Hot Science Cool Talks

UT Environmental Science Institute

100

The Secret Lives of Dinosaurs

Dr. Julia Clarke

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Hot Science Cool Talks 100

The secret lives of dinosaurs

Julia Clarke

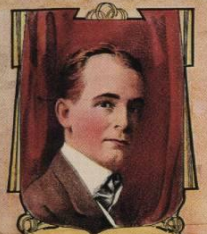
Professor

Jackson School of Geosciences

How have we imagined dinosaurs?

WINSOR McCAY'S "GERTIE"

WONDERFULLY TRAINED DINOSAURUS



WINSOR McCAY
AMERICA'S GREATEST
CARTOONIST.

A Prehistoric Animal that Lived Thirteen Million Years Ago, Brought Back to Life. A Most Marvellous Work of Art, Science and Humor. She's a Scream

GERTIE JUST LOVES AN AUTO.

BOX OFFICE
FEATURE
FILM

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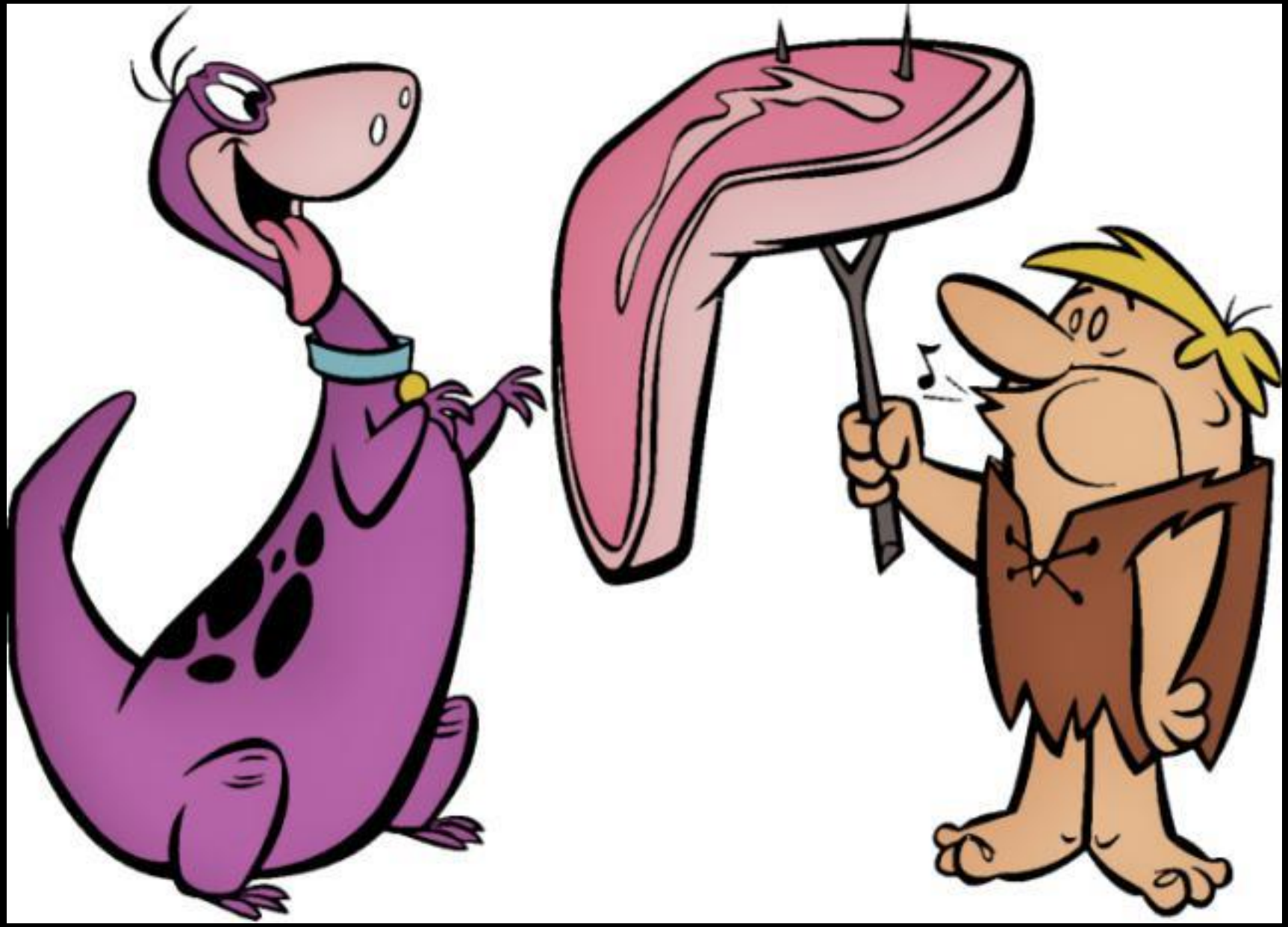
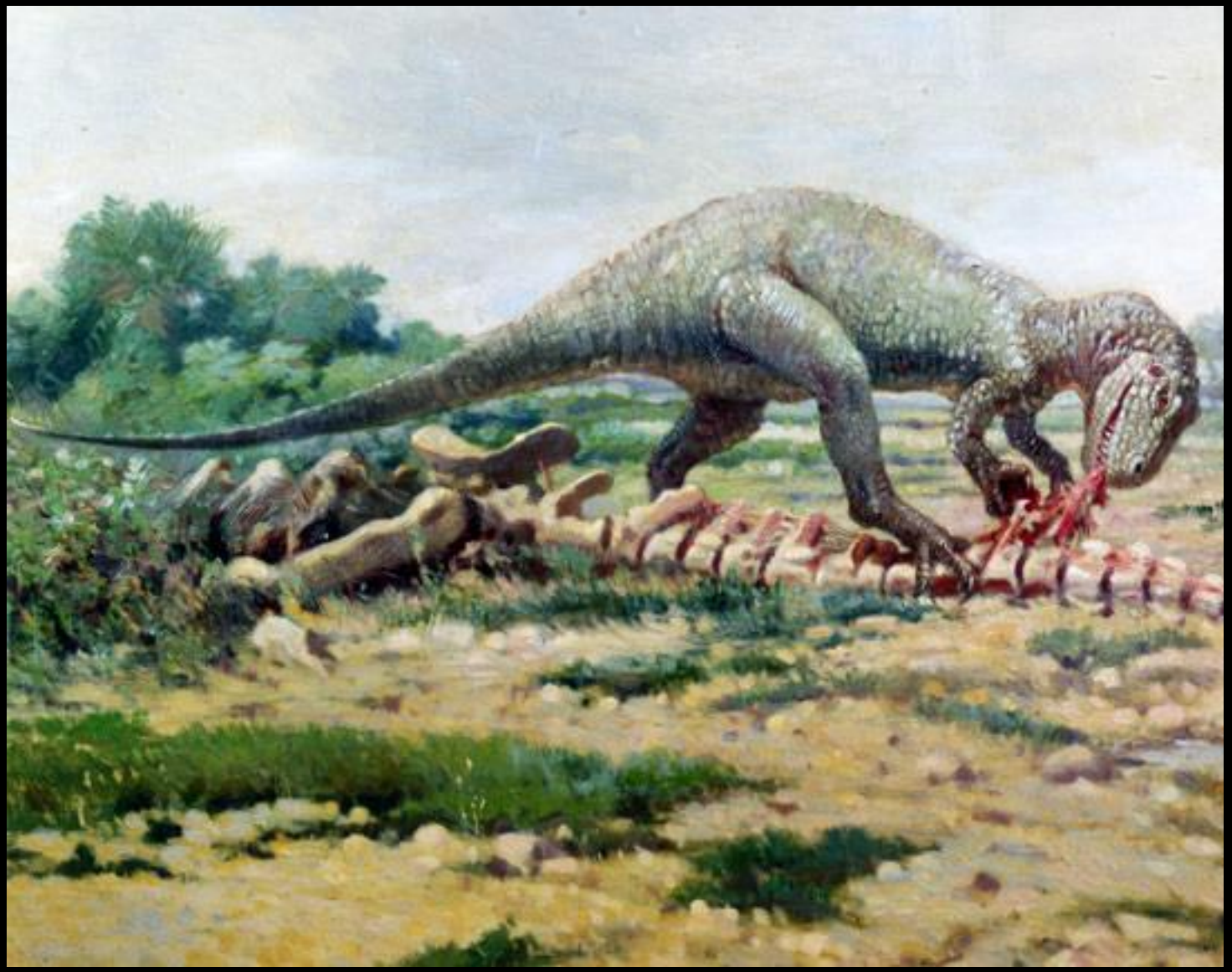
WILLIAM FOX, *President.* EXCHANGES IN ALL PRINCIPAL CITIES.





