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Full Length Research Paper

The study on the authenticity of the wild South China tiger on an hunter's photos

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The wild South China tigers, with no authenticated sighting more than 25 years, are generally considered functionally extinct. A hunter has published a set of photographs of a South China tiger that he claims were taken in the Daba mountain of China on October 3rd, 2007. Subsequently, a month later (but claimed a six-year-old product by its manufacturer), a tiger picture poster appeared in the public domain. The result has been a controversy over the authenticity of photographs; the tiger photos being widely believed to be copied from the tiger picture poster. However, upon analysis of all the photos, it is concluded that the tiger in the photos is a 3-dimensional, animate object, suggestive of a living tiger have been photographed from the mountain. Comparing the poster tiger with the photo tiger, it appears that the poster tiger is an artificial monster that had been copied and modified from the photo tiger. As good news, the wild South China tiger have not been extinct.

Key words: Wild South China tiger, photo-tiger, poster-tiger, authenticity.

INTRODUCTION

The subspecies of tiger, South China tiger, is considered to be the "stem" tiger and was estimated to number 4,000 in the early 1950s. But following the extermination in the "anti-pest campaigns" during 1950s to 1970s, this subspecies has not been authentically sighted in the wild after 1983, and is believed by many scientists to be "functionally extinct". Consequently, the South China tiger has been listed as one of the world's ten most endangered animals.

The Daba Mountain in Zhenping County, Shaanxi province of China is a traditional South China Tiger's habitat. Although this animal has not been spotted there over 25 years, villagers claimed to have encountered them several times in the last decade. Whether the South China tiger is really extinct?

An excellent hunter, Mr. Zheng-Long Zhou, had published a set of photographs of a young South China tiger that he claimed to have been taken in the Daba Mountain in October 3rd, 2007, after more than one month search in the forest (Rare-tiger photo flap makes fur fly in China. Science, 2007, 318: 893). Subsequently, a month later, a tiger picture poster appeared in the public domain that was claimed to be a six-year-old product by its manufacturer (Tiger tracked to this 2002 poster. Science. 2007, 318: 1701). Since then, controversy over the authenticity of photographs has been ongoing for over two years in China. This paper reports the results of a scientific investigation of the controversy. The research principle is based on the 3-D structure and active change, contrasting to the plane and still picture. This paper documents many convincing evidences to conclude that the tiger in the photographs is three-dimensional, live and moving.

MATERIALS

Mr. Zhou has taken 40 photos by a digital camera (Canon 400D) and 31 photos by a film camera. But most of the photos were poorly focused with very small object and only about 10 digital photos can be used for well analysis. In the Investigation of the scene of Zhou took the photos, he hid himself behind a large stone 9.4 m away from the tiger. The tiger picture poster was obtained from the manufacturer.

RESULTS

Three-dimensionality of the object (tiger) in Zhou's photos

Stem along the tiger body

A small stem with three large leaves extends immediately behind the tiger's tail, running backwards and right to the tiger's hip, is observable in photo number 29 (Figure 1). One of the leaves is seen to cover a bit of the tiger's back and stretch behind its head. Photo number 40 (Figure 1) too demonstrates the same cross relationship between the stem and the tiger's tail.

If the tiger is an erect cardboard, the backward inclined stem must have stretched apart from the back of the cardboard and hence could not have crossed up to the tiger's tail and hip and, thus, would not overlap its back. An attempt to reproduce the effect by taking a photo of a poster tiger and a stem has been made. As noticeable in Figure 2, only if the stem is slightly inclined forward does it cross the tiger's tail, and hence the leaf covers the back of the tiger. Only if the tiger was a 3-D object the stem could stretch along the tail, hip and the back of the tiger as seen in the photo.

Moreover, it may be noted that there are three big leaves (stretching above the head, back and in front of the left neck of the tiger) that cover part of the borders giving the impression of something having been hidden behind the leaves. Furthermore, the exposed borderlines, especially in the tail and back, demonstrate a natural transition from the tiger to the environment. On the contrary, if the photos were taken from a cardboard, the exposed borderlines of the tiger must have been sharp. No such evidence of sharp borderlines is observed in Figure 1.

