Cyanomitra oritis feeding on *Impatiens sakeriana*.

ECOLOGY

Best Feed Forward

New World hummingbirds and Old World sunbirds are both adapted for feeding on nectar. They share specialized traits, such as an elongated bill and a small body size. Hummingbirds, however, have become famous for their ability to hover indefinitely in front of flowers, whereas sunbirds seem less able or inclined to do so. Following on a recent study that demonstrated that African sunbirds can hover when challenged to feed from an invasive, hummingbird-pollinated New World plant (*Nicotiana glauca),* Janeček *et al.* have examined the pollination system of the native African plant *Impatiens sakeriana*, which displays a suite of characteristics common to plants that attract hovering birds: red flowers, a long flower spur, high nectar production, and an absence of nearby perching structures as is usually observed in sunbird-pollinated plants. The reproductive ecology of this plant has been a conundrum. It had been hypothesized that it evolved to be pollinated by a now-extinct hovering bird; in this species' absence, it would have to be either self- or insect-pollinated. The authors used exclusion and germination experiments along with observations to demonstrate that these plants are not capable of self-pollination and are not pollinated by insects. Further, they showed that two species of African sunbirds (*Cyanomitra oritis and Cinnyris reichenowi*) will both perch and hover at *I. sakeriana* flowers. Nevertheless, *C. reichenowi*, when perching, pierces the sides of flowers to drink the nectar, resulting in lower seed production. Therefore, the authors suggest that the distinctive flower morphology of *I. sakeriana* has evolved in order to induce birds to hover, instead of perch, and thus to enforce a fair trade of nectar for pollination. — SNV

Oikos **119**, 10.111/j.1600-0706.2010.08612.x (2010).

PHYSICS

A Fertile Majorana Habitat

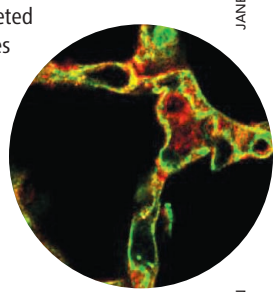
Most species of (near-) elementary particles (such as electrons and protons) have their own antiparticle partners with which they annihilate in a burst of gamma rays. Usually the antiparticle is distinct from the particle. An exotic exception to that rule is the spin-1/2 Majorana fermion, which is its own antiparticle. Although predicted more than 70 years ago, Majorana fermions are yet to be observed, with neutrinos and dark matter WIMPs being the prime candidates. Recently, another possible setting for Majoranas emerged in solid-state materials such as certain topological insulators (TIs) that have a linear electron dispersion but are also superconducting. On doping the TI Bi_2Se_3 with copper, a superconducting state was observed; however, calculations indicated that such doping would destroy the conditions necessary to support the Majorana state. Now, Wray *et al.* find in their angle-resolved photoemission experiments that this is not the case, raising a realistic possibility of a first observation of a Majorana fermion. — JS

Nat. Phys. **6**, 10.1038/nphys1762 (2010).

CELL BIOLOGY

Keeping Things Clear

Pneumonia is a serious inflammatory lung disease commonly caused by bacterial infection. It is a major cause of death in all age groups and particularly in those who are chronically ill, and further insight into its pathogenesis may promote the development of new therapeutic approaches. Ray *et al.* have discovered an alternative mechanism underlying the pathobiology of pneumonia caused by bacterial infection. Cardiolipin is a phospholipid that mitochondrial membranes are rich in. It is a minor component of pulmonary surfactant, which is secreted into the airways and lines the alveolar surface of the lungs, reducing surface tension and enabling proper lung function. Higher concentrations of cardiolipin are found in animal models of lung injury, suggesting that its regulation is important in disease pathogenesis. After discovering higher levels of cardiolipin in fluid isolated from the lungs of pneumonia patients, the authors uncovered a critical role for cardiolipin in surfactant activity and in lung structure and



Atp8b1 (red) at the cell surface (green) in a mouse lung.

