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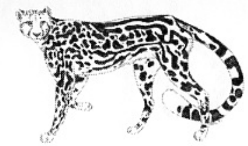


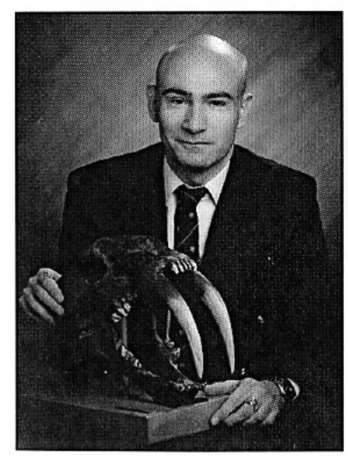
EDITORIAL

Welcome to the third volume of the *Journal of Cryptozoology*, which, I am very pleased to announce, received a record number of submissions. Clearly, therefore, the momentum created by the first two volumes is continuing apace. Although some of the submissions did not survive the peer-review process, five notable – and very different - papers received favourable evaluations. Following the completion of revisions where stipulated by their respective reviewers, these papers were all formally accepted and are now published here.

Consequently, this is the largest volume of the journal prepared to date, and bodes well for its future as a legitimate scientific periodical attracting scholarly and meretricious cryptozoological contributions to the zoological literature. Long may it continue to do so!

The journal is now actively calling for submissions in relation to Volume 4. These should be emailed to me directly (at karlshuker@aol.com). Before doing so, however, all contributors must ensure that their manuscripts have adhered to the journal's presentation style and requirements as given in each volume's Instructions to Contributors section, and also online in the journal's website (at http://www.journalofcryptozoology.com). Failure to do so could result in instant manuscript rejection by the reviewers.

Lastly: All subscription enquiries should be addressed to the Publisher at publisher@journalofcryptozoology.com



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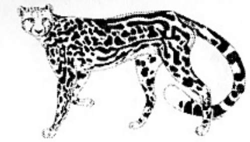

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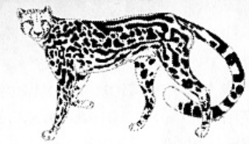

TARGET PRACTICE - EVALUATING AVAILABLE FINE-RESOLUTION SATELLITE IMAGERY AS A POTENTIALLY USEFUL TOOL IN CRYPTOZOOLOGY

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ABSTRACT
The availability of fine-resolution satellite imagery is potentially an attractive tool that could be used in cryptozoological searches for large living dinosaurs in remote parts of the world. Existing full-size dinosaur models can be used for target practice to evaluate the technology and assess its limitations. At present resolutions, most large modern animals can be seen and counted but not identified by type. There is much opportunity for wishful thinking and optical illusions.

INTRODUCTION
With accounts of dragons resembling non-feathered dinosaurs in the historical records of various people groups around the world (Heuvelmans, 1958; Nelson, 2012), there is a perception by some that there may be living dinosaurs in some of the remote and densely forested parts of the world. As a result, cryptozoological field investigations have occurred. The mokele-mbembe is supposedly like the prehistoric sauropod dinosaur *Apatosaurus* in general outline, and has been reported in the northwestern portion of the People's Republic of Congo and in southwestern Cameroon (Mackal, 1987; Gibbons, 2010). The region also has legends of smaller creatures with dinosaur-like features. Sometimes expeditions are conducted, at significant expense, to document their existence, but all have failed to provide conclusive proof of living dinosaurs (Mackal, 1987; Woetzel, 2001; Gibbons, 2010).

Digital imagery for popular cameras is expressed in megapixels, the total number of pixels (smallest picture element) across the area of view. Large megapixel numbers indicate greater detail in the image. For remote sensing imagery, the size of the pixel at ground level expresses the resolution. Small resolution numbers indicate greater detail in the image. Enlargement of imagery beyond the original pixel size produces coarse or blurred images with no further detail.

Google Earth is a free Internet software (with supplements for a fee) that can display detailed satellite imagery of most of the world, with finer aerial imagery of large urban areas. Fine-resolution imagery from satellites is becoming common. American satellites (Table 1) now (or recently) operated by DigitalGlobe, Longmont, Colorado, include panchromatic (greyscale, black and white) resolutions per pixel ranging from 1.0 m to 0.3 m. The European Astrium-Geo satellite constellation also offers 0.5 m (Pleiades). Multispectral (blue, green, red, near-infrared and other bands) resolutions are 4 times coarser. In June 2014, the United States government relaxed the resolution restriction from the present 0.5 m to 0.25 m at some time in 2015 for imagery made available to the public. At such resolutions, large sauropod creatures might be detectable by satellite. Google Earth provides limited samples of fine-resolution satellite imagery, most at 0.5 m or coarser resolution. Searching original archives of these satellites, however, is likely to be very expensive.