Inspection of the photo scene revealed a small living stem in the region of the tiger tail, which is the only tree in that area. Also the three types of dry leaves have been found in the ground (Figure 9). These indicate that the tree and the leaves naturally grew there, not artificial added.

Stem penetrating through the beard and cheek hairs of the tiger

In photo number 6, a green stem with green leaves appears in the front of tiger's head; to the right, the stem penetrates through the beard and cheek hairs of the tiger (Figure 3). The white beards are obviously in the front of the green stem and divide the stem into many segments. Upon passing through the beard, the stem runs up and is apparently inserted through a cluster of cheek hairs of the tiger. Consequently, the endings of the hair cluster appear to have been somewhat raised up. Furthermore, this stem does not appear in the same position in some other photos (Photo 40 inset in Figure 3) where the undisturbed relationship between the tiger's normal beard and face is evident. If photographed from a poster, the relationship should have been unvarying through the entire series of photographs. This strongly suggests evidence that the tigers in the photos are three dimensional objects with real bread and hairs.

The change of shadows on the nose and lips of the tiger

In photographs, the snout of animals is a good region for checking their stereo attributes. If the photo was taken from a living tiger, the shadows below the nose, between the two upper lips (at nasolabial groove) and between the lips and tongue must be varied on the focus and position of camera or the movement of tiger itself. It is fortunate that such change have really existed in the photo tigers. As observed in Figure 4, a Y-shaped shadow appears below the tiger's nose in photos numbered 6 and 40. However in the poor focused photo number 12, the lower parts of Y between the two sides of upper lips appears to have disappeared; in contrast, the right-upper part of Y is darker in color and wider in size than that in photo number 6. More interestingly, in photo number 29, the left-upper part of Y is not a straight line again but curved towards the nares prominently and formed a curve about 90°. Despite numerous attempts by author, with different focal distances and camera positions, the Y-shape shadows in photographs of the poster tiger never displayed any distortion (Figure 10). Therefore, the snout area in Zhou's photos must be 3 dimensional nose and lips as like in real tigers, but never a planar picture with a Y-drawing.

The change of glisten on the nose tip of the tiger

The wet surface of tongue and the glossy surface of nose tip in the living tiger reflect light; the glisten may be expected to vary with change in photographic parameters (focal distance and position of camera), or the movement of tiger itself. In Zhou's photos, the change in glisten on the tip of nose can be judged clearly (Figure 4).

In the poster tiger, the glisten on the nose tip is a slender, horizontal bar (Figure 10), but in photo number 40, the glisten is as thick as a rectangular form. Furthermore, the glisten in photo number 6 is inclined and triangular form and mainly covers the right part of nose tip. In photo number 12, the glisten is inclined much more and raised a little, thus, exposed the black speckle on the left nose tip that had been covered by glisten in both the photos 6 and 40. These variations indicate movement of tiger head while taking the photo, which seems coincident as Mr. Zhou's statement that the tiger ever raised or lowered its head (and erected its ear) while he took the photos. Thus, the change of shape and

Figure 1. The 3-D attribute of the photo-tiger shown by the relationship between a tree stem (arrow) and the tiger body in the numbered 29 and 40 photos. The backward inclined stem indicates a stereo body.

Figure 2. The test to take a photo of the mini poster tiger and a stem. The picture was erected and the stem slightly inclined forward.

Figure 3. Photo number 6 shows a green stem with leaves (green arrow) penetrating through the beard (red arrow) and cheek hairs (yellow arrow) of the tiger. Photo number 40 (inset) shows the normal beard and face.

Figure 4. The change of shadows below the nose of tiger (blue and red arrows) and the change of glisten on the nose tip (white arrow) in the tiger photos.

