analysis strengthens the case for climate change as the key driver of megafaunal extinctions, with human impacts playing a secondary role. — AMS
Science, this issue p. 602

HUMORAL IMMUNITY
B cells have a need for speed
High-affinity antibodies provide long-lasting protective immunity against many infections. Generating such antibodies requires help, in the form of T cells, which interact with antibody-producing B cells. As B cells proliferate and mutate their antibody genes, T cells select the cells producing high-affinity antibodies. Gitlin et al. show in mice that B cells that receive T cell help transit through the cell cycle more quickly by increasing the speed at which replication forks progress. Such a rapid cell cycle transition gives high-affinity B cells a selective advantage. — KLM
Science, this issue p. 643

TOPOLOGICAL MATTER
Weyl physics emerges in the laboratory
Weyl fermions—massless particles with half-integer spin—were once mistakenly thought to describe neutrinos. Although not yet observed among elementary particles, Weyl fermions may exist as collective excitations in so-called Weyl semimetals. These materials have an unusual band structure in which the linearly dispersing valence and conduction bands meet at discrete “Weyl points.” Xu et al. used photoemission spectroscopy to identify TaAs as a Weyl semimetal capable of hosting Weyl fermions. In a complementary study, Lu et al. detected the characteristic Weyl points in a photonic crystal. The observation of Weyl physics may enable the discovery of exotic fundamental phenomena. — JS
Science, this issue p. 613 and 622

IN OTHER JOURNALS
Edited by Sacha Vignieri and Jesse Smith

GALACTIC ARCHEOLOGY
Exposing an act of galactic cannibalism
Our Milky Way galaxy contains two streams of stars that have been stripped by its gravity from the neighboring Sagittarius Dwarf Spheroidal Galaxy (Sgr dSph). de Boer et al. have disentangled the streams from the surrounding Milky Way and analyzed their star formation history. No stars are younger than 6 billion years old, indicating when they were ripped from the Sgr dSph. The streams also reveal how the stars originally formed in the Sgr dSph, including the moment when type Ia supernovae began enriching the galaxy. This galactic archeology will help us understand how the Milky Way grew by consuming smaller galaxies. — KTS

STROKE TREATMENT
Randomized clinical trials for mice
To ensure valid conclusions for formal drug approval, the design and analysis of clinical trials are very stringent. Llovera et al. applied the criteria of the gold-standard randomized controlled clinical trial to a preclinical investigation in mice. They tested an antibody to CD49d, which inhibits leukocyte migration into the brain, in two mouse models of stroke. Their six-center randomized controlled study showed that the antibody reduced both leukocyte invasion and infarct volume after a small cortical stroke, but had no effect on larger injuries. — KLK

ENVIRONMENTAL SCIENCE
Deltas are growing centers of risk
Population growth, urbanization, and rising sea levels are placing populations living in delta regions under increased risk. The future resiliency and potential for adaptation by these populations depend on a number of socioeconomic and geophysical factors. Tessler et al. examined 48 deltas from around the globe to assess changes in regional vulnerability (see the Perspective by Temmerman). Some deltas in countries with a high gross domestic product will be initially more resilient to these changes, because they can perform expensive maintenance on infrastructure. However, short-term policies will become unsustainable if unaccompanied by long-term investments in all delta regions. — NMW
Science, this issue p. 638; see also p. 588

PATERNAL CHROMATIN
Biparental control in remodeling sperm
Maternally and paternally inherited animal genomes reorganize and replicate before entering the first zygotic mitosis. Maternally deposited proteins in the egg recondition the sperm DNA; however, Levine et al. show that paternal factors are also involved. The Drosophila testis-specific protein HP1E localizes to paternal chromosomes and controls sperm DNA reorganization to prime it for embryonic chromosome segregation. Elimination of HP1E in males results in male sterility. Hence, proteins from both parents prime sperm DNA so it can be synchronized with the maternal genome for the first zygotic mitosis. — BAP

PSYCHOLOGY
Believing you know is not the same as knowing
Impossibly large numbers of people believe that they are above average drivers; similarly, people often think that they understand how GPS works, but then cannot provide a persuasive explanation. Atr et al. add the phenomenon of overclaiming to this list of metacognitive judgments. They find that crowdsourced workers claim
How to adapt to climate change
Climate change is imposing increases in temperature on a wide variety of species. Such warming conditions may be particularly challenging for aquatic animals, for which warming waters bring not only temperature increases but also associated oxygen limitations. Some species have displayed an ability to adapt to warming conditions across generations. Veilleux et al. looked at the transcriptome of parents and offspring in a Pacific damselfish, *Acanthochromis polyacanthus*, and found three suites of genes whose expression was altered during transgenerational exposure to increased temperatures. These included genes involved in metabolism, immune response, and tissue development. Notably, heat-shock gene expression did not change, suggesting that these markers of immediate response to increased temperatures may not be involved in longer-term adaptation. — SNV


Whither carbon capture and storage?
Carbon capture and storage (CCS) is widely considered an essential aspect of efforts to limit global warming. Yet efforts to develop CCS technology are progressing slowly, and no full-scale power plant with CCS is in operation. Maddali et al. analyze the costs and risks associated with CCS and model the effects of its delayed implementation using a dynamic nonlinear simulation tool. Based on a number of emissions and mitigation scenarios, the authors conclude that CCS is not sufficiently mature and, in its current form, is too expensive to contribute significantly to global climate change mitigation. Other mitigation strategies must therefore be developed urgently. — JFU


CLIMATE ADAPTATION
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Microbiome
Belowground-aboveground
Symbiotic microorganisms, such as nitrogen-fixing bacteria and phosphorus-transferring fungi (mycorrhizae), are vital for plant growth in wild systems. The symbionts may scavenge rare nutrients for plants, but how do they interact? Van der Heijden et al. systematically simulated the plant-symbiont communities found in sand dunes in experimental microcosms kept free of contaminating organisms. For wild legume (peas, beans, and their relatives) seedlings, hosting nitrogen-fixing bacteria alone was not enough to guarantee growth; mycorrhizal fungi supplying phosphorous had to be present too. This synergism becomes apparent only when plants live on a nutritional edge. — CA

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Solar cells
Healing perovskite thin films
Inorganic-organic perovskite thin films function best in solar cells when they are free of defects and grain boundaries, but the as-synthesized films are often rough and highly polycrystalline. Zhou et al. now show that methyl ammonium lead iodide (CH$_3$NH$_3$PbI$_3$) rapidly reacts with gas-phase methyl-amine (CH$_3$NH$_2$) to form a liquid, and then reforms a solid film after degassing. Processed films decreased in root mean square roughness by about a factor of 25, and their overall power conversion efficiency in solar cells increased from 5.0 to 14.5% after treatment. — PDS


CLIMATE CHANGE
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