Table 1: Launch dates and panchromatic resolutions at nadir (straight down) of some American satellites.

Abbrev.	Name	Launch date	Resolution
IK	IKONOS	1999, Sept 24	0.80 m
QB	Quickbird	2001, Oct 18	0.61 m
OV3	Orbview-3	2003, June 26	1.0 m
WV1	WorldView-1	2007, Sept 18	0.50 m (panchromatic only)
GE1	GeoEye-1	2008, Sept 6	0.46 m
WV2	WorldView-2	2009, Oct 8	0.46 m
WV3	WorldView-3	2014, Aug 13	0.31 m

METHODS

On 6 July 2013, the author visited the Water Park in the southwestern part of the city of Tianjin in northeastern China. There he observed two full-size models of *Apatosaurus* (Figs 1 and 2) and one of *Stegosaurus* (foreground, Fig. 2).

The author checked Google Earth and saw patterns created by these models. They can serve as targets for attempts to identify any large dinosaurs by satellite imagery. They also illustrate the challenges of interpretation.

RESULTS:
SATELLITE IMAGERY

Google Earth imagery was excessively zoomed in and screen captured for an effective 0.184

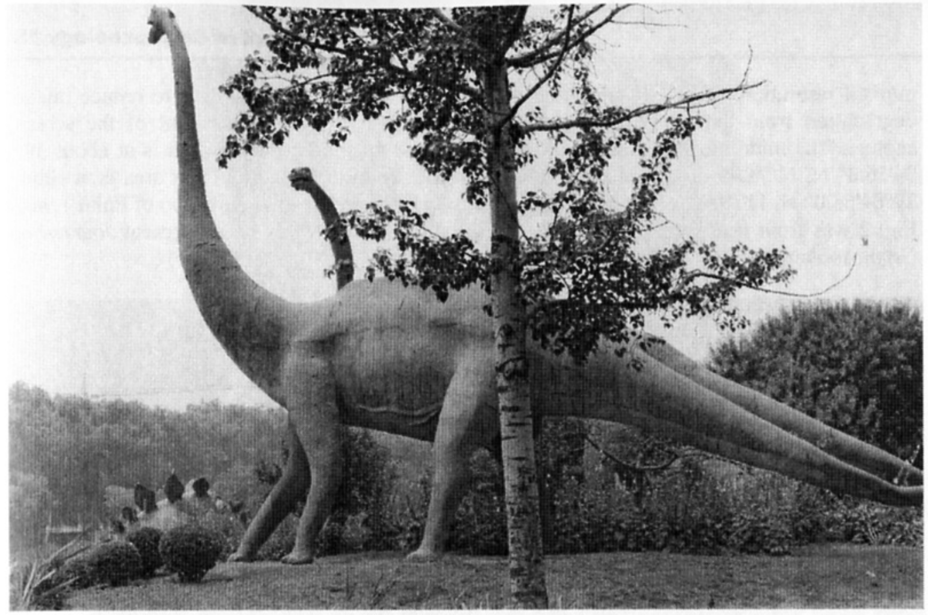

Fig. 1: *Apatosaurus* models in the Water Park, Tianjin, China (Edmond W. Holroyd, III)