Figure 5. Dissimilarity in form of the tiger's eyes: In photo number 26, the right eye is largely opened and the pupil is in the center of the eye with a bright central point surrounded by a yellow sclera. In photo number 35, the right pupil is large and partly hidden under the upper eyelid. In photo number 29: the pupil is small and in the center of the eye. In photo number 40, the pupil is small but in the upper side of the eye, and the back of auricle faces the front.

position of glisten on the nose tip indicates a living and moving tiger there.

Relative positioning of the object's (tiger) organs in Zhou's photos

Disparity in the tiger's eye characteristics

In the set of tiger photographs published by Zhou, the size of the eye, the position and size of the pupils in all comparatively well-focused photos are different. The changes of the eye in some photos are remarkable (Figure 5), suggesting the tiger's eye to be active and moving between shots.

Variation in the tiger's upper lips features

Additionally, upon careful analysis of the photos, it appears that the tiger's upper lips too were changing position between shots; the angle between the upper lips in photos numbered 6 and 12 vary significantly (Figure 6).

Dissimilarity in the tiger's tail characteristics

The tiger's tail can only be seen in 8 photos. But the position and shape of the tail differs quite a bit across the set. As noted in Figure 7, the tail is immediately behind the right hind leg in photo number 29, but apart from the right hind leg in photo number 31 and erect in photo number 26. This proves that the tail of tiger was moving at all times.

Doubts have been expressed that, in the photos published by Zhou, the tiger is always lying there without large movement;

Something not expected from an animate object. Zhou explained that the tiger had just eaten a boar, seeming to suggest that it was snoozing that afternoon. Our analysis, based on the variations in relative positions of various organs, suggests that the object was an animate object.

Reconstruction analysis of the photo tiger

Not a single of the photographs in Zhou's set captures the tiger in its entirety. Hence, a reconstruction of the

Figure 6. Change in the upper lips in two photographs: In photo number 12, the upper lip is somewhat more widely opened compared to that in the photo number 6, with a greater angle between the two upper lips (the gap between the blue dotted line and the red dotted line representing the increment in angle). Note, the thicker and asymmetrical tongue with reflected light.

Figure 7. Variation in position and form of the tiger's tail (yellow arrows). In photo number 12, the tail departs from hind leg a little and is horizontally bend back. In photo number 26, the tail appears to be erect among the foliage. In photo number 24, the tail begins to bend back. In photo number 40, a clear tail segment is visible. In photos numbered 29 and 30, the tail begins immediately behind the hind leg and end with an up-curve. In photo number 31, the tail appears to be positioned significantly away from the hind leg.

entire tiger has been attempted in this study. Of all the photographs in Zhou's set, maximum part of the tiger's body (most part of right hind limb and almost all left front limb is exposed) only can be seen in photographs

Figure 8. Reconstruction of photo tiger based on number 29 with parts of limbs from numbers 12 and 24 (red arrows) and a part of thorax from number 12. The left shoulder is behind the tree (yellow arrow), and the limbs are extended along the ground.

numbered 23 and 24. Unfortunately, both these photos are highly blurred. The right front limb is mostly exposed only in photo number 12. The photo number 29 is the best focused of the lot and the ground in front of the tiger is well exposed. Then, the tiger sizes in three photos (photographs numbered 12, 24 and 29) were adjusted according to equal pupil distance and the three tiger images from the three photos were overlapped according to their body strips. When a best fit of the strips was accomplish, their heads or eyes were always found to be non-superposition. By erasing all parts of photo number 24 except of the distal part of right hind limb and all left front limb, and photo number 12 except of distal part of right front limb and thorax, a whole body of photo tiger was reconstructed in clear form (Figure 8). Note, the toes and claws in right limbs were un-recovered. Here, it is clear that the limbs of the tiger were extended along the ground and the right front limb is most ahead on the ground. Apparently, the photo must have been taken from a 3–D tiger or a true tiger.

Investigation of the scene of the photo indicates that the tree beside the tiger (most right in Figure 8) is at a platform (Figure 9). The left shoulder of the tiger is partly visible behind this tree (photo number 24). Thus, the tiger must have been lying on a lower ground behind the tree and extend its limbs to the front of the tree, especially put its left forelimbs on the edge of the platform and resulted a higher left forelimbs in the photos.