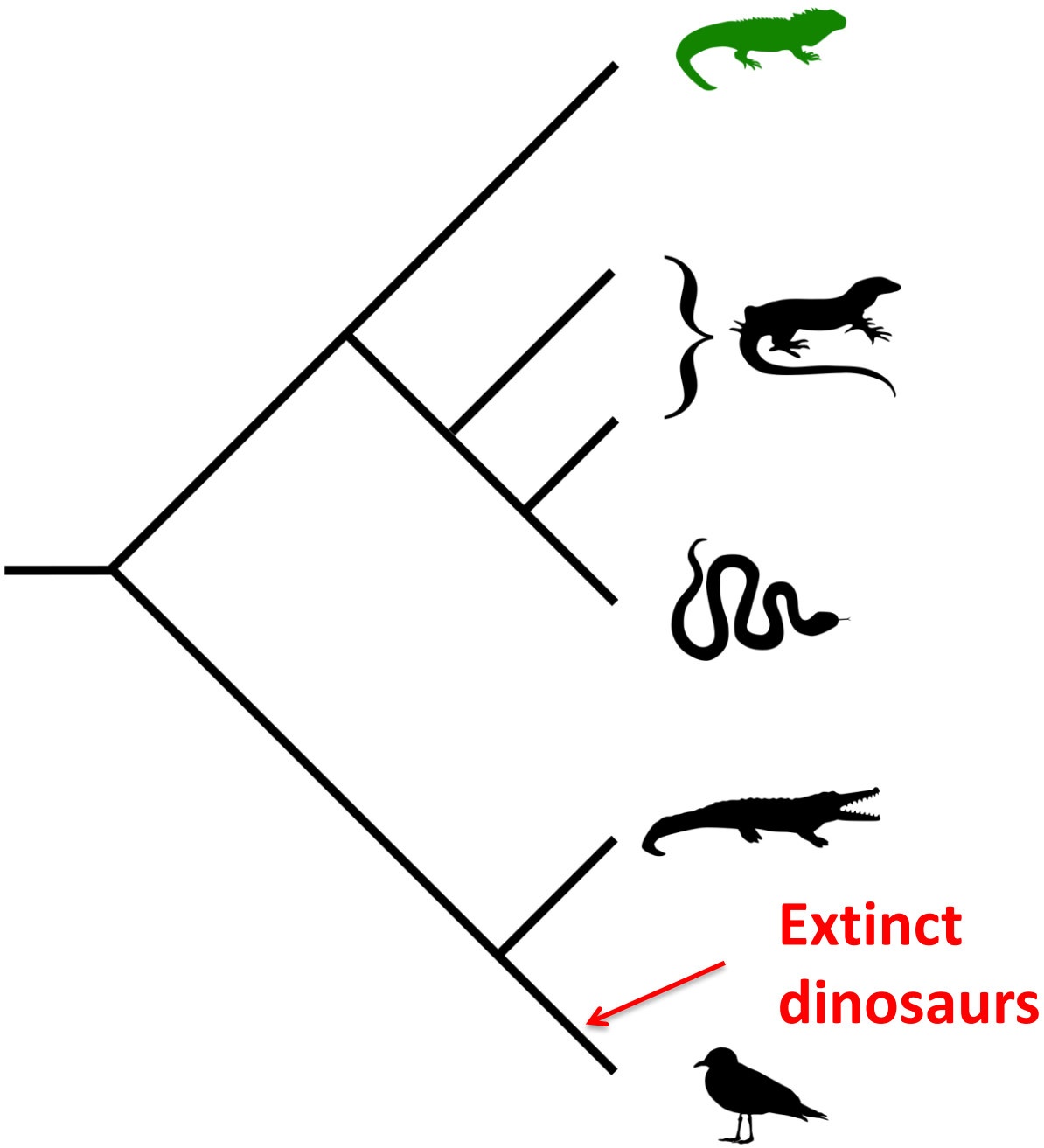
What does science reveal about the secret lives of dinosaurs?

What did they look like?


WGBH-TV
SERIES
THE FRENCH CHEF

Science secrets: can we tell what dinosaurs looked like?

The Age of the Comet ascertained to a Nicety. The Antediluvians Recognise an Old Acquaintance of A.M. 1372.


Extinct
dinosaurs

Living dinosaur

Closest living cousins of dinosaurs

Quarries in Liaoning Province,
and adjacent areas in northeastern China

Rocks ~149 Ma-110 Ma

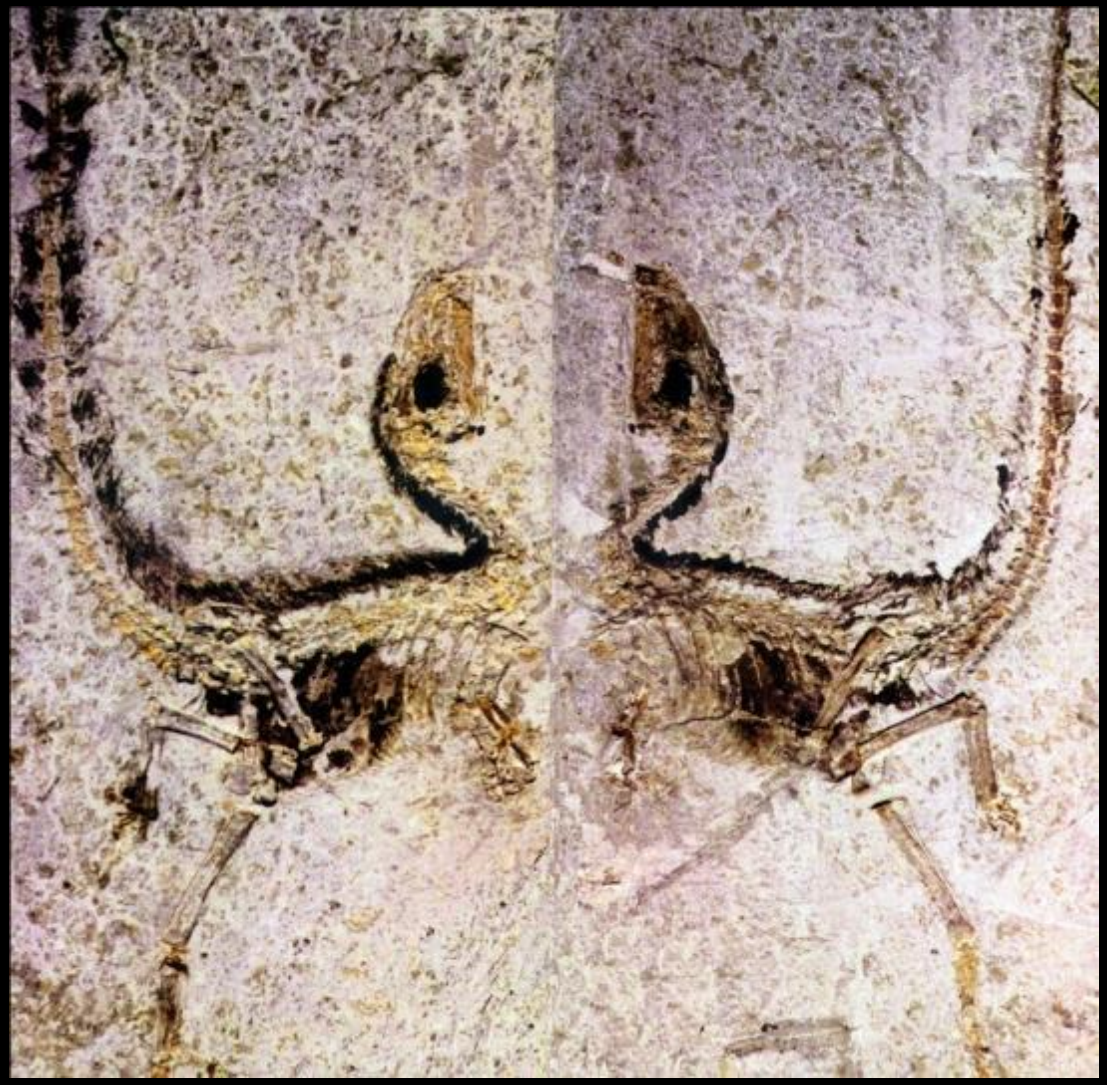
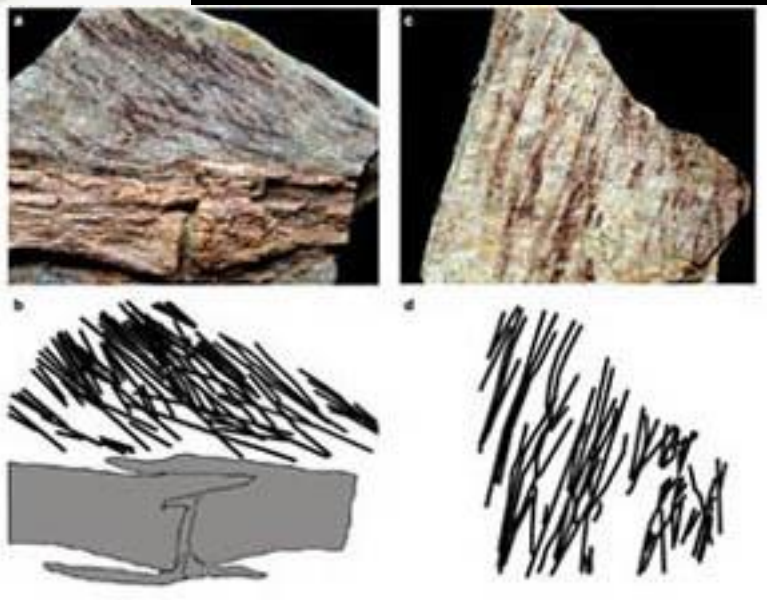
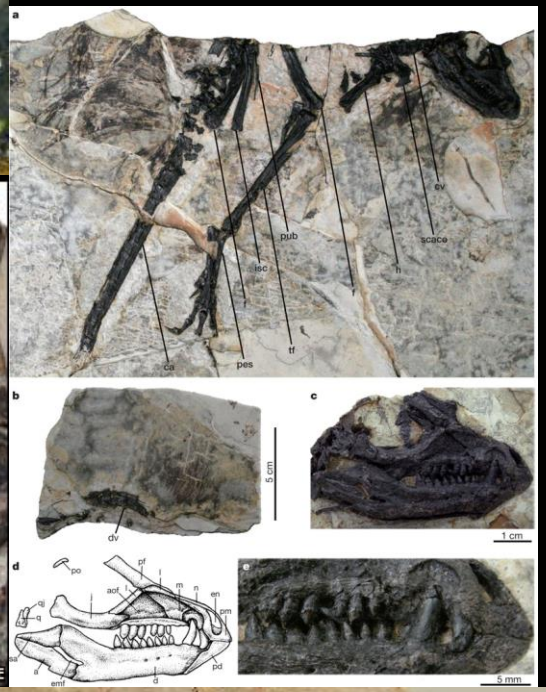