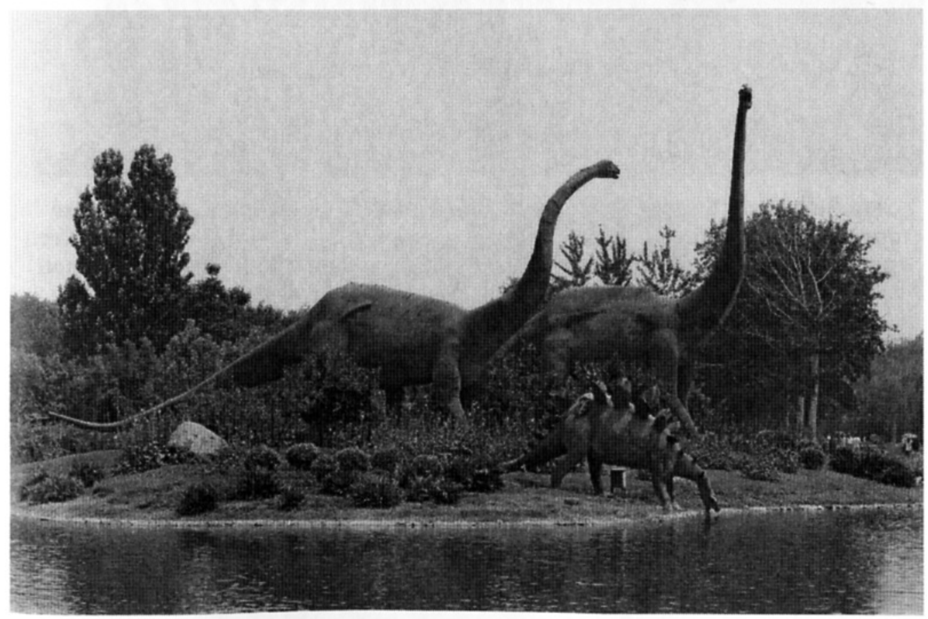

Fig. 2: *Stegosaurus* (foreground) and *Apatosaurus models*, Water Park, Tianjin, China (Edmond W. Holroyd, III)

m/pixel resolution, obviously finer than the satellites can deliver. This was to reduce image degradation from the publication printing process. Fig. 3 shows the extent of the screen capture. The middle of the island on which the dinosaur models are located is at about 39° 04'56.0" N, 117°09'24.9" E. The centre of the dark star in the bright circular area is at about 39°04'55.0" N, 117°09'21.7" E. Fig. 1 was taken from the approximate location of Point 1, and Fig. 2 was from near Point 2. The colour photograph reproduced on this present *Journal of Cryptozoology* volume's back cover was from near Point 3.

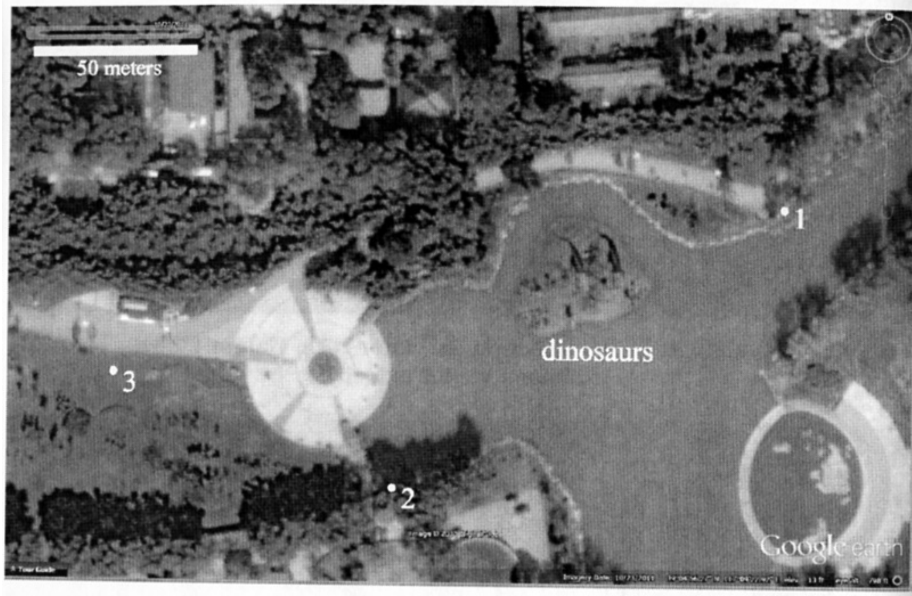

Fig. 3: The southwestern part of the Water Park, Tianjin, China. Approximate locations from which photos were taken on 6 July 2013 are indicated by the three numbers. Image dated 23 October 2011. The dinosaur models are on the island (Edmond W. Holroyd, III)

Eleven dates of satellite imagery were available at the time of the screen captures; they are identified later. The latest scene, for 1 February 2013, was zoomed out to coarser resolutions in order to provide intermediate imagery for georegistration (the process of establishing the geographic location and scale of an image). Positional 'truth' was selected as the panchromatic band 8 of Landsat-8, path 122, row 33, for 5 May 2013 (resolution 15 m). From coarse to fine, the successive Google Earth resolutions, as screen captured and georegistered, were 9.87 m, 3.10 m, 0.71 m, and 0.184 m. Absolute positional accuracy is not critical for this exercise, only image resolution.