DISCUSSION

Documenting the evidences, the present study concludes that the tiger in the Zhou's set of photographs is a three-dimensional, animate object. When taking the photo, the eye, the tail and the mouth of the laying tiger was always moving, the shadows under the tiger's nose and the glisten on the tip of the tiger's nose was always varied. As a sum, Mr. Zhou had taken a wild tiger at Daba Mountain. But the poster tiger have same trips and posture with the photo tiger, what had happened?

Figure 9. The scene after 5 month later shows that the tree beside the tiger in the photos is on a platform.

Figure 10. The tiger picture poster. Besides the clear hairs on ears and around face, all other parts are low resolution, as poor as Zhou's tiger. Also this tiger was monster, armed with primate-like ears, downward canines, tremendous tail and a un-jointed hind limb. Inset: the details in the region of snout of poster tiger.

Who copied whom?

Many believe that Zhou, the photographer, copied the poster tiger (Figure 10). Although the stripes of the two tigers are very similar, the other features of the two tigers are quite different as detailed below:

a. The poster tiger has a pair of large ears and the auricle faces front, which is just like the shape of bats of primates. But the true tiger, especially the South China tiger, has small ears and the auricle faces side as in the normally seen in all carnivores and ungulates. In Zhou's photos, lower part of left ear is relatively well exposed and the back of auricle faces the front in photo number 40, as in normal direction and shape (Figure 5).
b. The poster tiger has a pair of downward canines, possibly those of the upper jaw. But in all carnivores, the lower canines are in the front of jaws, and only if the mouth is wide open are the upper canines exposed. Thus, the "upper canine" in poster tiger is an artificial mistake.
c. The poster tiger's tail appears to be about two-thirds of the hind limbs in diameter; a proportion not known to exist in any known tiger species. In the root of the tail, there has an obvious artificial drawing trace.
d. Differences between the tongues in the poster and the photos are prominent. In the poster, the tongue appears flat and symmetrical (Figure 10). Comparatively, in the photo tiger, the tongue is thicker and asymmetrical, and the right part is thinker and protruded than the left part (Figure 6). The tongue in the photo tiger reflects light prominently, while that in the poster does not seem to do so and lack shine. The tongue in living animals is generally wet and, hence, is expected to glisten.
e. The hind limb of poster tiger is a straight rod without any joint at all. But the real tiger's hind limb have large curve on the joint of knee and ankle.

These five "characteristics" is sufficient to conclude that the poster tiger is an artificial monster, but not a real tiger. On the contrary, Zhou's tiger appears to be a typical South China tiger, with small head and ears, red-brown hairs in the back, rhombus-like strips in the trunk and slender tail. There are only 74 domestic South China tiger in the world and none of them could well be the tiger in the Zhou' photos.

In the poster, the resolution of the ear, beard and eyes of the tiger is high while the other parts of the body, including face, show a poor resolution, just as blur as that in Zhou's photo. This is in conflict with the basic principle of depth of field in photography. According to this principle, in the poster tiger, at least the middle face should be as clear as the posterior ear and the front beard and the body as clear as the head. On the other hand, in Zhou's set of photographs, resolution does not change much over different parts of the tiger. Thus again, the poster tiger is not a real photo.

The poster tiger should be created from Zhou's photos by polished the head part by adding a pair of large and clear ears, a pair of canines and some clear beard and hairs around the face. We have known that the manufacturer have copied one ear from a Bengal tiger from internet and horizontally inverted it to produce another ear, with a little modification. Thus the two ears in the poster tiger are highly symmetrical. But the manufacturer claimed that their tiger was rented from a German photographer as a 12*6 positive film, with high resolution. Evidently, the lie is so terrible that they cannot show us the non-existed film up till now.

All in all, the truth is so clear, just needing to compare the Figures 1 or 8 to 10: how different the face! How different the color! How can copy the Figures 10 to 1 by a camera?