Illustration by © Portia Sloan

Xu et al., 2004

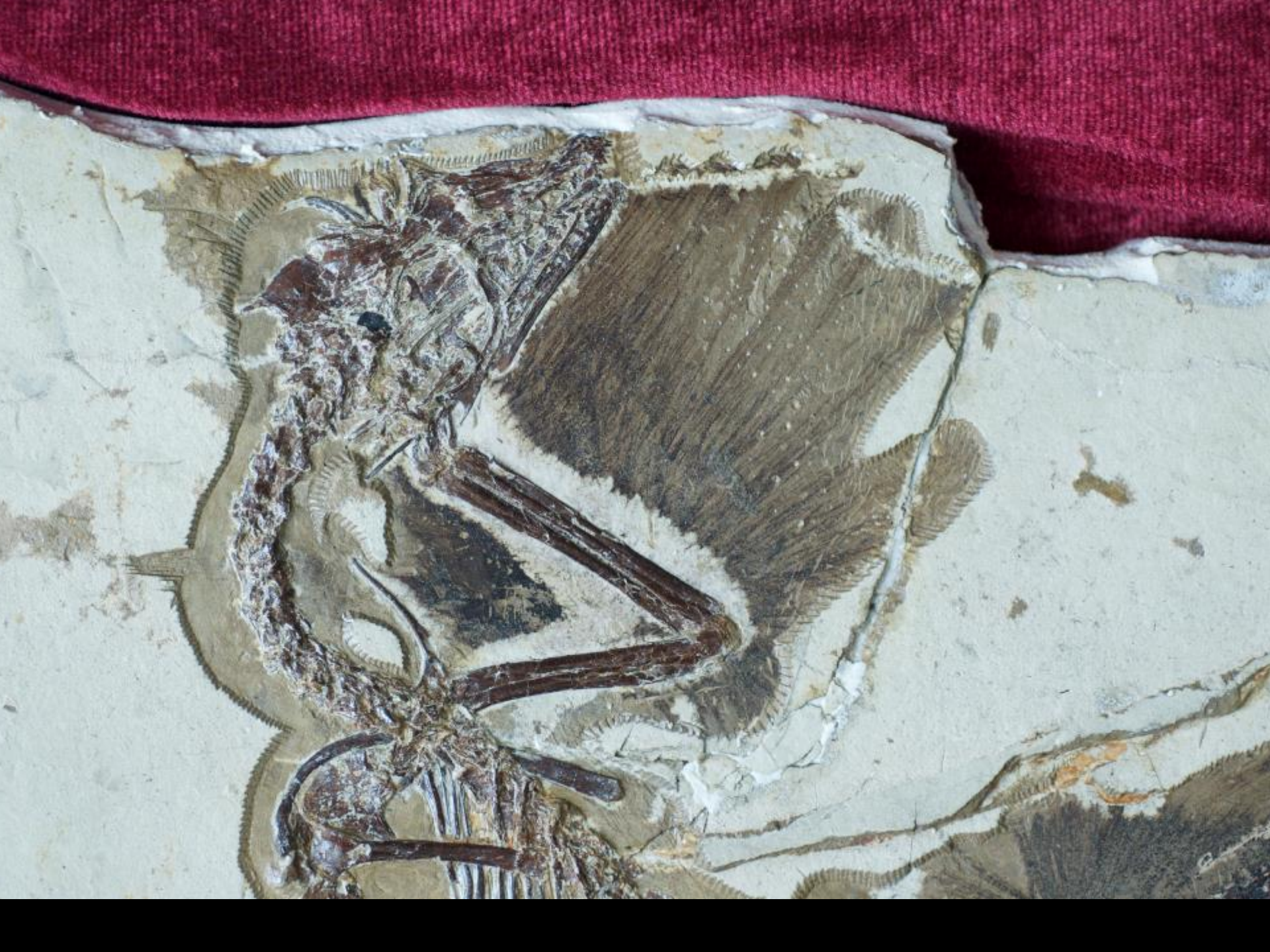


Dilong : a proto-feather covered tyrannosaurid

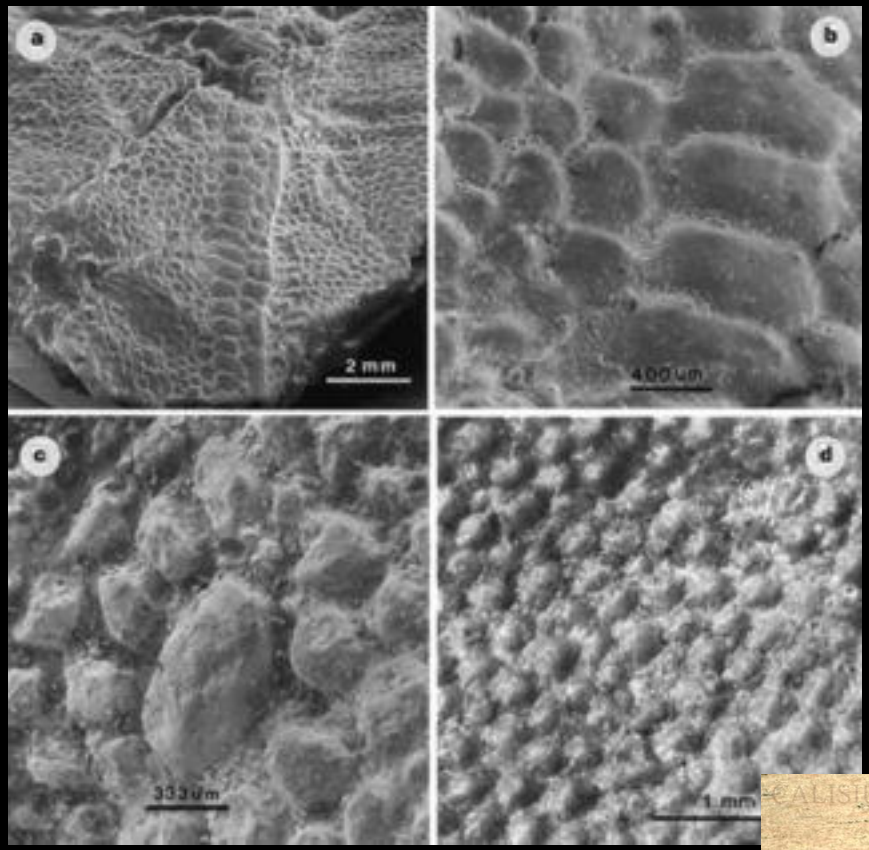


Dinosaur
bristles and fuzz

Microraptor

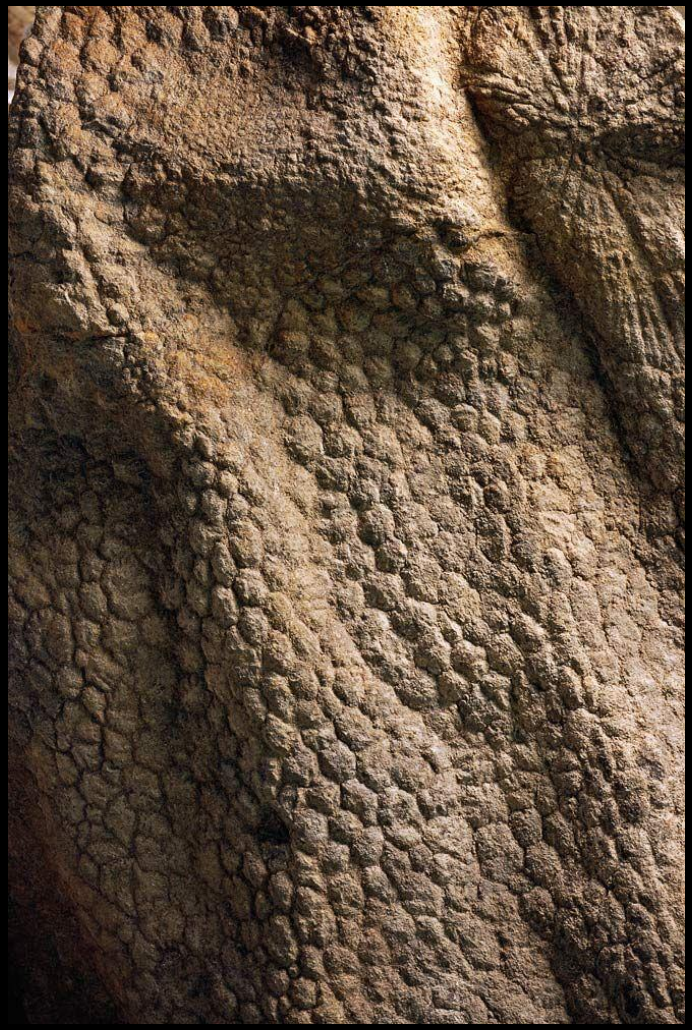


Feathers and filamentous feather precursors (fuzz)

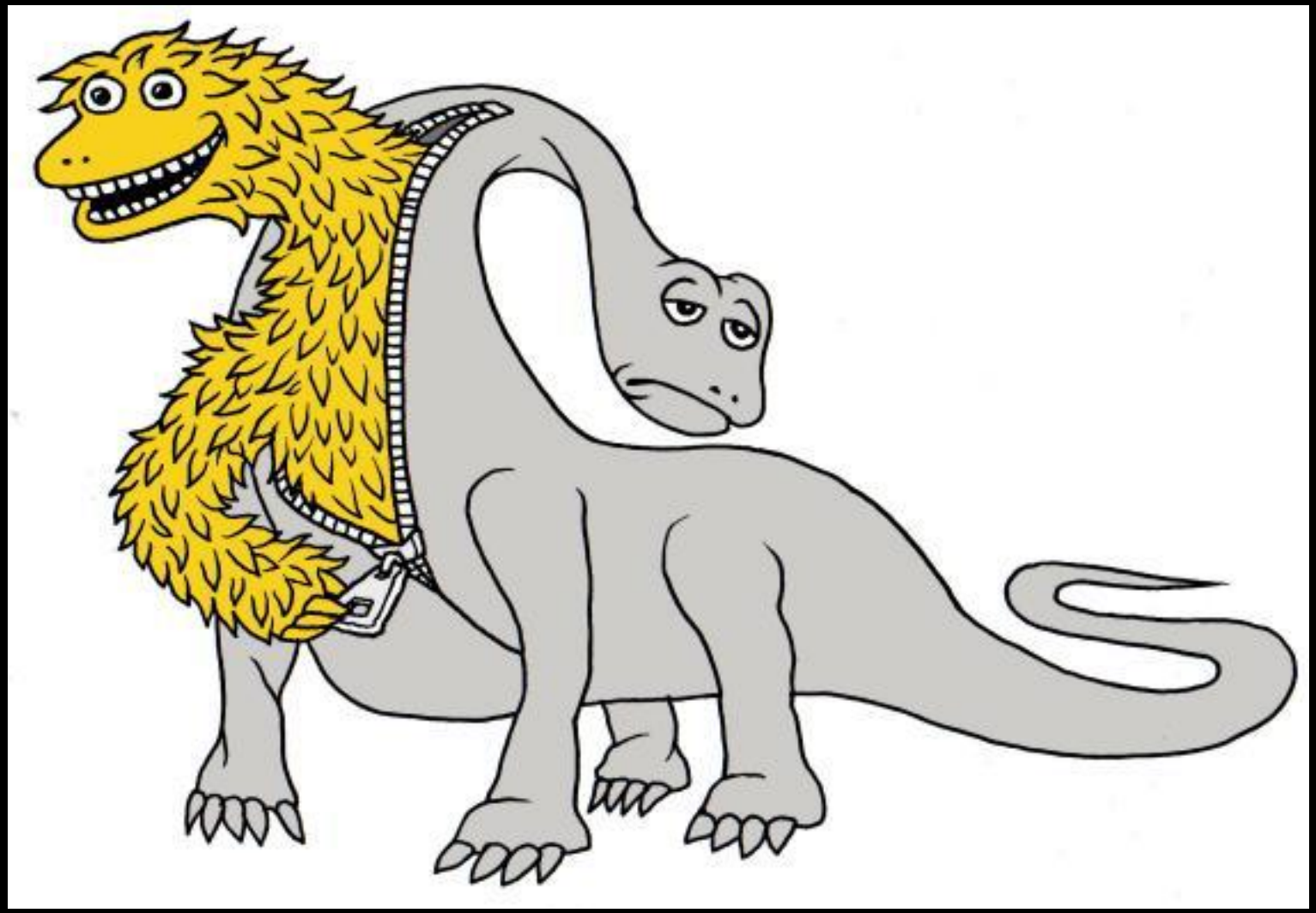


Scales are rare….

They are in sauropods



