Polar dinosaur conundrum

Michael J. Oard

Dinosaurs are commonly thought to be 'tropical' animals—but recently their remains have been discovered close to the inferred 'Mesozoic' poles.[1] Such discoveries include dinosaurs unearthed in southeast Australia and New Zealand in areas assumed to be close to a former South Pole. Many dinosaur remains are not only found near the inferred 'Mesozoic' poles, but also at polar latitudes today. Dinosaur bones and tracks have been found on Svalbard (north of Norway), the North Slope of Alaska, northern Canada from the Yukon Territory to the Queen Elizabeth Islands, central Siberia and Antarctica.[2]

Many types of dinosaurs have recently been discovered at high latitudes. Pachycephalosaurs were discovered on the North Slope of Alaska in 1999.[3] A duck-billed dinosaur tooth was recently discovered on James Ross Island, Antarctica.[4] Eight types of dinosaurs—four herbivores and four carnivores—are now known from northern Alaska.[3,5] Abundant but widely spaced tracks and trackways have also been found in northern Alaska.[6,7] All dinosaur fossils found at high latitudes are also found at lower latitudes; it appears there were no dinosaurs adapted just to polar locations.[8] The North Slope dinosaurs resemble those found in Alberta, Canada and Montana and Wyoming, USA.[9]

But because of these polar discoveries, the idea that dinosaurs were tropical beasts has been changed, ushering in ideas about 'warm-blooded dinosaurs' in order to survive the cold. However, the physiology of dinosaurs has been the subject of much controversy. It is still not known whether or not dinosaurs were warm-blooded (endothermic)[10] as there are many physiological differences between species. Many paleontologists believe the dinosaurs possessed a unique physiology between warm-blooded and cold-blooded.

How could dinosaurs live at polar latitudes?

Polar dinosaurs raise the obvious question as to how they could survive the cold and the long period of darkness:

> 'It is difficult to imagine how this community functioned if the temperatures were as low as the physical indicators suggest. No convincing explanation exists as yet for this apparent anomaly.'[9]

Although the 'Mesozoic' was a relatively warm period in uniformitarian Earth history, there still must have been cold, snowy winters at high latitudes.[11] Fiorillo summarizes the postulated environment for northern Alaska:

> 'During the Cretaceous, northern Alaska was even farther north than it is today, and so the dinosaurs that lived there would have needed mechanisms to cope with both the cold and the dark.'[12]

Others see special adaptations for wintering at high latitudes, such as the large eyes possessed by the small theropod *Troödon*.[13] Large eyes supposedly help the dinosaur to see in the dark, but could such a small dinosaur really survive the cold temperatures? One dinosaur is even thought to have hibernated. In order to support living at polar locations, some scientists have suggested that the dinosaurs were able to feed on low-quality forage in the winter. However, the diet of herbivores during winter is problematic.[14]

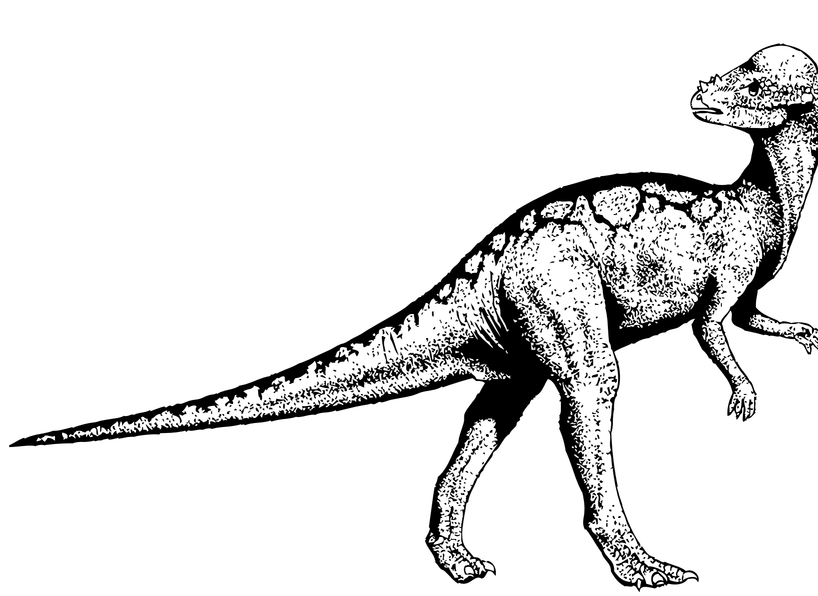
Some paleontologists believe the dinosaurs migrated to lower latitudes in order to cope with the long winter darkness and cold. However, migration is not likely because very young dinosaurs, about one year old, have also been found in polar latitudes, and they supposedly could not migrate long distances.[14–16]