Author's investigation

The present author has investigated tiger traces for three times in Daba Mountain. During the first three-day investigation, two sets of foot print of large cats were found. In one of them, the forefoot is 10.5 cm and hind foot 8.5cm in width (Appendix Figure 1) (http://511.img.pp.sohu.com.cn/images/blog/2009/4/17/22/10/1215fa36c96g214.jpg); in another, the forefoot is 13.5 cm and the hind foot is 10.5cm in width. In the course of the second investigation, wounds were observed in a big tree, which was pierced by large canines and scratched by claws (Appendix Figures 2 and 3) (http://1814.img.pp.sohu.com.cn/images/blog/2009/7/29/0/12/1236f7076c8g214.jpg and http://512.img.pp.sohu.com.cn/images/blog/2010/4/28/10/2/128f4edc605g215.jpg). During the last investigation, also many foot print and tree wounds were observed. Based on the author's experience and knowledge it is estimated that there are about six to eight South China tigers currently living in Daba Mountain. It is exciting news that South China tigers are still surviving in the wild. But the bad news is that the mountain have being destroyed because disavowal of existence of wild tigers there.

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Rare-tiger photo flap makes fur fly in China. Sci. (2007) 318: 893.
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Appendix

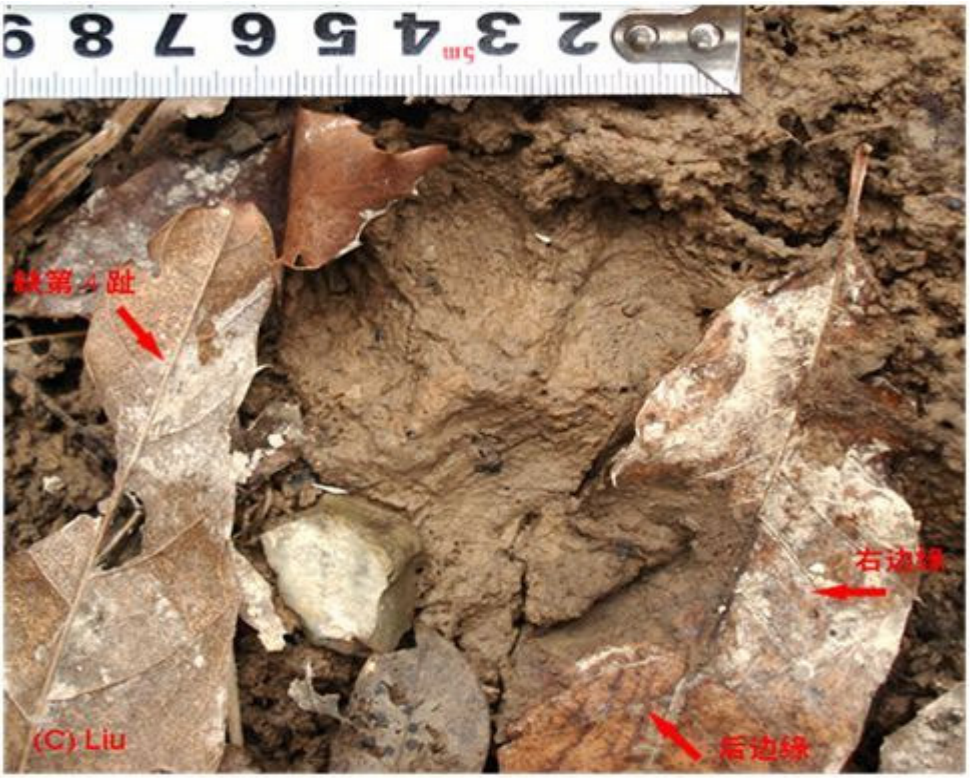

Figure 1. A hind footprint of a large cat or a tiger.

Figure 2. Gnawing traces of canines in the wound of a tree.

Figure 3. Scratched traces of claws in a tree, the distance between traces is 3-5 cm.