Hadrosaurs
Ceratopsians

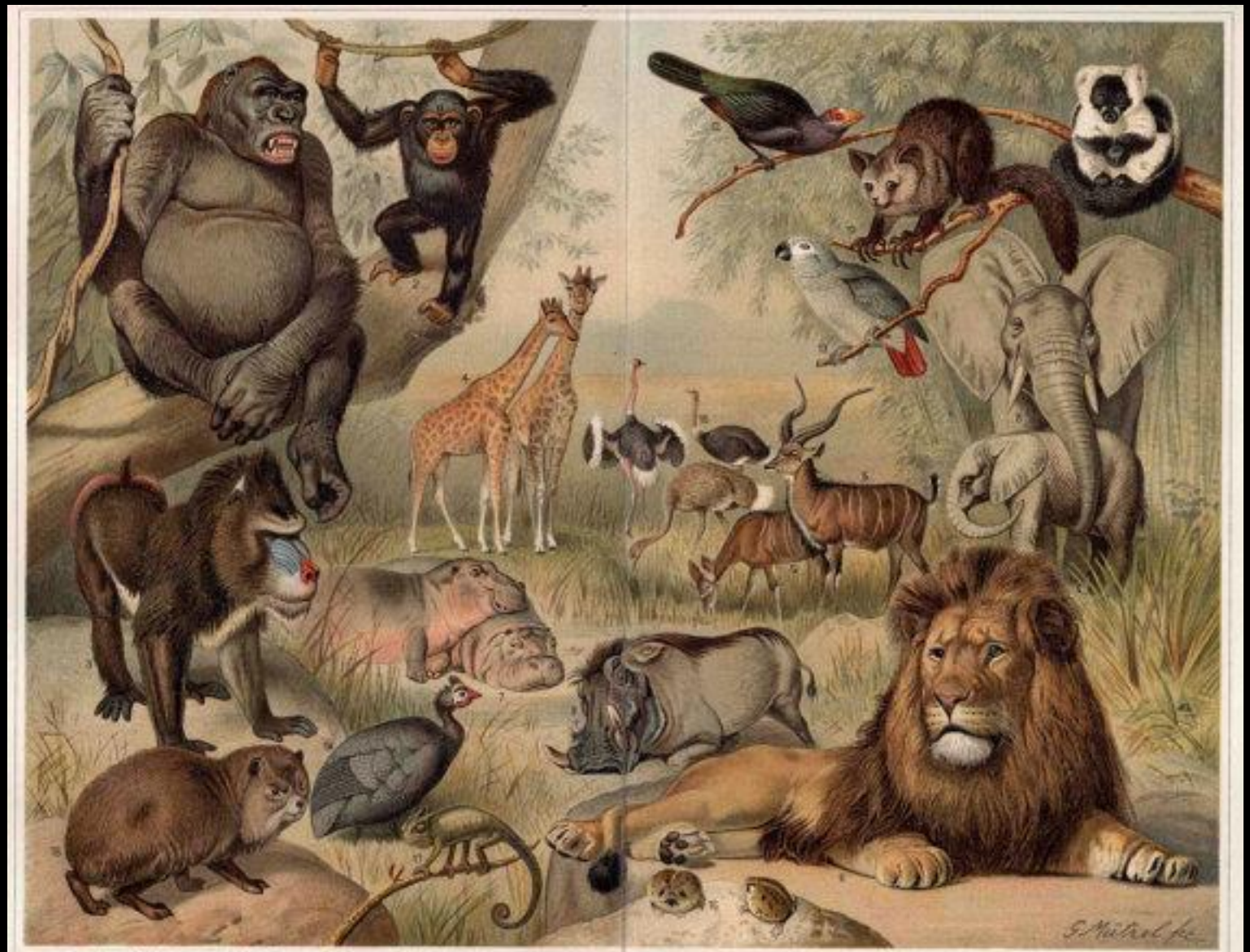


by Mark Alan Stamaty


Yutyrannus huali
A large tyrannosaurid
Passer domesticus
65
CRETACEOUS
125 myo
145
JURASSIC
200
TRIASSIC
251
15 cm long filamentous feathers
Liaoning, China
Meaning: beautiful feathered tyrant
Length: at least 7 or 8 m
Weight: around 1400 kg
Chris Masna

Scienc secrets: what color was your dinosaur?