Large body size has also been invoked to explain survival in the cold.[17] However, many of the discovered dinosaur species are relatively small.

Popular extinction hypotheses questioned

The idea of polar dinosaurs has put a damper on those dinosaur extinction hypotheses that rely on a 'sudden' climatic cooling regime, such as the meteorite and volcanic hypotheses.[18] Buffetaut plainly states the problem for extinction hypotheses that rely on cold temperatures:

> 'To put it simply, the fact that ectothermic [cold-blooded] reptiles generally survived the [Cretaceous/Tertiary] boundary, whereas dinosaurs did not, shows



Pachycephalosaurs, along with other dinosaurs, have been found at polar latitudes. All those found have also been found at lower latitudes, so they don't seem to have been adapted just to polar conditions. This presents a quandary for uniformitarian explanations of dinosaur life and death.

> that climate deterioration was not a significant extinction factor … What can be said, however, is that cooler climates at the end of the Cretaceous are extremely unlikely to have led to dinosaur extinction … More importantly in view of the above-mentioned discoveries in the polar regions, the predictable results of a cooling trend are that ectothermic reptiles would have been more affected than dinosaurs. The fossil record shows exactly the reverse.'[19]

The belief that dinosaurs lived in prolonged winter darkness in a relatively cold 'Mesozoic' climate dispels the idea that they died out from a slow cooling. It also discredits the idea the dinosaurs died from abrupt cooling caused by 'meteor impact or a volcanic winter', resulting from dust and very small particles being injected into the stratosphere and blocking out some of the sunlight.

Other polar warmth indicators

Although uniformitarian scientists are searching for ways to explain polar dinosaurs, there are indications that polar latitudes were once much warmer than today. Cold-blooded tetrapods, such as crocodiles, turtles, and some amphibians, have been found in southeast Australia with the dinosaurs.[10] Southeast Australia was assumed to lie within the Arctic Circle at the time. Based on modern counterparts, these tetrapods cannot live during prolonged cold spells.

An extinct type of crocodile found on Axel Heiberg Island at 80°N implies that annual mean temperatures greater than 14°C occurred during at least part of the 'Cretaceous', but the current mean annual temperature is –20°C.[20] Warm climate trees, such as Swamp Cypress, along with crocodiles, alligators, flying lemurs, giant land tortoises, varanid or monitor lizards, also indicative of a warm climate, have been discovered on the same island in rocks of 'Eocene' age.[21]

Just recently, scientists drilled into the Alpha Ridge in the Arctic Ocean and made the astonishing discovery that the Arctic Ocean was as warm as 15°C during the 'Late Cretaceous'.[22,23] Jenkyns *et al.* extrapolate this result and suggest that the waters of the warmer 'middle Cretaceous' Arctic Ocean were greater than 20°C.[24] This deduction was based on carbon-rich sediments with abundant diatoms, woody fragments, leaf cuticles, spores and pollen found in the drill cores. Poulsen exclaims: 'For a region blanketed in darkness for half the year, the Arctic Ocean was astoundingly warm.'[25] Poulsen summarizes:

> 'Analyses of [ocean bottom] sediments retrieved from a drifting ice island suggest that the Arctic Ocean may have been ice free and as warm as 15°C about 70 million years ago. Therein is a challenge for climate models.'[26]

Such a climate would be exceedingly difficult to resolve in a uniformitarian construct given the conditions stated above by Poulsen.