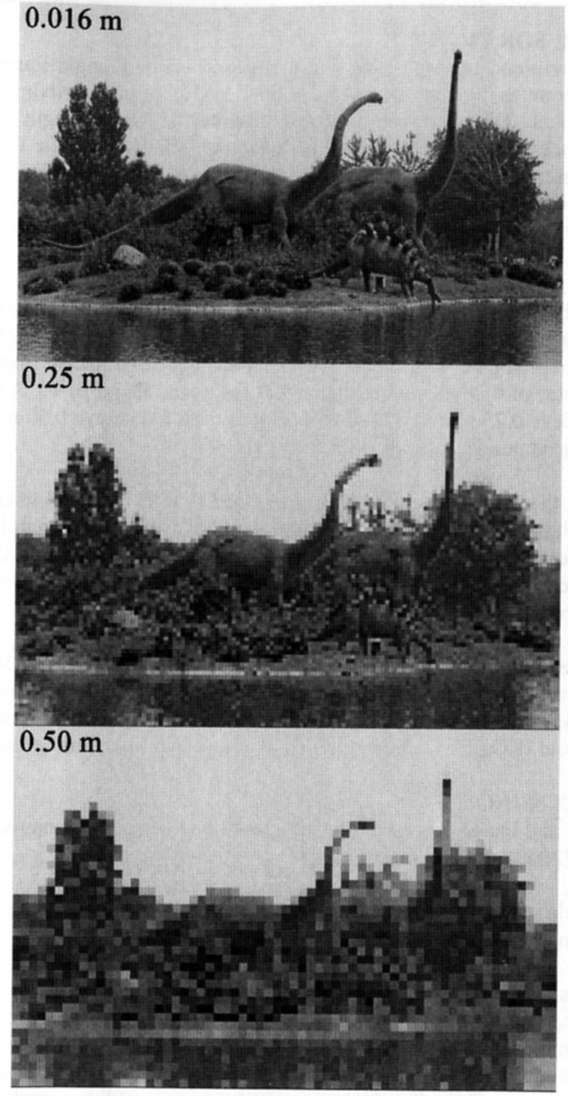

Fig. 4: Fig. 2 image at 0.016 m, 0.25 m, and 0.50 m resolution (Edmond W. Holroyd, III)

PHOTO SCALE FOR FIG. 2

A scale was determined for Fig. 2 by first measuring in the Google Earth image the length from the rock centre to the *Stegosaurus* nose tip: 15.65 m at an approximate distance of 68.5 m from the camera. The same angular view provides a greater length across that view at increasing distances beyond the rock and *Stegosaurus*. Again using the Google Earth image, the distance from the camera to the nearer *Apatosaurus* of Fig. 2 was about 80.3 m. The rock-to-nose length extrapolated to the *Apatosaurus* distance becomes 18.35 m. The image resolution of the digital camera at the distance to the first *Apatosaurus* was calculated as 6.52 mm/pixel.

That is obviously much finer than any commercial satellite can produce. For comparison in Fig. 4, Fig. 2 was reduced to 0.25 and 0.50 m resolution by a 'cubic convolution' process that calculates a resampled pixel brightness over a 4 x 4 matrix of adjacent pixels. The image was reduced by a factor of 4, then another factor of 4 for a total factor of 16. A final factor of 2.40 was used to achieve 0.25 m pixels, and of 4.79 was used to achieve 0.50 m pixels. The extent of the latter reduced image was only 43 x 65 pixels.

To create Fig. 4, the original Fig. 2 view was reduced by a factor of 2.4 to create the top image at 0.016 m resolution. The 0.25 m and 0.50 m versions were then resampled using a 'nearest neighbour' process to produce coarse pixels, expanding them to match the size of the top image. The effective resolutions are indicated in the sky. The imagery was also reduced from colour to panchromatic, like the satellites' finest resolution.

In the 0.25 m version, the large dinosaurs are recognisable. The coarse 0.50 m pixels are fine enough to identify the general outline of the dinosaur models. However, it becomes challenging to separate them from trees and bushes with such panchromatic imagery. 1.0 m resolution (as from IKONOS) would be twice as coarse and likely not recognisable.

IMAGE PROCESSING

Remote sensing and image processing techniques are described in numerous books, including Lillesand *et al.* (2008) and Weng (2012).

Colour could help with target identifications, and a pan-sharpening technique can colourise the panchromatic imagery with the multispectral colours.

Cars are comparable in size to some large dinosaurs. Fig. 5 shows a parking lot at two resolutions using WorldView-2 imagery, enlarged to show coarse pixels. Panel 3 is the panchromatic image at 0.5 m pixels with the best detail. Panel 1 is the grey scale version of the multispectral image at 2.0 m pixels. The scene was intentionally chosen with a diagonal orientation of the objects in view. There are two rows of five cars each, exhibiting various colours. Three additional cars are in the lower left, parked beside a grassy strip with some small bushes casting shadows. The street is in the lower left corner. Buildings and shadows occupy the top and upper left of the scene. Lawn with two shrubs casting shadows and larger trees are in the lower right.