How would you figure out the color of an extinct dinosaur?



1. Gorilla. — 2. Schimpanse. — 3. Mandrill. — 4. Giraffe. — 5. Kudu. — 6. Löwe. — 7. Flußpferd. — 8. Elefant. — 9. Warzenschwein. — 10. Ziegenfuß. — 11. Vari. — 12. Papageifresser. — 13. Jako. — 14. Perlhuhn. — 15. Strauß. — 16. Nashorn. — 17. Chamäleon. — 18. Klippschliefer.

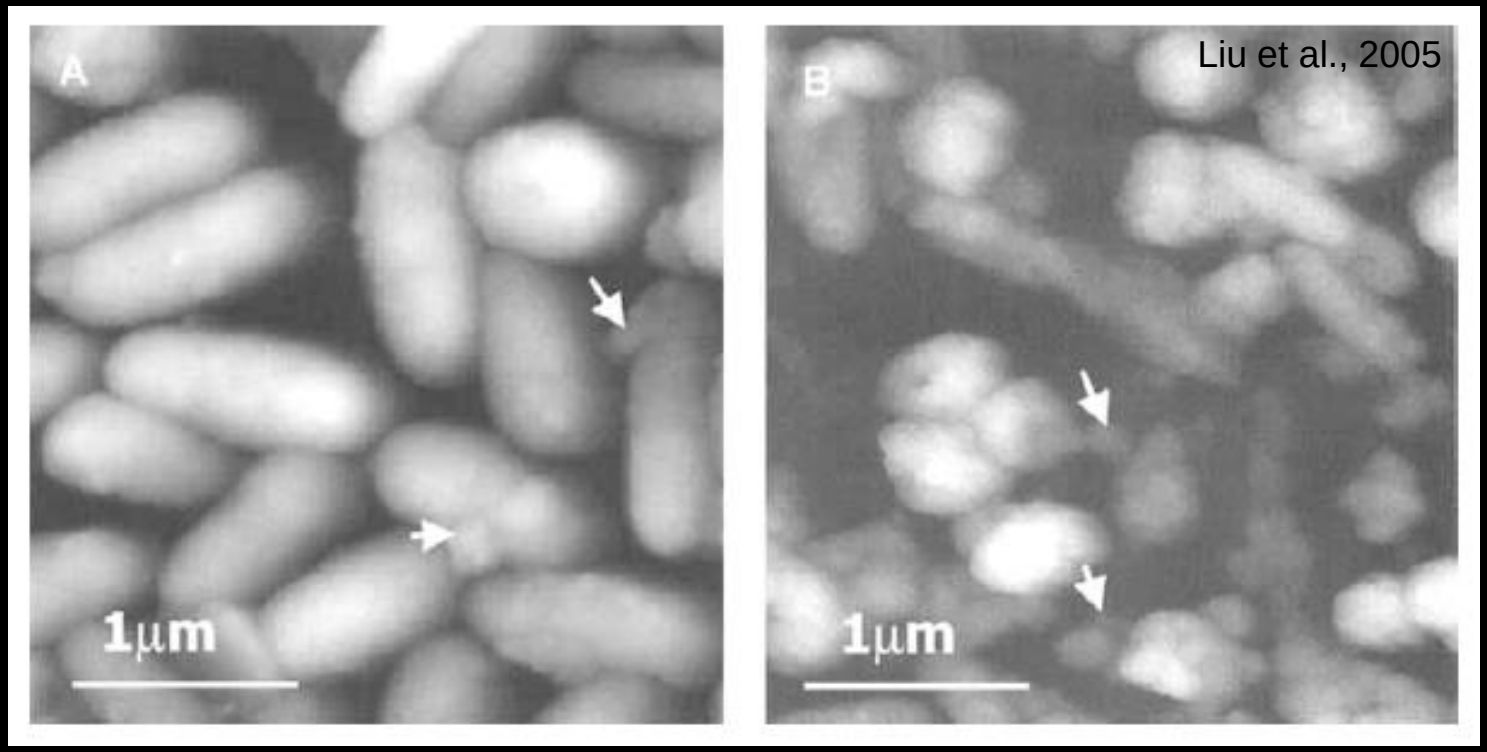
Melanin based coloration

Browns and rufous reds: phaeomelanosomes

Black: eumelanosomes

White: melanosomes absent

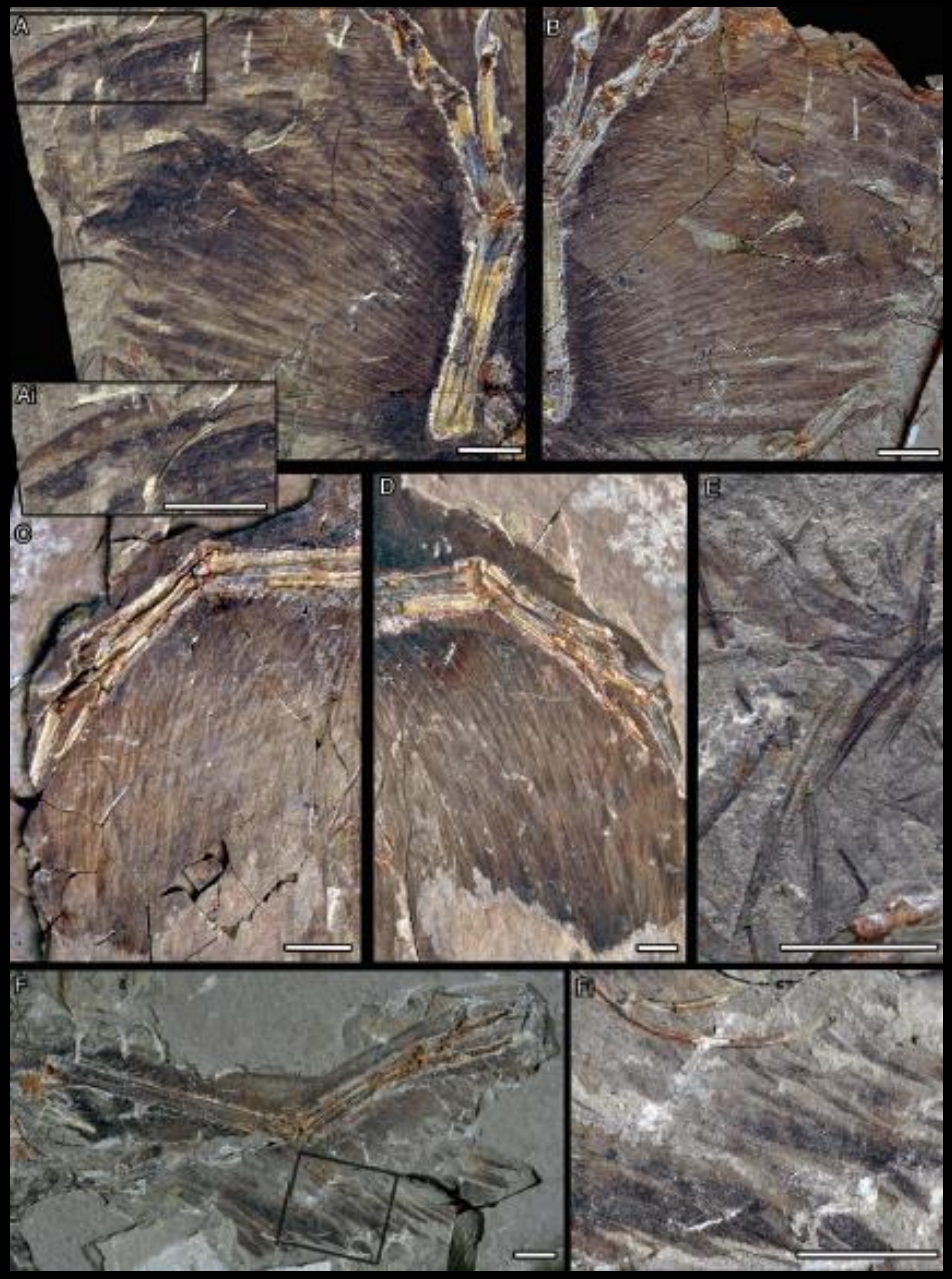
Melanosomes are melanin pigment packages.
Black melanosomes have longer particles and are more dense.
Red melanosomes have shorter particles and are less dense.



