millikelvin, reaching the desired strongly coupled regime. —JS
Science, this issue p. 61; see also p. 33

PALEONTOLOGY

A proto-mammalian giant
Early terrestrial amniotes evolved into two groups: the sauropods, which led to the bird and dinosaur lineages, and the synapsids, which led to mammals. Synapsids were diverse during the Permian but were greatly reduced after the end-Permain extinction (about 252 million years ago). The few groups that survived into the Triassic were mostly small and retained a sprawling gait. Sulej and Niedżwiedzki, however, describe a dicynodont from the Late Triassic of Poland that is as large as some coexisting dinosaurs and appears to have had an erect gait—like modern mammals. Thus, megaerbivores in the Triassic were not only dinosaurs. —SNV
Science, this issue p. 78

PROKARYOTIC IMMUNITY

Additional, diverse CRISPR systems
CRISPR systems have been revolutionizing molecular biology. Mining the metagenomic database, Yan et al. systematically discovered additional subtypes of type V CRISPR-Cas systems. The additional Cas12 effector displayed a range of activities, including target and collateral cleavage of single-stranded RNA and DNA, as well as double-stranded DNA nicking and cleavage. These diverse nuclease activities suggest how an ancient transposase may have evolved into various type V effectors and expand the nucleic acid detection and genome-editing toolbox. —SYM
Science, this issue p. 88

SOCIAL SCIENCES

Deadliest 100 days of the Holocaust
More than 25% of the approximately 6 million Jews murdered during the Holocaust were killed in one 100-day period in 1942. Stone used an unusual dataset of railway transportation records to show that during this period, the Nazis murdered more than 1.47 million Jews, a kill rate that is 10 times higher than previous estimates. Contradicting contemporaneous analyses of the Holocaust, the author shows that Operation Reinhard was exceptionally violent in its extreme kill rate, number, and proportion of the population murdered, even when compared to other 20th-century genocides. —PJB

DRUG DEVELOPMENT

A long-lasting poison scavenger
Nerve agents are neurotoxic compounds found in pesticides and chemical weapons. They act by blocking the transmission of nerve impulses to the muscles, and exposure can be fatal within minutes. Zhang et al. developed a nanoparticle-based bioscavenger that breaks down organophosphate nerve agents into innocuous compounds. Prophylactic treatment of rats and guinea pigs confirmed low immunogenicity and good biodistribution. Treated animals were protected from repeated exposure to the nerve agent sarin over 7 days. This nanoscavenger might thus help prevent nerve-agent poisoning in at-risk subjects. —MM

HUMAN GENETICS

Alzheimer's disease in admixed people
Several genes have been identified that increase the risk of late-onset genetic disorders, such as Alzheimer’s disease (AD). Specifically, the ApoE e4 allele is associated with a higher risk of developing AD. However, individuals of African ancestry that carry this variant appear to be less prone to developing AD. Rajabi et al. examined AD cases and controls in admixed individuals of Puerto Rican and African-American descent and found that individuals who carried the African variant of ApoE e4 background had less risk of developing the disease. It seems the African variant of ApoE e4 contains protective genetic variants. —LMZ

PLANT SCIENCE

Essential metal for plants
Although zinc (Zn) is an essential micronutrient for plants and humans, much of the world’s agricultural land is deficient in Zn. Sinclair et al. studied plants that are unable to deliver Zn into their own xylem. The plant shoots were thus internally starved regardless of whether Zn was available from the root. The Zn-starved shoots signaled to roots to increase Zn supplies. In response, the roots up-regulated expression of the genes encoding metal transport/tolerance protein 2 (MTP2) and heavy metal ATPase 2 (HMA2). Local Zn deficiency in roots left these same genes unaffected. It seems that Zn taken up in lateral roots is transported into the endoplasmic reticulum by MTP2, thus gaining access to the intercellular symplastic network. The Zn then progresses from outer epidermal cells toward the core of the root, where it is exported by HMA2 into the xylem for transport to the shoot. The shoot asks for what it needs, and the root delivers. —PJH

SKIN

Roots of acne
Most people experience a bout of acne at some stage in their life. For an unlucky few, the skin

Transport records have been analyzed to estimate the number of Jews murdered by the Nazis in 1942.
EVOLUTION

Sing on high, dance on the floor

The frugivorous, polygamous, and wildly glamorous birds of paradise are a puzzle to evolutionary biologists. What is sexual selection acting on to result in such extremely visual, behavioral, and aural diversity among these related species? Ligon et al. analyzed 961 video clips, 176 audio clips, and 393 museum specimens. They concluded that females are selecting on the combined sensory assault from song, display, and plumage color, resulting in a “courtship phenotype.” Although all elements are required for successful courtship, there is room for variation depending on environmental constraints. Song predominates in the canopy, where it is unimpeded by twigs and branches, whereas flashy behavioral display is most effective on the gloomy forest floor. —CA


RELATIONSHIP SCIENCE

Ending a relationship

When deciding to end a relationship, people may consider the feelings of their partners as well as their own. Joel et al. investigated whether decisions to break up are driven in part by perceptions of a partner’s dependence on the relationship. They found that participants were less likely to initiate a breakup with their partners when they felt that their partners were more dependent on the relationship for psychological well-being, even when participants were unsatisfied in the relationship. Even participants who were actively considering breaking up with their partners were less likely to do so if they felt their partners depended on the relationship. These results suggest that people exhibit costly, prosocial preferences in relationships even when they may wish to leave them. —TSR


OPPORTUNITY DENIED

The inequality of innovation

A lack of social capital can undermine a child’s likelihood of becoming an inventor, regardless of her inventive ability. Using U.S. patent records for 1.2 million inventors, combined with tax records and other data, Bell et al. show how children from high-income families are several times more likely to become inventors than those from lower-income families, even when they have comparable math abilities. Children who grow up in areas where innovation and patenting are more common are more likely to patent as well, and particularly in the same class of technologies that had a high innovation rate in their childhood communities. —BW


PLASTIC POLLUTION

Scallops seasoned with nanoplastics

Microplastics are present in marine environments worldwide. As these particles break down further, they form nanoplastics, which are harder to detect. Nanoplastics also can enter the environment directly from commercial products such as paints and cosmetics. Al-Sid-Cheikh et al. investigate the uptake of such nanoplastics by scallops at predicted environmental concentrations. The authors use radiocarbon labeling to track the nanoplastics within the scallop tissues. Uptake differs depending on particle size: Larger nanoplastics accumulate in the intestine, whereas smaller nanoplastics are dispersed through the entire scallop body. After exposure to nanoplastics ceased, smaller nanoplastics were no longer detected after 14 days, but some larger nanoplastics persisted for more than 48 days. The presence of the smaller nanoparticles in muscle tissue suggests that the particles can cross epithelial membranes. —JFU


condition feels relentless and can evade treatment. Petridis et al. performed a DNA study of individuals with acne vulgaris and found that those affected share similar, but surprising, genetic mutations. Homing in on 15 regions of the genome, they identified a series of culprit genes that controlled hair growth and follicle formation. This discovery lends weight to the idea that hair follicle shape creates a milieu susceptible to bacterial colonization and inflammation. —PNK

Ending a relationship
Tage S. Rai

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