotgun.

WITH HEAD ENTIRE, FOR THE FORMALIN BOX, A GOOD CATCH. IT HAD TWO NEEDLE-SHARP TEETH, ONE OF WHICH PRICKED ME A LITTLE; JUST ENOUGH TO SHOW YOU CAN'T BE TOO CAREFUL—IF CAREFUL ENOUGH.* THE MEN WERE ALL SPELLBOUND AND GOT A GRAND SHUDDER; THEY ARE SCARED PINK OF SNAKES, BUT WITH BETTER REASON THAN AT HOME, FOR HERE THREE FOURTHS OR MORE OF THE SPECIES ARE VENOMOUS, AND MANY ARE VERY DEADLY.”

—FUERTES, IN *FUERTES AND OSGOOD* 1936:219

“*THIS PROVED TO BE A MAMBA, ALLIED TO THE COBRAS, AND ONE OF THE DEADLIEST OF SNAKES. FUERTES, WHO HANDLED IT FREELY WHILE IT WAS STILL ALIVE, HAD A VERY NARROW ESCAPE.”

—OSGOOD, IN *FUERTES AND OSGOOD* 1936:219

“PERHAPS YOU'D BE INTERESTED TO KNOW THAT THE BIG SNAKE YOU DALLIED WITH ON THE ESCARPMENT TRAIL IS A MAMBA AND PROBABLY THE MOST POISONOUS SNAKE IN AFRICA. MAYBE THERE IS A GOD, AFTER ALL.”

—LETTER FROM OSGOOD TO FUERTES, JULY 20, 1927; *M. F. BOYNTON* 1956:305

Osgood (1927:471) clearly was troubled by implications of the mamba incident, having noted in an obituary for Fuertes, “Patience he had at the skinning table and the drawing board, but at other times in his impetuosity he was occasionally near to disaster.”

Those same Fuertes diary comments, provided by Osgood, were repeated almost verbatim by Loveridge (1936:43, see below), who gave measurements of 1900 mm for the mamba's intact head and body skin, plus 520 mm for the tail—thus ~7.9 feet in total length, which even allowing for some stretching suggests that the collector's estimate of the snake's size was reasonably accurate. Loveridge also provided the following clarification:

“MR. FUERTES WAS UNDER A MISAPPREHENSION AS TO THE LARGE PROPORTION OF VENOMOUS SPECIES IN ETHIOPIA, NOT MORE THAN ONE IN SIX IS DANGEROUS TO MAN; IT IS HIGHLY PROBABLE THAT THE INCIDENCE OF INDIVIDUALS OF THE VENOMOUS SPECIES IS NO HIGHER THAN IN OTHER PARTS OF AFRICA.”

—LOVERIDGE 1936:43

Having long been impressed by accounts of astonishingly rapid-onset and severe symptoms from Black Mamba bites (e.g., Durrant and Haagener 1992; Spawls et al. 2018:565), I initially was skeptical of Schmidt and Inger's (1957) story. However, Schmidt was already an expert on African snakes when he joined the FMNH staff in 1922 (Adler 1989:91–92), as was Loveridge when he examined the specimen a few years later (Adler 1989:111–112), so misidentification could not explain lack of venom effects. And to further complicate things, half a century after Fuertes' death another expedition member described the shooting of the mamba and its defensive bite in seemingly more revealing detail:

“AN EXPERIENCE WITH ONE OF THE FEW SNAKES ENCOUNTERED ON THE TRIP COULD HAVE BEEN DISASTROUS. AS LOUIE WAS RIDING ALONG, A SIX-FOOT MAMBA, A RELATIVE OF THE COBRA AND ONE OF THE MOST DANGEROUS REPTILES IN AFRICA, APPEARED IN THE TRAIL AHEAD. FUERTES DREW HIS TRUSTY REVOLVER, AIMED OVER HIS MULE'S EARS AND SHOT THE REPTILE. THEN, IN SPITE OF THE HORRIFIED PROTESTS OF THE NATIVES, HE PICKED IT UP. HE WAS CARELESS; THE SNAKE WAS NOT DEAD, AND IT STRUCK, JUST SCRAPING THE SKIN OF HIS HAND.”

—BAILEY 1977:121; PARAPHRASED AND QUOTED IN PART BY PECK 1982:156

Besides Fuertes being on horseback (Schmidt and Inger 1957) versus riding a mule (Bailey 1977), as well as having been scratched on a finger versus a hand, respectively, a third discrepancy could cast doubt on the accuracy of Bailey's account. Fuertes' notes as quoted by Loveridge (1936:43) actually stated “I auxed! [not “shot,” see above] it in the neck...,” incorrectly clarified by Loveridge as “Shot with an auxiliary collecting gun”; I infer that the one-word change in Fuertes and Osgood (1936:219) was made rather than explain “aux,” which originally had been written in the diary. In fact, for museum collectors, aux refers to a chamber insert for shotguns, such that with a single firearm one has the option of smaller rounds, fired without the specimen damage a larger one would cause—e.g., a .22 or .38 pistol cartridge loaded with dust shot (pellet diameter ~1 mm or less, also known as rat or snake shot) or a .410 shotgun cartridge with bird shot (diameter ~3–5 mm). Either type of smaller cartridge can be fired through the barrel(s) of a 12-gauge shotgun (Fig. 2), just as implied by the Schmidt and Inger quote (1957:237). Nonetheless, Fuertes often did use a collecting pistol, as have other ornithologists (e.g., Winker 2010:190) and herpetologists (e.g., Gloyd 1937:fig. 16):