It was also reported that leaves and fruit of a tropical breadfruit were discovered in 1883 in 'Cretaceous' sediments in western Greenland.[27] Breadfruit requires a tropical climate with a temperature range from ~15–38°C! Breadfruit fossils have also been unearthed in northern Canada.[25]

Dinosaurs transported to high latitudes during the Flood

Because of the abundant evidence for warm polar latitudes and the lack of support for warmth from paleoclimate simulations,[17,21] it is unlikely that any of these animals or the vegetation actually lived and thrived at polar latitudes. This again shows the difficulty of seeking to interpret evidence within a uniformitarian paradigm. All these warmth-loving organisms, including the polar dinosaurs, were more likely transported to polar latitudes during the Flood.[28,29]

References

1. Oard, M.J., Polar dinosaurs and the Genesis Flood, *Creation Research Society Quarterly* **32**:47–56, 1995.
2. Oard, ref. 1, p. 47.
3. Gangloff, R.A., Fiorillo, A.R. and Norton, D.W., The first pachycephalosaurine (dinosaurian) from the paleo–Arctic of Alaska and its paleogeographic implications, *Journal of Paleontology* **79**(5):997–1001, 2005.
4. Case, J.A., Martin, J.E., Chaney, D.S., Reguero, M., Marenssi, S.A., Sanillana, S.M. and Woodburne, M.O., The first duck–billed dinosaur (family Hadrosauridae) from Antarctica, *Journal of Vertebrate Paleontology* **20**:612–614, 2000.
5. Fiorillo, A.R., The dinosaurs of the Arctic Alaska. *Scientific American* **291**(6), p. 89, 2004.
6. Gangloff *et al.*, ref. 3, p. 997.
7. Fiorillo, A.R. and Gangloff, R.A., Theropod teeth from the Prince Creek Formation (Cretaceous) of northern Alaska, with speculations on Arctic dinosaur paleoecology, *Journal of Vertebrate Paleontology* **20**(4), p. 676, 2000.
8. Rich, T.H., Vickers-Rich, P. and Gangloff, R.A., Polar dinosaurs, *Science* **295**, p. 980, 2002.
9. Rich *et al.*, ref. 8, p. 979.
10. Buffetaut, E., Polar dinosaurs and the question of dinosaur extinction: a brief review, *Palaeogeography, Palaeoclimatology, Palaeoecology* **214**:225–231, 2004.
11. Fiorillo, ref. 5, p. 86.
12. Fiorillo, ref. 5, p. 88.
13. Fiorillo and Gangloff, ref. 7, pp. 675–682.
14. Fiorillo, ref. 5, p. 90.
15. Fiorillo and Gangloff, ref. 7, p. 677.
16. Fiorillo, A.R. and Gangloff, R.A., The caribou migration model for Arctic hadrosaurs (Dinosauria: Ornithischia): a reassessment, *Historical Biology* **15**:323–334, 2001.
17. Fiorillo and Gangloff, ref. 16, p. 331.
18. Oard, M.J., The extinction of the dinosaurs, *Journal of Creation* **11**(2):137–154, 1997.
19. Buffetaut, ref. 10, p. 228.
20. Oard, M.J., A tropical reptile in the 'Cretaceous' Arctic; paleofauna challenge to uniformitarianism, *Journal of Creation* **14**(2):9–10, 2000.
21. Oard, M.J., cold oxygen isotope values add to the mystery of warm climate wood in NE Canada, *Journal of Creation* **17** (1):3–5, 2003.
22. Jenkyns, H.C., Forster, A., Schouten, S. and Sinnighhe Damsté, J.S., High temperatures in the Late Cretaceous Arctic Ocean, *Nature* **432**:888–892, 2004.
23. Poulsen, C. J., A balmy Arctic, *Nature* **432**:814–815, 2004.
24. Jenkyns *et al.*, ref. 22, p. 889.
25. Poulsen, ref. 23, p. 815.
26. Poulsen, ref. 23, p. 814.
27. Jenkyns *et al.*, ref. 22, p. 891.
28. Oard, ref. 20, p. 10.
29. Oard, ref. 21, p. 4.