EDITED BY STELLA HURTLEY

Honeybees Can't Do It Alone

The majority of food crops require pollination to set fruit with the honeybee providing a pollination workhorse, with both feral and managed populations an integral component of crop management (see the Perspective by **Tylianakis**, published online 28 February). **Garibaldi *et al.*** (p. 1608, published online 28 February) now show that wild pollinators are also a vital part of our crop systems. In more than 40 important crops grown worldwide, wild pollinators improved pollination efficiency, increasing fruit set by twice that facilitated by honeybees. **Burkle *et al.*** (p. 1611, published online 28 February) took advantage of one of the most thorough and oldest data sets available on plant-pollinator interaction networks and recollected data on plant-pollinator interactions after more than 120 years of climate change and landscape alteration. The historical data set consists of observations collected by Charles Robertson near Carlinville, Illinois (USA), in the late 1800s on the phenology of plants and their pollinating insects, as well as information about which plants and pollinators interacted with one another. Many sites were revisited in the early 1970s and in 2009 and 2010 to collect similar plant-pollinator data. Pollinator function has declined through time, with bees showing lower visitation rates and lower fidelity to individual plant species.

Action at a Distance

Snowfall in the Sierra Nevada provides a large fraction of the water that California receives as precipitation. Knowing what factors influence the amount of snow that falls is thus critical for projecting how water availability may change in the future. Aerosols have an important effect on cloud processes and precipitation. **Creamean *et al.*** (p. 1572, published online 28 February) found that dust and biological aerosols originating from as far away as the Sahara facilitate ice nuclei formation and ice-induced precipitation in the Sierra Nevada and show how dust and biological articles from places as distant as Africa and Asia can influence precipitation over the western United States.

Copper in the Spotlight

Elemental copper should, in principle, be a productive catalyst for the commercial preparation of propylene oxide; however, in practice, surface oxidation under industrial conditions quickly diminishes selectivity below a useful threshold. **Marimuthu *et al.*** (p. 1590) now show that irradiating the copper with visible light during the reaction excites surface plasmon resonances that lead to reduction of the oxide coating and restore selectivity.

Making the Final Cut

Abscission, the final separation of two daughter cells, was long thought to be an unimportant step in cytokinesis, triggered merely by the cells pulling strongly enough on the bridge to rupture it. Research over the past 10 years, however, has challenged this notion. Defects in cutting the cytokinetic bridge can lead to the formation of large networks of connected cells or to binucleate cells. **Lafaurie-Janvore *et al.*** (p. 1625) now show that the forces postmitotic cells exert on the cytokinetic bridge play an important role in abscission: Surprisingly, increasing the tension in the bridge inhibits abscission, while reducing tension induces abscission. This could provide a sensing mechanism to ensure that daughter cells establish sound connections with their surrounding cells and matrix before detaching from one another.

Lamin Loppers

The nuclear lamina provides mechanical stability to the nuclear envelope and is involved in regulation of cellular processes such as DNA replication. Defects in the nuclear lamina lead to diseases such as progeria and metabolic disorders. One of the components of the nuclear lamina, lamin A, undergoes a complex maturation process. A key player is an inner nuclear membrane zinc metalloprotease (ZMP) that is responsible for two proteolysis steps (see the Perspective by **Michaelis and Hrycyna**). **Quigley *et al.*** (p. 1604) report the crystal structure of human ZMPSTE24 and **Pryor *et al.*** (p. 1600) that of the yeast homolog Ste24p. The structures provide insight into the mechanism of catalysis and into why mutations in ZMPSTE24 lead to laminopathies.

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Balancing Humans with Apes

Shared ancestral polymorphisms between species tend to be relatively rare, and studies of trans-species polymorphisms have focused on just a few regions known for balancing selection. **Leffler *et al.*** (p. 1578, published online 14 February) performed genome-wide scans among humans and great apes and found shared polymorphisms between chimps and humans. Many of the identified variants seem to be associated with genes involved in pathogen response or defense, suggesting that this widespread balancing selection may reflect the ongoing arms race between pathogens and hosts.

Beta Bonding

Carbonyl compounds, which incorporate carbon-oxygen double bonds, are among the most productively reactive molecules in synthetic as well as biochemical contexts. The carbon directly bonded to oxygen is rendered highly electrophilic, while the adjacent (α) carbons are easily deprotonated to undergo further transformations. In contrast, the β carbons that are one step further along the chain tend to be relatively inert. **Pirnot *et al.*** (p. 1593) now show that a dual catalyst system—consisting of an amine and a photoactive metal complex—can activate the β carbons of carbonyl compounds to couple with aryl substrates.

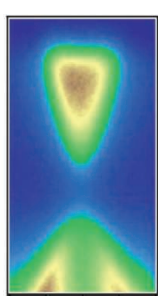
Patchy Polar Cap

Patches of enhanced density plasma in the polar ionosphere (or polar cap patches) disturb radio communications and satellite positioning at high latitudes during magnetospheric storms. Using data from Global Positioning System satellites and a high-frequency radar network, **Q.-H. Zhang *et al.*** (p. 1597) analyzed a magnetospheric storm driven by a strong coronal mass ejection from the Sun and followed the evolution and motion of a patch of ionization throughout the polar cap. The localized dayside flow response to the solar disturbance allowed a patch to be stored and grow in the dayside polar cap, and the gaps between patches were controlled by the onset of magnetic reconnection in the magnetosphere's tail.

Fairies? No, Termites!

Fairy circles consist of circles of perennial vegetation that grow within otherwise mostly barren desert habitat on the southwest coast of Africa. Many hypotheses have been put forward to explain the creation and maintenance of fairy circles. Using long-term data collected on the distribution and physical and biological components of these features, **Juergens** (p. 1618) found that the circles are generated by the actions of the sand termite, which removes vegetation produced following intermittent rains. Once generated, the circles collect water, which sustains the growth of perennial vegetation at the edges of the circles, allowing for long-term persistence of the termites.

Magnetic Topology



Topological insulators owe their exotic properties to the peculiarities of their band structure, and one can induce a transition between a topologically trivial and nontrivial material by chemical doping. Now, **J. Zhang *et al.*** (p. 1582) have gone a step further—simultaneously observing that a magnetic quantum transition as the ratio of Se and Te is varied in $Bi_2(Se_xTe_{1-x})_3$ thin films grown by molecular beam epitaxy and doped with magnetic Cr. Photoemission and transport experiments, as well as density functional calculations, imply that the topological transition induces magnetism.

Focusing on the Right Metabolite

A variety of human cancers, including acute leukemias and brain tumors, have mutations in the genes encoding isocitrate dehydrogenase 1 or 2 (IDH1, IDH2), which cause overproduction of a metabolite called 2-hydroxyglutarate (2HG). **Losman *et al.*** (p. 1621, published online 7 February) show that the *R*- but not the *S*-enantiomer of 2HG can transform cells and that *R*-2HG mediates transformation at least in part through effects on protein modifying EglN prolyl hydroxylases. Importantly, the transforming activity of *R*-2HG was reversible, suggesting that therapeutic strategies focusing on inhibition of *R*-2HG production or inhibition of EglN prolyl hydroxylases merit further investigation.

CREDIT: J. ZHANG *ET AL.*

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