“[FUERTES]...DOVE INTO HIS LUGGAGE FOR A SMALL SHOT PISTOL” AND IN ANOTHER INCIDENT, “LABORIOUSLY EASING HIMSELF FROM HIS MOUNT TO THE GROUND AND PAINFULLY HOBBLING [FROM AN INFECTED THORN PUNCTURE WOUND] AWAY WITH COCKED GUN...”

—OSGOOD (1927:471)

“MEMBERS OF THE A[MERICAN]. O[RNITHOLOGISTS]. U[NION]. WHO CROSSED THE CONTINENT IN A PARTY TO ATTEND THE 1903 SAN FRANCISCO CONGRESS WILL RECALL FUERTES' SKILL WITH A COLLECTING-PISTOL AND HIS ACTIVITY IN USING IT WHENEVER OPPORTUNITY OFFERED; AND SOMETIMES HE MET OPPORTUNITY MORE THAN HALF-WAY.”

—CHAPMAN (1928:16)

“...BAILEY AND I RODE OVER HERE [A SITE NEAR ADDIS ABABA], WITH A CHANGE OF HORSES...I HAD MY PISTOL HANDY, AND COLLECTED 17 BIRDS ON THE RIDE...”

—FUERTES TO HIS WIFE, LETTER OF OCTOBER 21, 1926; *M. F. BOYNTON* 1956:278

So, did Fuertes shoot the mamba with a shotgun or with a pistol? I have found no evidence of “aux” used as a noun or a verb with respect to handguns, and Fuertes’ original notes, as well as the Schmidt and Inger quote—presumably based on talks with Osgood at FMNH—favor a shotgun. A small neck wound on FMNH 12738 resembles a clean slit if the snake’s head is lifted upward, and a radiograph reveals a longer internal cut which transects the spinal column and presumably was fatal (Fig. 1). Between ventral scales 9–13 (counted as in Dowling 1951), where the body was severed and removed, there are two small ragged holes in the dorsal skin, and most mid-dorsal scales have been destroyed between ventral scales 15–19; given that Fuertes shot the snake “in the neck,” at least some of that damage presumably resulted from clusters of pellets that either passed through or were discarded with the carcass. In the radiograph a dense spherical object is visible at the base of its brain case, ~25 mm anterior to the first external wound; it is at least 3 mm in diameter, consistent with bird shot from a shotgun cartridge rather than ~2 mm smaller, as would be the case for dust shot from a pistol. Evidently the pellet caused a puncture, which then was enlarged with knife or scissors to dispatch the snake. Assuming the projectile’s path was direct to base of the skull, it would not have injured either right or left venom injection mechanism; I do not know whether neurological control would have remained intact.

A second question is whether Fuertes told anyone back home about the snake encounter, and if not, why? The mamba is not mentioned in letters to his family during those last weeks in Abyssinia (M. F. Boynton 1956:295–300), nor does his response to Osgood’s letter quoted above, after their return, address the incident (M. F. Boynton 1956:305–306). The public lecture hall at Cornell University’s Laboratory of Ornithology is named for Fuertes, yet the snakebite is not part of local campus lore (C. Walcott, J. Fitzpatrick, and I. Lovette, pers. comm.), nor do his granddaughters recall ever hearing of the incident (M. Boynton and K. Payne, pers. comm.). Given the upbeat tenor of his correspondence, perhaps Fuertes never told the family out of a dismissive attitude toward such mishaps, or so they would not worry during future absences. And maybe herpetologists and mammalogists are more prone to excitement about Black Mambas than are ornithologists.

Finally, was Fuertes actually bitten by the Black Mamba? Dry bites by that species are known (J. Marais, pers. comm.), notwithstanding formidable venom and—for an elapid—long fangs (~6–8 mm in FMNH 12738, right fang protruding below jaw line in Fig. 1; cf. Bogert 1943:335). The artist himself might not have discerned if the “prick” to his finger came from glancing contact with a wounded snake’s fang or an active strike. Moreover, biologists have survived both dry bites and severe envenoming from other deadly snakes, and only rarely have died from snakebites; estimates based on accident and visitation rates at field stations indicate that the risk is extremely low (Carr 1969; Colwell 1985; Hardy 1994; Hardy and Zamudio 2006; Adler 2007:254–255). Naturalists do die violently in the field (Conniff 2010), but judging from my own decades of work with venomous snakes in the U.S. and abroad, as well as from published estimates, we are in greater danger from planes, vehicles, and armed men (e.g., Murphy 1997; Sasse 2003; Winker 2010; Greene 2013:97–98, 119–120). What can be said with certainty is that Fuertes carelessly handled an injured but moving, extremely dangerous serpent, and survived the experience. He was not so lucky with the train.

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