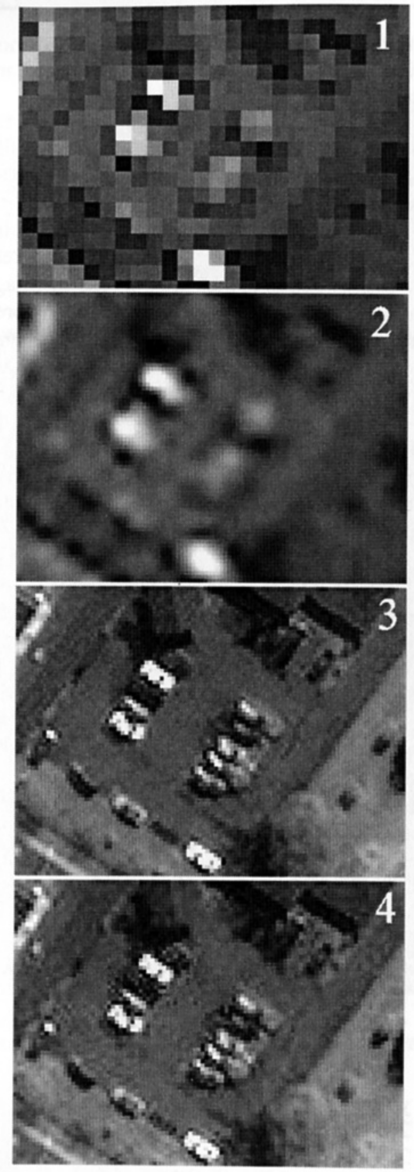

Fig. 5: Parking lot at two resolutions (Edmond W. Holroyd, III]

Panel 2 shows Panel 1 resampled to 0.5 m pixels using the smoothing process of 'cubic convolution'. The resampling does not add further detail. Neither Panel 1 nor Panel 2 resolves the cars and other fine details.

A popular image compression technique is JPEG, creating image files with a '.jpg' file name extension. The colourised (pan-sharpened) version of Panel 3 was exported to the JPEG format, then imported back into the image processing system and transformed back into the panchromatic style. The JPEG image is shown in Panel 4 of Fig. 5. It looks very similar to the original panchromatic image in Panel 3, but notice that some pixel areas have a speckle of different brightnesses in Panel 4. This demonstrates a loss of image detail and truth in the JPEG compression technique. It serves as a warning that compressed imagery may have artifacts that could corrupt image interpretation. The images of Google Earth are compressed, and so original imagery from the satellites is superior and should be examined to confirm interpretations.

SATELLITE TIME SERIES

The island scene was extracted from the eleven Google Earth screen captures of different dates and tiled as Fig. 6. The dates of each image are identified in yyyymmdd format (year, month, day). The variety of resolutions is apparent.

Public access to DigitalGlobe archives to determine which satellite produced the Google Earth image is no longer available. Table 2 identifies most of the satellites using the Image Hunter software of Apollo Mapping (http://imagehunter.apollomapping.com).

The expected resolutions, as mentioned above, are 1.0 m, 0.6 m, and 0.5 m. The sun angle is always from the southeast, as shown by tree shadows in the leaf-off winter scenes. The imagery time is approximately 10.30 am local solar time. The off-nadir angle and viewing direction of each satellite image are quite variable, as indicated by the tilts of buildings elsewhere in the imagery. The street lights, which appear as bright white dots, accordingly change positions with respect to the sidewalks. The solar elevation angles create different shadow positions for the *Apatosaurus* models. Even knowing what is in the image, it is still challenging to distinguish the models and their shadows from other possible objects at 0.5 m or coarser resolution.