Black hair

Red hair

Comparisons with 100+melanosome samples associated with red-brown, black, and gray colors in living birds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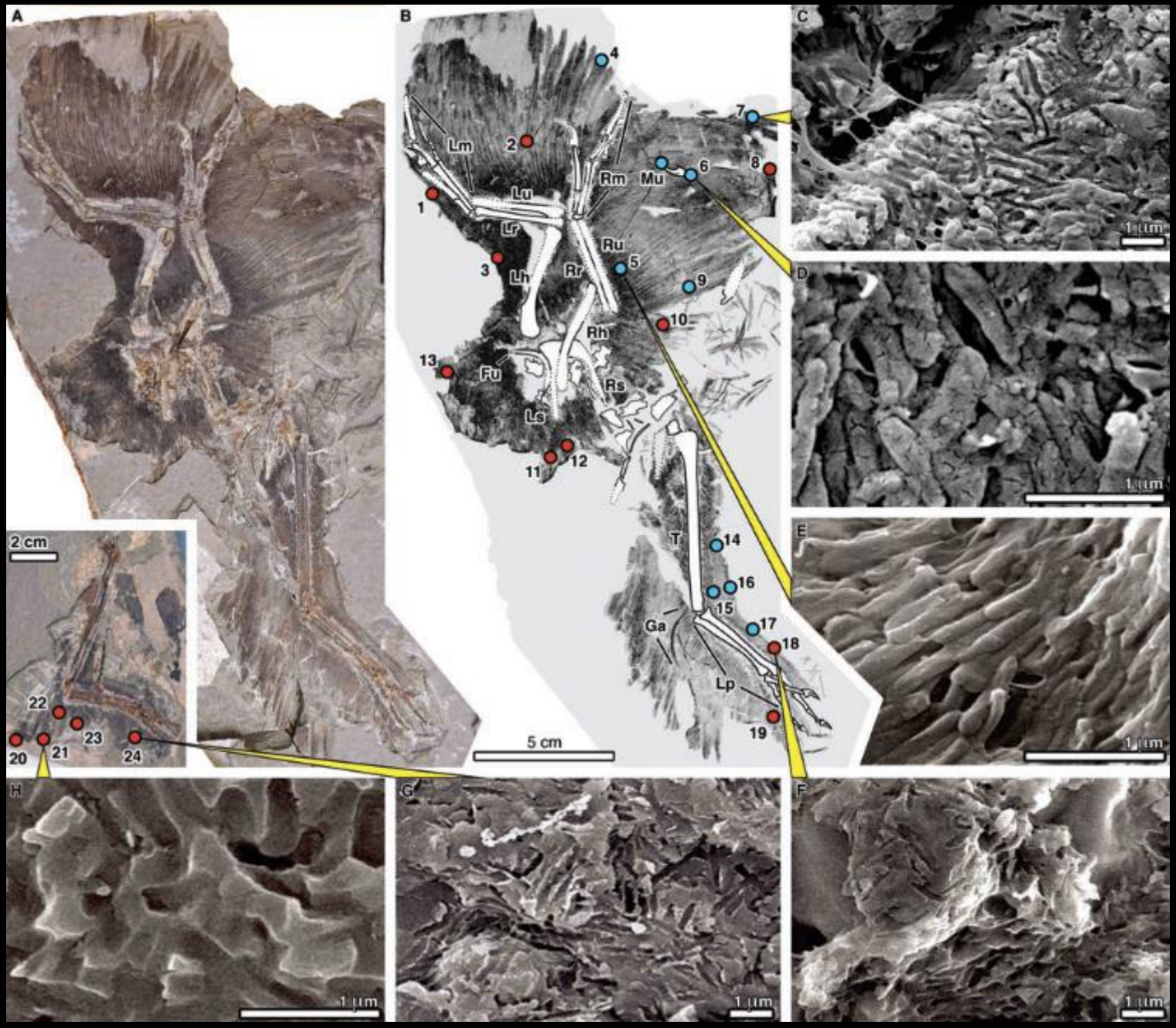
B
C
D
E
F
Fi


A
B
C
D
E
F
G
H
2 cm
5 cm
1 µm
Lm
Lu
Lr
Lh
Ls
Fu
Rm
Ru
Rr
Rh
Rs
Mu
T
Ga
Lp
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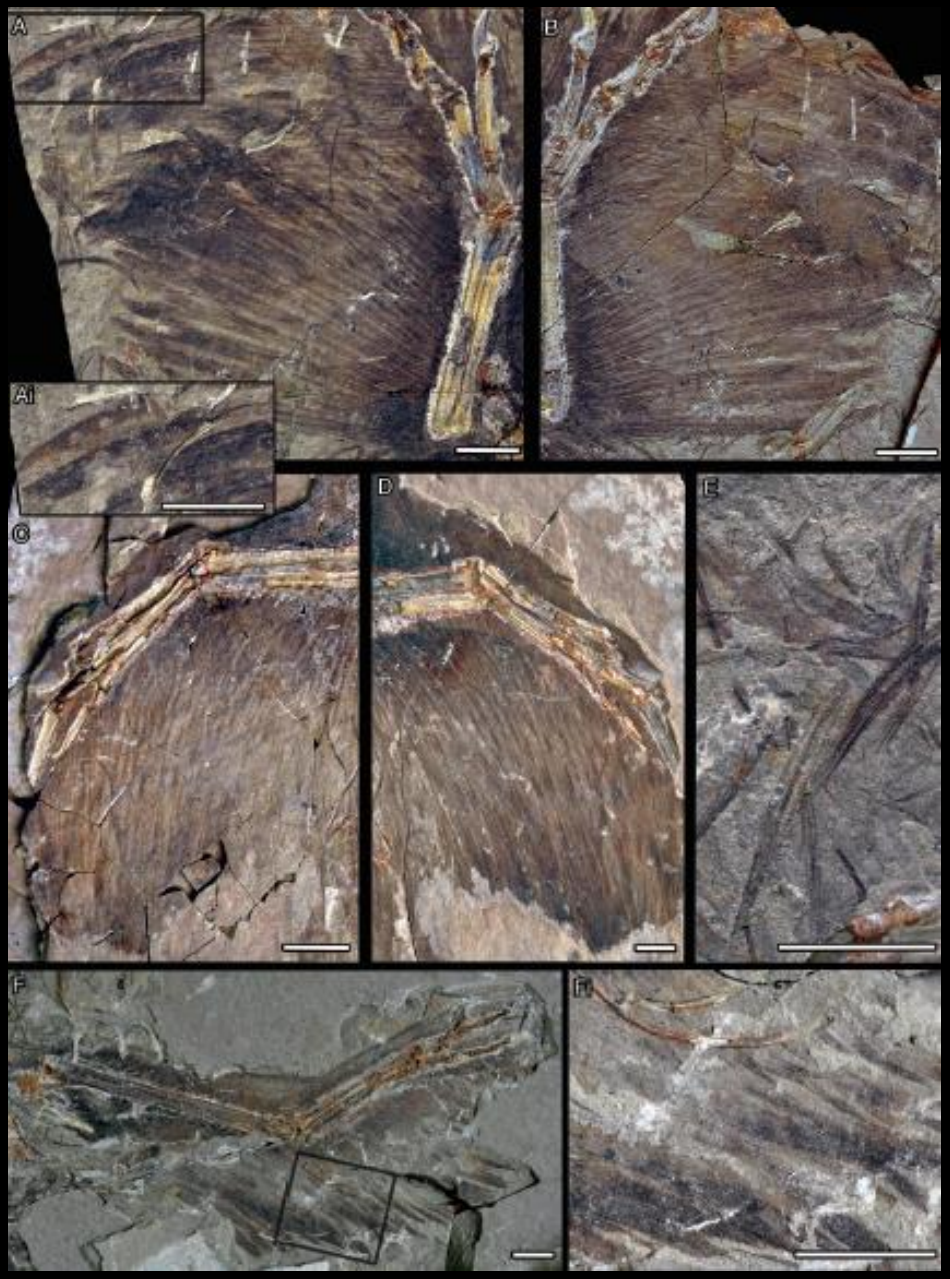
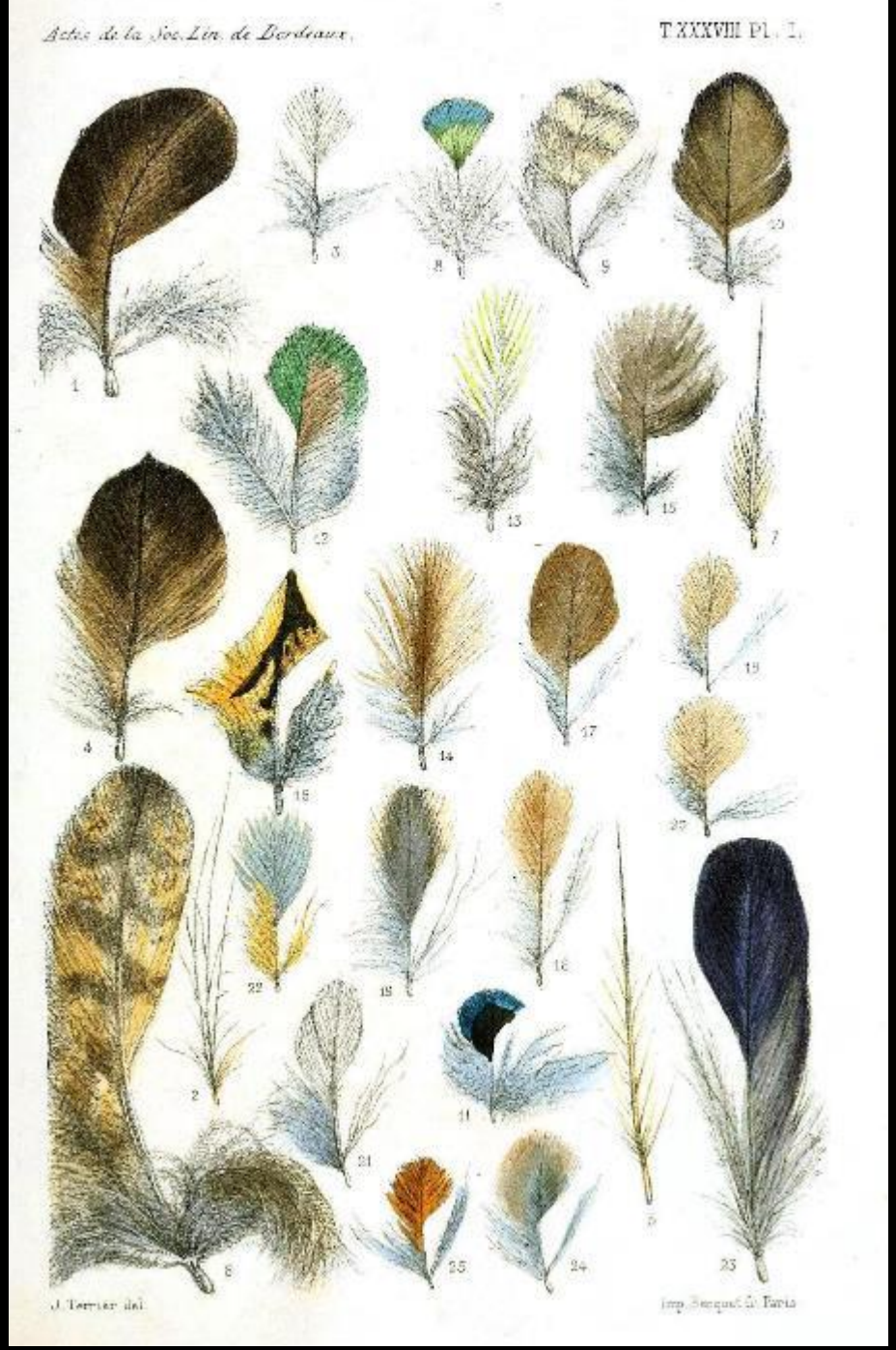
First color map of an extinct dinosaur

