

## A quagga photographed in Africa

(Mammalia, Perissodactyla, Equidae)

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Gustav Theodor Fritsch, a nineteenth-century German medical doctor and anthropologist, travelled through southern Africa between 1863 and 1866 recording his observations in a diary accompanied with photographs. He photographed a quagga (*Equus quagga quagga* Boddaert, a subspecies of the plains zebra that became extinct by the late nineteenth century) in April 1864 at a farm near Bloemfontein and used photoxylography to print it. This image, together with the better-known photographs of a quagga taken at London Zoo, provide valuable evidence about the phenotype of these animals that can be used to assess contemporary descriptions and illustrations.

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The twenty-first century has seen renewed interest in quaggas (*Equus quagga quagga* Boddaert, 1785), an extinct subspecies of plains zebras endemic to southern Africa whose upper bodies had a pronounced brown coloration, and whose stripes were confined to their heads, necks, shoulders and forequarters (Harley et al. 2009, Jónsson et al. 2014, Pedersen et al. 2018). This paper focuses on a photograph of a quagga taken by Gustav Theodor Fritsch (1838–1927) in southern Africa. The photographic techniques used under field conditions in the mid-nineteenth century and the contents of the photograph are both of interest.

A quagga mare (*Equus quagga*, then thought to be a different species from the plains zebra) was bought from a wild animal dealer and kept at the London Zoo from 1851 until her death in 1872. She features in five photographs taken in 1863 and 1864 by Frank Haes and in 1870 by Frederick York (Huber 1994) as part of their photographic collections of zoo animals. It is stated frequently (Huber 1994) that this animal was the only living quagga to be photographed; however, we believe that Fritsch's

photograph (reproduced as Figure 1) also shows this same subspecies.

Fritsch, a German anthropologist, travelled through southern Africa in 1863–1866 with a tripod camera, chemicals and glass plates that he developed in a tent (Dietrich & Bank 2009). He used two photographic processes, namely the wet collodion that was widely in use from 1851 and the then new dry plate process. Whereas the wet collodion required that glass plates be photosensitized on site, exposed while still wet, and developed immediately thereafter, with the dry-plate process a number of plates could be prepared and kept for several days. Dry-plate techniques were still in their infancy at the time, only three dry-plate processes having been introduced by the early 1860s: the dry collodion, collodio-albumen and tannin processes. It remains unclear what dry-plate method Fritsch used and to what extent he used it. On one of the rare cases where he writes about his photographic processes in his book, he mentions that while in Cape Town he began testing a new method: "I used these days



**Fig. 1.** A woodcut of a quagga, young wildebeest, blesbok and ducks photographed at Quaggafontein, the farm of Andrew Hudson Bain, in present-day Bainsvlei (then Bains Vley), southwest of the city of Bloemfontein. In his diary, Fritsch recorded that he visited Bain's farm on April 8, 1864. The photoxylograph of the quagga shows the dark dorsal stripe extending to the dock of the tail, the unstriped legs, and the body stripes that terminate at the white of the belly. Reproduction of figure 25 in Fritsch (1868).

to prepare myself for a new photographic process that I thought of utilizing on my journeys through the country" (Fritsch 1868, pages 30 and 31). He noted that he had taken the opportunity of testing prepared dry plates on his visit to Camps Bay. The disadvantage of the new dry plate method was that the exposure time was double or triple that of the wet plate exposure. Under good lighting conditions the wet plate was roughly 20 seconds. Probably when photographing human subjects, he used the wet plate method as people cannot sit still for too long (something which Fritsch often complained about). With landscapes he most likely used dry plates, and perhaps also with domesticated animals.

The fate of the original quagga photograph used to produce Figure 1 is unknown. Fritsch converted the photograph into a wood engraving through a process called photoxylography or facsimile wood engraving, whereby photographs were photochemically transferred to wood blocks for engraving and the engraver could manually reproduce the image without the intervening process of a draughtsman to redraw the pictures. Most probably, in our view,

the wood engraving used to produce Figure 1 was reconstructed from other photographic images of these animals as the stone wall in the background with the window and shutters was drawn separately from other reference material and looks less 'photographic' than do the animals.

David Barnaby (a naturalist who was a quagga enthusiast) appears to be the only other author to have commented on Fritsch's photograph (Barnaby 1996). He discussed whether this animal was a well-striped quagga or a closely related subspecies *Equus quagga burchellii* Gray, 1824 that has similar coat coloration to quaggas, although with more stripes. This is a valid question as plains zebras show a cline in coat markings with quaggas – as the most southerly form of the species – having the least stripes and the most brown background coloration. There was variation, however, even within the subspecies, as some quaggas had stripes only on their faces, necks and forequarters, whereas for others the stripes extended as far as their rumps. The latter might be confused with the least-striped animals of the adjacent cline, *Equus quagga burchellii*.

Quaggas lived in the Cape Colony, and in the Orange Free State where they shared the northeastern part of their range with *Equus quagga burchellii* (Boshoff et al. 2016). Andrew Bain's farm was located in the Orange Free State and so the zebra photographed on his farm could have been either of the two local subspecies; however, there are two arguments in favour of the animal being a quagga.

The zebra in Figure 1 is striped on its body to approximately the same degree as the well-striped quagga specimens in the Natural History Museum at Tring, United Kingdom, the Natural History Museum Vienna, Austria, and the Museum Wiesbaden, Germany. Importantly, the animal in Fritsch's photograph resembles quaggas in the absence of stripes on its legs. By contrast, leg stripes are present in most specimens of *Equus quagga burchellii* (Groves 2002).

Fritsch referred to the specific animal he photographed as a quagga: "Der Zwinger ist belebt von verschiedenen Antilopen, dem Quagga und mannigfaltigem wilden Geflügel ..." (Fritsch 1868, page 136). Although the name 'quagga' was sometimes used indiscriminately in southern Africa to refer to zebras (Skead 1980), *Equus quagga burchellii* was termed the "bontquagga" (striped quagga) to distinguish this subspecies from the true quagga. Fritsch, knowledgeable about the fauna of southern Africa and trained as an anatomist, anthropologist and physiologist, would have used the word 'quagga' with precision when referring to the animal in Figure 1.

We argue that these observations support the view that the zebra photographed by Fritsch was almost certainly a quagga. We therefore believe that its photograph can, like that of the mare photographed in London Zoo, provide valuable evidence about the appearance of quaggas that can be compared with contemporary descriptions and illustrations. In particular, Fritsch's photograph is evidence that William Cornwallis Harris who hunted in southern Africa during 1836 and 1837 and provided some of the earliest descriptions of African animals was incorrect in featuring full horse-like tails in his paintings of quaggas and in his description of these tails as 'strictly equine' (Harris 1969, page 12). As shown in Fritsch's photograph (Figure 1), the tail of that quagga, unlike those of horses, has a distinct dock at the base of the tail which is not covered by long hair. Additionally, Harris's painting of quaggas shows that their dark stripes are confined to the uppermost part of their bodies, whereas Fritsch's photograph shows them to be much more extensive – extending down to the white of the belly.

Recent genetic studies have provided the complete genome of quaggas (Jónsson et al. 2014), and have shown the migration of their ancestors from Central Africa to habitats in southern Africa in the

last 367000 years (Pedersen et al. 2018). To complement this fascinating genomic information, we believe Fritsch's photograph provides a clear image of the phenotype of quaggas.

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