Table 2: Identification of satellite imagery and dates in Google Earth views

(NB - Apollo Mapping dates are one day later, likely being China date/time rather than Colorado date/time.)

yyyymmdd	Ident.	Resolution
20001119	IK	1.0 m
20040111	?	?
20051120	?	?
20070324	QB	0.6 m
20090416	QB	0.6 m

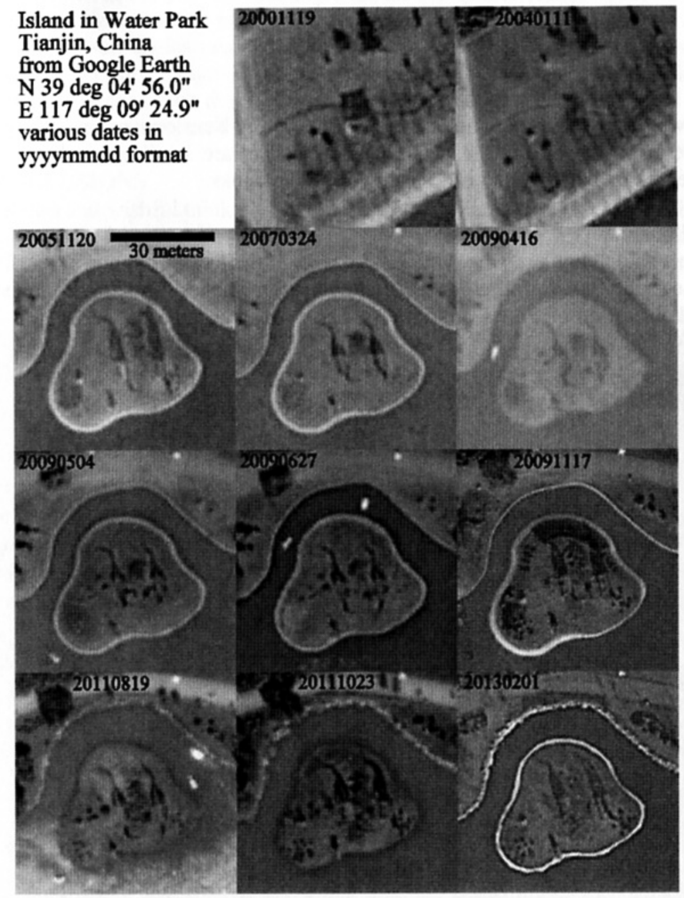

Fig. 6: Various satellite views of the dinosaur models on the island

20090504 QB	0.6 m
20090627 QB	0.6 m
20091117 ?	?
20110819 WV2	0.5 m
20111023 WV2	0.5 m
20130201 GE1	0.5 m

The first two dates show the land and vegetation before development into the park. In later images, the bright spots in the water around the island are small boats. In the cold season images, the trees lack leaves but cast shadows of their trunks.

MOVEMENTS

Live animals should not be in the same positions and orientations in imagery of different days. That is a necessary test for all proposed living dinosaur images. They must move. Imagery of the lower left portion of Fig. 3 provides the series of other dinosaur models in Fig. 7. Date format is yyyymmdd.

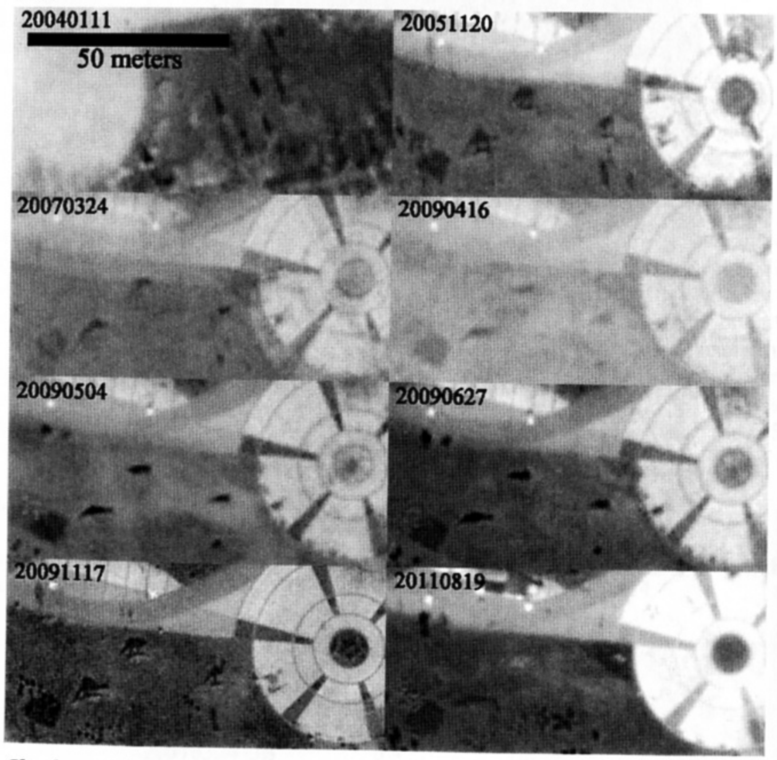

Fig. 7: Shadows of additional dinosaur models in the Water Park, Tianjin, China

The upper left panel shows the land before it was developed into the park. The lower right (and subsequent dates) shows the models and shadows missing. They were not present when the author visited in 2013. The low sun angle for the November scenes in the upper right and lower left has produced shadows of four different types of dinosaur models. For dates in between, the high sun angles nearly merge the model bodies with their shadows, but their positions remain the same. Animals move. In a search for living dinosaurs, a series of images must have only one scene with the animals in view at particular locations, and all other before and after images must not repeat their positions.