Credit: By Michael DiGiorgio/Courtesy Yale

Illustration by © Michael DiGiorgio

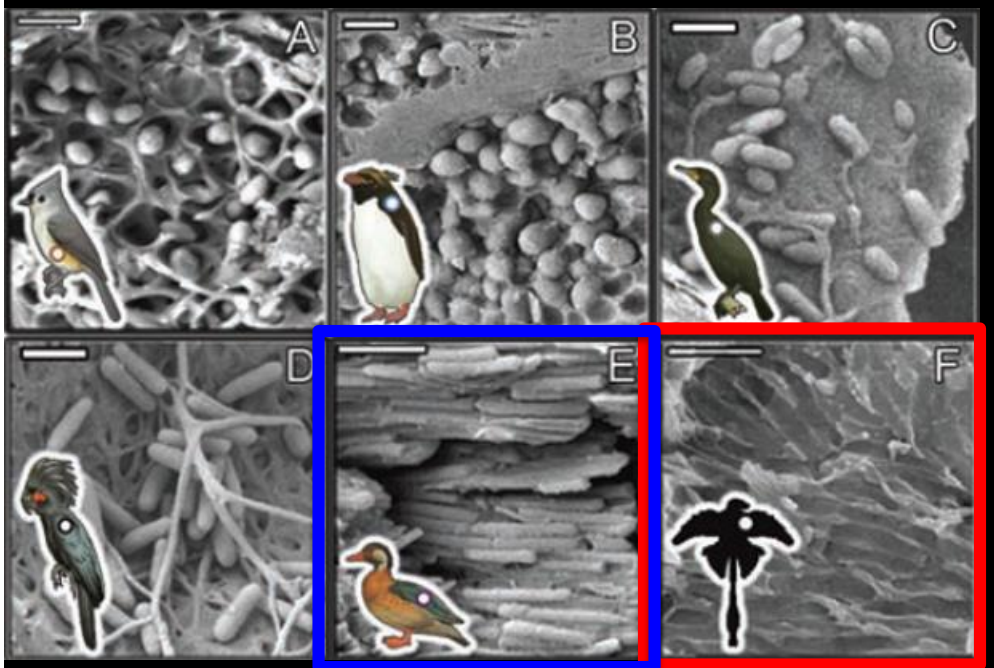
- As soon as feathers appear in the fossil record …





- they are patterned… with spots and stripes

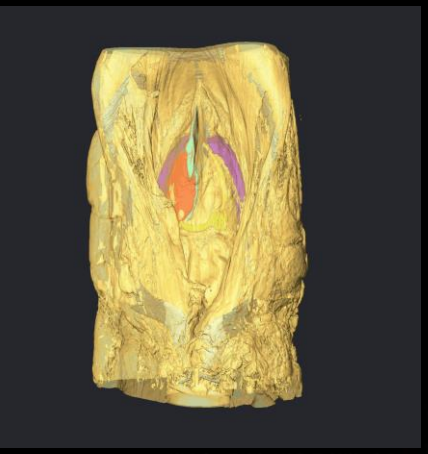
Microraptor ~120 Ma a dromaeosaur dinosaur


A
B
C
D
E
F

Iridescence is used in displays and signaling…

Secrets: What might dinosaurs sound like?

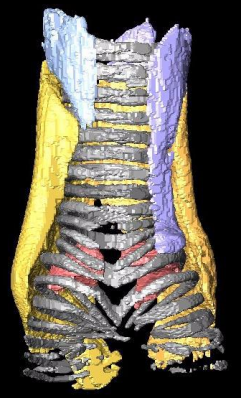
In our imagination…



Alligator

Bird

Sound makers: vocal folds



Sound source

Larynx

Trachea

Syrinx

Bronchi

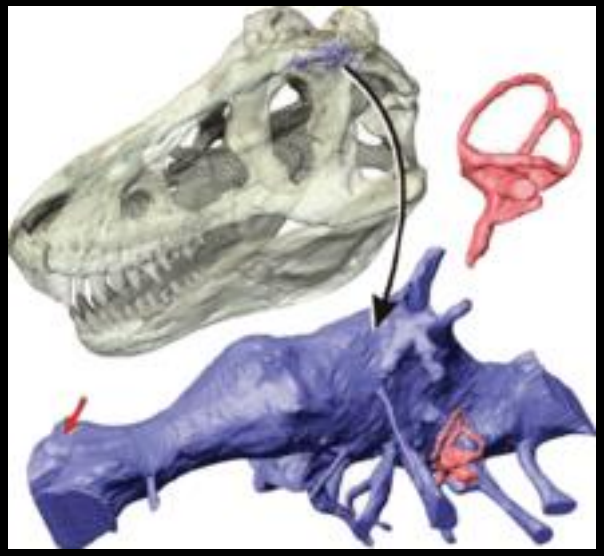
Two sound sources

Reide et al. 2015


ARVALIS.DEVIANTART.COM

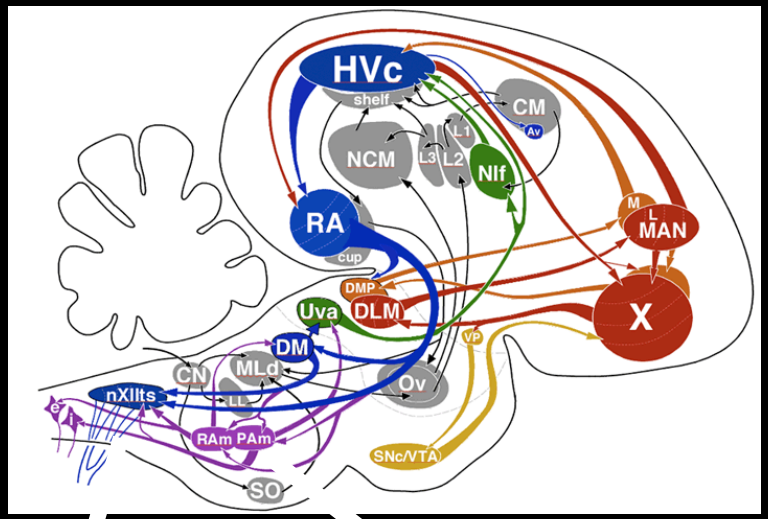

andymorffew.com

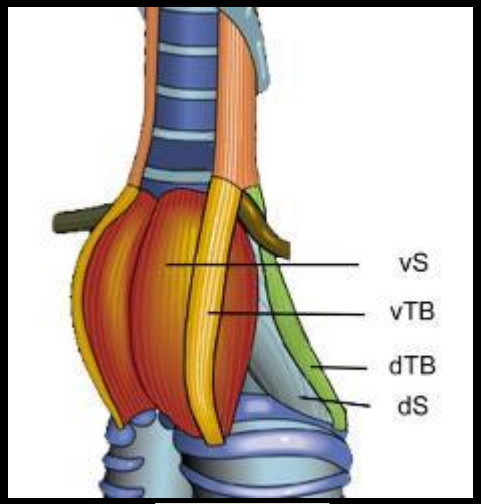
Small brains….



