Could a cold heart stand a cold winter?

Recent dinosaur finds in southeastern Australia have scientists wondering how these ancient reptiles could have weathered the cold, dark winters that gripped that area 100 million years ago. While new evidence provides no solution to the freezing-dinosaur conundrum, it offers a potential way out of the problem.

According to the latest data, the winters may not have been as grueling as earlier evidence suggested, report Thomas H. Rich of the Museum of Victoria in Melbourne and Patricia V. Rich of Monash University in Clayton, Victoria. The paleontologists described their work this week at the 28th International Geological Congress, held in Washington, D.C.

The Riches and their colleagues have discovered a number of dinosaur fossils at sites along the coast of south-central Victoria (SN: 3/19/88, p.184). During mid-Cretaceous time, this region sat much closer to the South Pole and was attached to Antarctica.

To flesh out a picture of dinosaur lifestyle, paleontologists are reconstructing the former Victorian climate — no easy feat for a time 100 million years ago. Living within the polar circle, the dinosaurs must have survived periods of winter darkness, which may have lasted up to four months, says Thomas Rich. Growth rings in tree fossils indicate the passing of seasons.

Using the ratios of oxygen isotopes in nearby rock, geochemists in the last few years have calculated the mean annual temperature of the fossil site at somewhere between -6°C and 5°C. Elsewhere in Australia, geologists have found evidence that ice existed at certain times of year during the Cretaceous (SN: 6/18/88, p.391). Since the Victoria dinosaurs were small and could not have migrated each season, the data hint these animals could have survived fairly cold, perhaps freezing temperatures—a suggestion that fuels the debate over whether dinosaurs were warm- or cold-blooded. Fossil finds from northern Alaska bolster the theory that dinosaurs could survive cold winters.

Yet the newest oxygen isotope data suggest that mean annual temperatures were 6°C, says Rich. What's more, his colleagues have just identified remains of a lizard from the same bone site. Lizards — known to be cold-blooded — could not have survived freezing temperatures, he says.

While the evidence for warmer temperatures seems to contradict the earlier evidence, it may not. Just as North American temperatures have swung from cold to warm since the last ice age, the climate of Cretaceous Australia may have fluctuated over many millennia. If so, dinosaurs could have lived in warmer northern Australia during the cold period and moved south over thousands of years as the climate warmed. Alternatively, they may have remained in the south through the frigid times.

Researchers cannot yet determine whether dinosaurs survived cold winters in Australia, Rich says. The newest isotope samples come from rock layers nearer the bone beds, so they should give a better picture of the dinosaurs' habitat than did previous isotope data. However, even the closest samples are not contemporaneous with the bone beds. "They are separated by 2 to 3 meters vertically," he says. "That could still be a couple of millennia." — *R. Monastersky*

Valdez 'bugs' chomp away

Last month, Environmental Protection Agency biologists initiated experiments on a soiled beach in Alaska's Prince William Sound to see whether treating its sandy and rocky shoreline with either of two types of fertilizer would enhance the natural detoxification of crude-oil residues (SN: 6/17/89, p.383). Preliminary data from those tests, released late last week, indicate that fertilizing indigenous aquatic bacteria indeed appears to accelerate the breakdown of oil spilled from the *Exxon Valdez* supertanker.

According to the EPA report, "natural biodegradation of the oil was already well underway... by the time the fertilizer was applied." This, it says, explains why the researchers found so many oil-degrading microbes at the start of their study. Just one week after beach fertilization began, however, the microbial communities had expanded measurably. And, as suspected, the fertilizers' formulations appeared to influence their efficacy. Sites treated with the water-soluble fertilizer contained 30 times more oil-degrading bacteria than did untreated beach plots. Sites sprayed with a fertilizer incorporating a vegetable oil to help it bind to the crude oil, however, housed 100 times more of the beneficial bacteria than nearby untreated zones.

Observation of the oil/fertilizer-treatment areas "clearly shows a striking disappearance of the [tanker] oil from rock surfaces," the report says. While EPA scientists haven't established that the bacteria ate the oil rather than simply loosening it to be washed back into the sound, such analyses are underway. Early data do indicate that the fertilizers have not collected in near-shore waters or overfed offshore algae, contributing to an oxygen-depleting algal bloom.

Noting the preliminary success of these bacterial-feeding regimes, EPA has expanded its Valdez microbial-detoxification program to include studies of nutrient movement within the beach and to monitor for adverse effects of the nutrient releases. □

Deadly RSV may fall to improved vaccines

In the alphabet soup of childhood vaccines, pediatricians hope the letters RSV will someday become as familiar as DPT. Diphtheria, pertussis and tetanus — once major causes of illness and death among children — have all but disappeared in the United States since development of the DPT vaccine. Not so with RSV.

RSV stands for respiratory syncytial virus, an influenza-like virus and the single most important cause of lower respiratory tract infection in infants and children. In the United States, RSV kills about 2,000 infants each year and hospitalizes an additional 55,000. Despite decades of attempts, major problems have stymied scientists' efforts to develop a vaccine against RSV, which spreads through close contact with infected children and adults and blooms in epidemic proportions each winter.

At this week's annual meeting of the American Society of Virology in London, Ontario, scientists provided some encouraging reports of RSV vaccine progress. Researchers estimate a commercially available vaccine remains three to five years away. But ongoing trials in animals and small numbers of humans now suggest they have overcome the major obstacles of previous years. An experimental vaccine in the 1960s enhanced the disease in some children, leading to some deaths and a strategy change among RSV vaccine researchers. Rather than working with inactivated whole viruses, scientists today use purified, antibody-provoking RSV proteins.

After years of tests in rodents and primates, scientists from Praxis Biologics in Rochester, N.Y., say they have immunized 40 adults and 23 toddlers 2 to 4 years old with a purified protein from the RSV outer jacket. They find high levels of protective antibodies, no disease enhancement and no notable adverse reactions, says Praxis researcher Thomas Kostyk. Pending Food and Drug Administration review of the data, Praxis hopes to begin tests in younger children.

Michael W. Wathen and his colleagues at the Upjohn Co. in Kalamazoo, Mich., report their creation of a genetically engineered vaccine made from a combination of two RSV proteins. They say tests in rats suggest their "chimeric protein" triggers a stronger immune response than does the single protein Praxis uses. Inoculation with the engineered protein protected rats from infection when they were challenged with a nasal spray of RSV. The company plans to expand to primate trials and expects to vaccinate humans within two years, says Upjohn virologist Roger J. Brideau.

— *R. Weiss*