OPTICAL ILLUSIONS

Optical illusions and wishful thinking can strongly affect image interpretations. Fig. 8 shows a Google Earth view of the Sangha River, Africa, between Cameroon and the People's Republic of Congo. This is in a general region where some have searched for the mokele-mbembe. The river width is about 317 m.

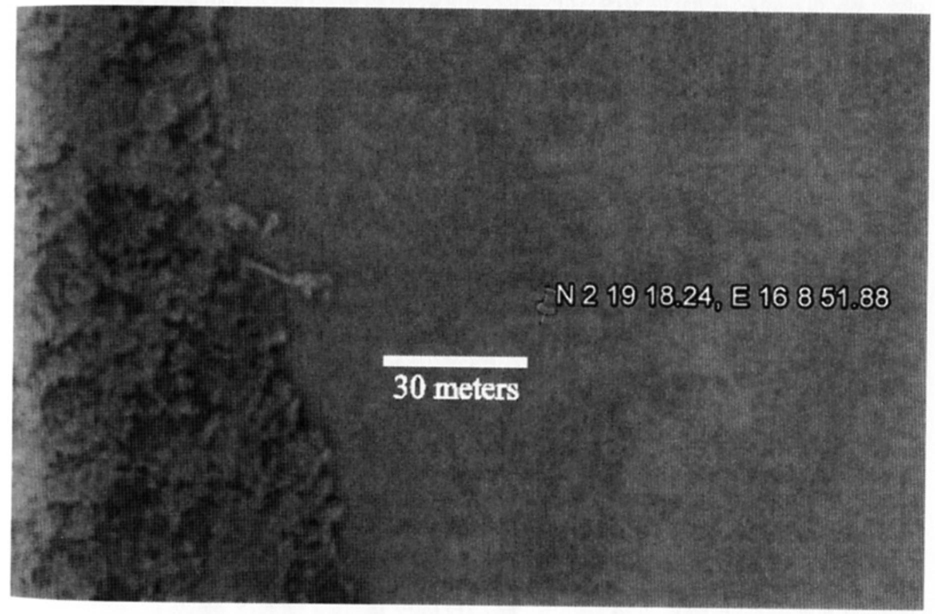

Fig. 8: A view of the Sangha River

At the river shore to the left of the location indicator are some light objects. The size and shape of one of them are similar to the long neck and body of a sauropod grazing on the trees. Imagination could classify the smaller objects as juveniles. However, a search of the rest of the river shows many small objects of similar colour but lacking the sauropod shape. Consequently, the author classifies the objects as fallen trees. Fig. 8 was screen captured from

Google Earth in October 2014, with an indicated image date of 18 January 2005. There are no other images in Google Earth to show before or after views of the object's location.

LARGE LIVING ANIMALS

Google Earth was used to examine areas where some large living animals might be expected. The author looked at Nairobi National Park, south of Nairobi, Kenya. He scanned parts of the Serengeti region of northwestern Tanzania. In both, the largest animals appear in herds as large dots in small speckled patches. Nothing in the body shapes could be interpreted for the type of animal.

The author examined in Google Earth the Maesa Elephant Camp, northwest of Chiang Mai, Thailand. Its demonstration arena is at about 18°53'55" N, 98°52'30" E. He has visited there twice. The Google Earth imagery of that location is of numerous dates and resolutions. At the finest resolution, the elephants that were in the open resembled large boulders, but they obviously moved between images. They could not be recognised as elephants in that imagery.

The zoo at Denver in Colorado, U.S.A., was examined with Google Earth imagery. Many of the available dates had imagery taken from aircraft, providing finer resolution than available from satellites. The apparent resolution of the aerial imagery was about 0.10 m.