Balanoff et al., 2013

Bird Song





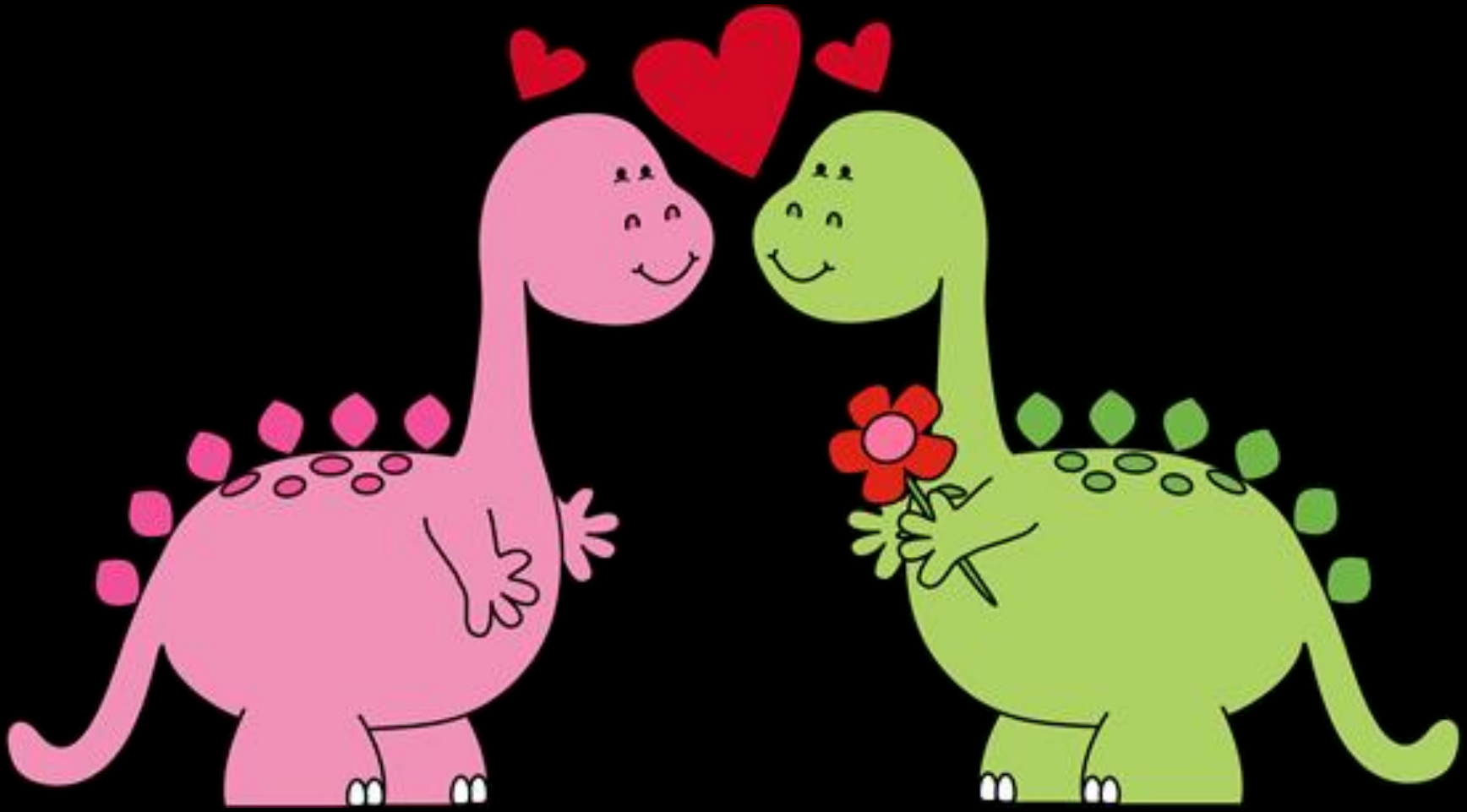
Syrinx

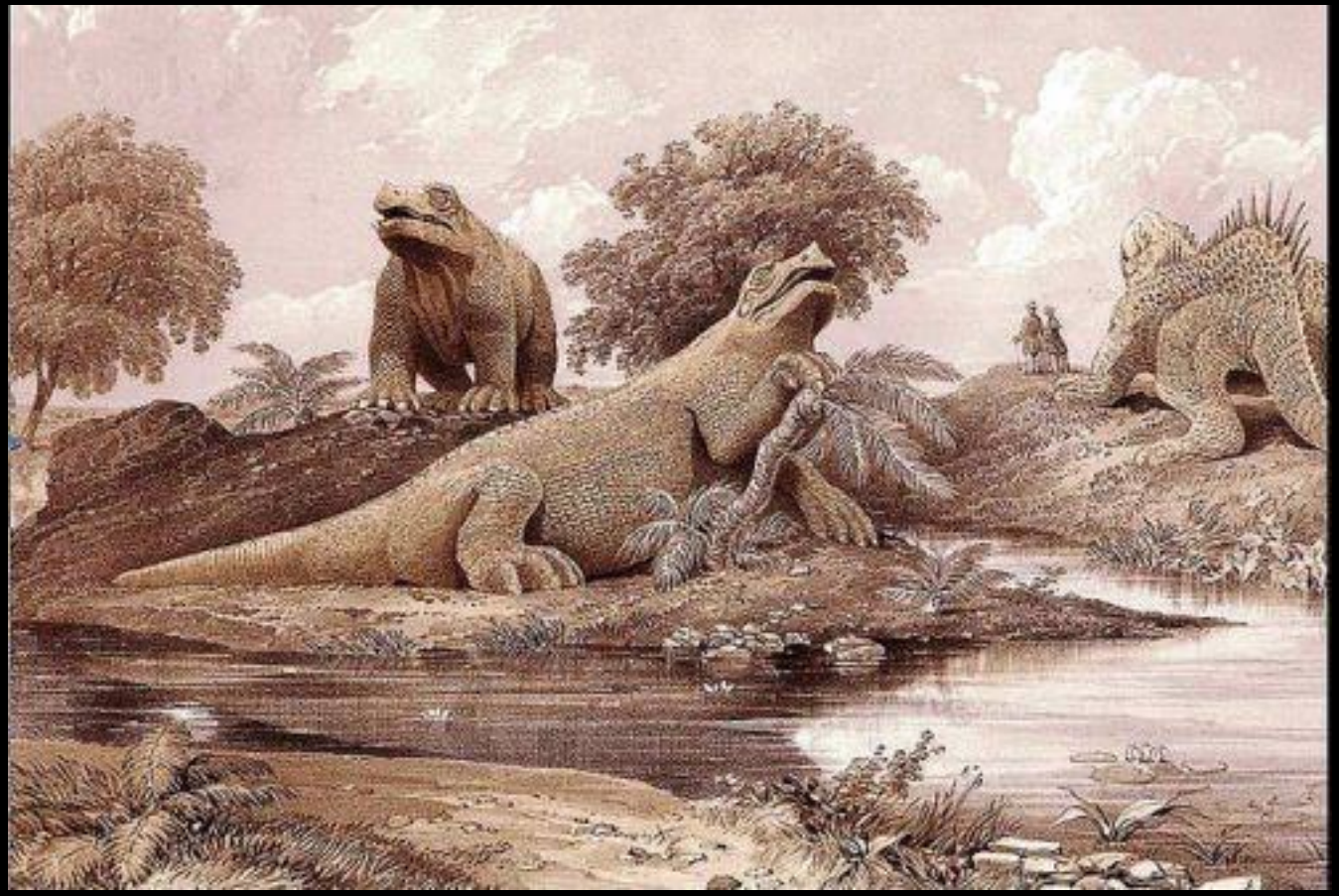
Respiration

Science Secrets:

When do dinosaurs make sounds?

Boom? Honk? Coo?





Science secrets: what would happen if dinosaurs didn’t go extinct?

Imagination: The Dinosauroid

Thank you!


Follow Dr. Clarke's adventures next month!
Feb 11, reddit.com/r/science
antarcticdinos.org
@antarcticdinos

Dr. Julia Clarke

Professor Julia Clarke is a paleontologist at the Department of Geological Sciences, Jackson School of Geosciences at The University of Texas at Austin, as well as research associate with the American Museum of Natural History. Clarke is lead author of an article in the September 2010 issue in the journal Science of her research team discovery of the first fossilized penguin species found with evidence of feathers. Her research interests include vertebrate paleontology and evolution of morphology, as well as avian anatomy and evolution.