JANEČEK; RAY *ET AL., NAT. MED.* **16**, 10.1038/NM.2213 (2010)

CREDITS (TOP TO BOTTOM): STEPAN

function in mice. The extracellular levels of cardiolipin are regulated by the lipid transporter Atp8b1, which imports phospholipids across the plasma membrane. Mutants of Atp8b1 are found in a familial disorder associated with an increased risk of pneumonia. Indeed, by overexpression and loss-of-function studies in cultured cells and in mice, the authors established a critical role for Atp8b1. These results suggest that the clearance of cardiolipin from the lungs may be of therapeutic benefit for treating pneumonia caused by bacteria, and thus could help to alleviate the current dependence on broad-spectrum antibiotics, which has led to the emergence of dangerous drug-resistant strains. — HP

Nat. Med. **16**, 10.1038/nm.2213 (2010).

CHEMISTRY

Golden Selection

Gold's widespread use in jewelry design and dentistry is due in large part to its remarkable resistance to chemical oxidation. There is in fact a fairly straightforward means of dissolving the metal—a concentrated combination of nitric and hydrochloric acids that's been in use for hundreds of years—but this solvent mixture is so generally corrosive that rings and fillings wouldn't be the primary worry if some happened to spill onto your fingers and teeth. Of more commercial concern is the acid mixture's failure to discriminate between gold and platinum, which hampers catalyst-recycling protocols. Lin *et al.* have discovered that a different, nonaqueous solvent mixture—thionyl chloride and pyridine—can also dissolve gold quite effectively but leaves platinum fully intact. The process is clearly oxidative, although the exact product is somewhat uncertain; x-ray photoelectron spectroscopy implicates the formation of trivalent gold species, and a salt of the tetrachloride anion $[AuCl_4]^-$ precipitates after several months. A number of other aromatic amines, as well as dimethyl formamide, can substitute for the pyridine. — JSY

Angew. Chem. Int. Ed. **49**, 10.1002/anie.201001244 (2010).

ECOLOGY

Shedding Dead Leaves

Historically, New Zealand had flourished without terrestrial mammalian fauna until the relatively recent arrival of humans. As a consequence, many plants have evolved in the absence of selective pressures generally attributed to mammalian lineages. One such example is the grass family, which is believed to have coevolved elsewhere

with grazing ungulates, such as modern-day horses. Many grasses show specific adaptations to grazing, including the retention of old leaves, which makes the live leaves less readily accessible to grazing mammals. Antonelli *et al.* demonstrate that many members of the danthonioid group of grasses of New Zealand (such as *Rytidosperma pulchrum*, above) have gained the ability to lose dead leaves, a process known as abscission, which is a relatively rare trait that occurs in only ~3% of graminoids worldwide and that allows plants to generate more biomass. The authors attribute this pattern to the lack of selective grazing pressures by mammals and demonstrate how this trait is correlated with species radiations in New Zealand but not in other endemic floras. These data suggest that release from a selective pressure can lead to species radiations and contribute to the uniqueness of biotas. — LMZ

Proc. R. Soc. London Ser. B **277**, 10.1098/rspb.2010.1145 (2010).

MICROBIOLOGY

Stressed by Heavy Metal

When an ecosystem is stressed, do the more tolerant species benefit or do all species decline? In natural microbial communities, examples of both responses occur, but comparisons across field sites and experiments are difficult. In a relatively controlled natural setting, Gough and Stahl studied the stress response to metals in anoxic sediments of a eutrophic lake that are loaded with high but variable levels of metal contaminants from a nearby zinc smelter. By using a broad sequencing technique to identify dominant microbial sequences at the domain level, they found that across a range of metal concentrations, the communities were quite similar, and except in a few instances, the abundance and diversity of bacteria, archaea, and eukaryotes were uncorrelated with metal concentrations. In a notable exception within the archaeal fraction, cold-adapted Crenarchaeota were strongly correlated with high levels of zinc, arsenic, and copper. Although little is known about these freshwater anaerobes—even their metabolic role in the microbial communities is unclear—they appear to have a competitive advantage in their response to metal stress over other archaeal clades, including more common methanogens. — NW

ISME J. **4**, 10.1038/ismej.2010.132 (2010).

CREDIT: ANTONELLI *ET AL.*, *PROC. R. SOC. LONDON SER. B* **277**, 10.1098/RSPB.2010.1145 (2010)