Again, the elephants were not recognisable as elephants, just as large boulders. The giraffes, with their long necks, provided good images and shadows for 7 October 2012 and 6 October 2013 imagery, shown in the upper left and upper right of Fig. 9 respectively. The three giraffes and their shadows are circled in those panels, showing the 0.10 m resolution. The later image was resampled to 0.25 and 0.50 m resolution, displayed as coarse pixels in the lower panels where the animals could still be seen and counted but are not recognisable as giraffes. So for any sauropod dinosaurs, they would need to be larger than giraffes and observed with the finest possible satellite imagery.

CONCLUSIONS

Modern fine-resolution satellite imagery, at panchromatic resolution of 0.5 m/pixel, is sufficient to record objects of sizes similar to large dinosaurs. Future imagery at 0.25 m resolution will help with identifications. Although colour resolution is 4 times coarser than panchromatic, a pan-sharpening technique colourises panchromatic imagery to produce scenes shown in Google Earth. Google Earth can be a free method of searching areas of interest but will have some artifacts from the image compression process. Original imagery from DigitalGlobe or Astrium must be purchased, possibly through resellers, for image interpretation confirmation. That can be expensive, especially because most imagery is unlikely to show any living dinosaurs, and optical illusions abound. Multiple images of the same location at different dates are needed to indicate movement of living creatures. Very few large dinosaurs have shapes that will provide distinctive imagery worthy of satellite image searches. Smaller animals sometimes can be seen as large dots and counted in fine satellite imagery but cannot be identified by animal type. Great caution is needed in image interpretation to overcome wishful thinking and optical illusions.

Fig. 9: Google Earth views of giraffes at the Denver Zoo, Colorado

REFERENCES

- Gibbons, W. (2010). *Mokele-Mbembe: Mystery Beast of the Congo Basin.* Coachwhip (Landisville).
- Heuvelmans, B. (1958). *On the Track of Unknown Animals*. Rupert Hart-Davis (London).
- Lillesand, T.M., *et al.* (2008). *Remote Sensing and Image Interpretation (6th Edition)*. John Wiley and Sons (Hoboken).
- Mackal, R.P. (1987). *A Living Dinosaur? In Search of Mokele-Mbembe*. E.J. Brill (Leiden).
- Nelson, V. (2012). *Dire Dragons*. Untold Secrets of Planet Earth Publishing Company (Red Deer [Alberta]).
- Weng, Q. (2012). *An Introduction to Contemporary Remote Sensing*. McGraw-Hill Companies (New York).
- Woetzel, D. (2001). Behemoth or bust: an expedition into Cameroon investigating reports of a Sauropod dinosaur. *Technical Journal*, 15(2): 62-68.

SEARCHING FOR THE PINK-HEADED DUCK IN MYANMAR

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ABSTRACT
Although no confirmed evidence exists for the continuing survival of the pink-headed duck, officially deemed extinct since the late 1940s, a number of claimed sightings have been reported during the subsequent seven decades that offer some degree of hope for this large and very distinctive species of waterfowl's persistence. In the present field report, the author documents his fourth expedition to Myanmar in search of pink-headed ducks.

INTRODUCTION

The only member of its genus, the pink-headed duck *Rhodonessa caryophyllacea* was a large species of diving duck that was instantly recognisable by virtue of the adult male's unique pink head and neck colouration combined with its all-dark body plumage. It was formerly recorded from several northeastern Indian states, and was considered resident in Assam, Manipur, Bihar, Orissa, and Bengal (now split between India and Bangladesh), as well as in adjacent regions of northern Myanmar, with sporadic reports from elsewhere in northern India, westwards as far as Kathmandu in Nepal, and southwards as far as India's Madras (now Chennai) and Maharashtra. Its favoured habitat was secluded pools among tall grass, where it fed by surface dabbling and sometimes diving, and occurred in pairs or small parties, but was always considered shy, elusive, and rare, and suffered from hunting and habitat loss (Madge and Burn, 1988).

The pink-headed duck was a species previously maintained in captivity, but it failed to breed. The last captive specimen died in 1936, 1939, or 1945 (opinions differ – Fuller, 2013), and the last reliable sighting in the wild was made during the late 1940s, since when this enigmatic species has been considered extinct (Madge and Burn, 1988; Birdlife International, 2001; Fuller, 2001; Tordoff, *et al.*, 2008; Hume and Walters, 2012). However, there have been a number of unverified sightings, including some near to the northern Myanmar-Tibetan border during the 1960s, and the locals claim that it does still exist in certain relatively inaccessible, rarely visited localities within its former range (Ara, 1960; Mehta, 1960; Singh, 1966; Madge and Burn, 1988; Eames, 2008; Tordoff, *et al.*, 2008; Hume and Walters, 2012; Fuller, 2013).