



ECOLOGY

The Reef Next Door

Marine reserves have been repeatedly shown to conserve local populations of fish and other marine organisms, but whether they also help to replenish nearby fished areas has been more difficult to demonstrate. Harrison *et al.* tested whether connectivity between reserves and nonreserves in the Great Barrier Reef enhanced the recruitment of fish to fished reefs. First, they sampled hundreds of adults and performed genetic parentage analysis on two exploited reef species, the coral trout and stripey snapper, across three of the reserves. They then identified the parents of juveniles captured from 19 sites scattered across a 1000-km area encompassing reserves and harvest areas. The authors found that adults sampled within the reserves exported a majority of their offspring to intervening harvest areas (between 55 and 83%) and other reserves, but that a significant proportion remained within the reserve. They estimate that reserves (where fish are both larger and more abundant) contribute about half of the overall recruitment, despite being smaller in area. These results demonstrate that marine reserves benefit nearby harvested areas substantially and facilitate persistence of the overall network. — SNV

Curr. Biol. **22**, 10.1016/j.cub.2012.04.008 (2012).

however, the purely chemical reaction is so slow that sulfate-reducing bacteria are mainly responsible for the corrosion of buried iron structures. In theory, the bacteria themselves could use the electrons generated during corrosion to drive their metabolism, but crusts precipitated on the iron surface would present a physical barrier to prevent the cells from coming in direct contact with the metallic iron. In laboratory and field experiments, Enning *et al.* found that the precipitating crusts on highly corroded iron surfaces were semiconducting, which provides an electrical path for electrons to travel between the iron surface and bacterial cells. To complete the electrochemical circuit, chimney-like structures in the crust allowed the passage of neutralizing ions. A sharp pH gradient inside the chimney promoted dissolution and pitting of the iron surface, and the released Fe^{2+} was incorporated into the chimney and crust. Inhibiting bacterial sulfate reduction in the subsurface may therefore reduce the economic costs associated with iron corrosion underground. — NW

Environ. Microbiol. **10.1111/j.1462-2920.2012.02778.x** (2012).

ASTRONOMY

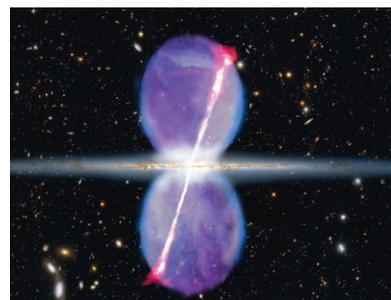
Active Galaxy

Like most other galaxies, the Milky Way hosts a massive black hole in its center. This hole is 4 million times more massive than the Sun, and although it currently lies dormant, it is expected that it experienced periods of activity as it grew by accreting gas and stars from its vicinity. Using data from the Fermi Large Area Telescope, Su and Finkbeiner report signs of that activity in the form of two gamma-ray jets, which emanate from the center of the Milky Way in nearly opposite directions. These jets are tilted at an angle of 15° from the north-south axis of the galaxy and extend to about the edge of two previously identified gamma-ray-emitting bubbles, which

extend 27,000 light-years north and south of the galactic center. The southern jet has blown a tenuous gamma-ray-emitting cocoon as it propagated through the interstellar medium. The shape of this

cocoon is similar to those of the radio-emitting cocoons produced by the jets of actively accreting black holes in distant galaxies. It is not clear whether the bubbles and the jets and cocoon system were produced concurrently. — MJC

Astrophys. J. arXiv:1205.5852 (2012).



ECONOMICS

Insuring Greater Health

What happens when health insurance is given to low-income individuals? Finkelstein *et al.* report on the 1-year outcomes after the state of Oregon enrolled roughly 10,000 uninsured adults, selected by lottery and with annual incomes of \$10,000 or less, in Medicaid. They find, in comparison to those who were not selected, a 15 to 35% greater consumption of health care, as measured by the number of hospital admissions, prescription drugs taken, and outpatient visits, along with a 15 to 60% greater rate of compliance with preventive care, such as testing for blood cholesterol and mammograms. The increased use of medical services was consistent with the observation that the incidence of diabetes, hypertension, asthma, and depression in the people who were eligible for Medicaid but did not win the lottery was twice as high as in

the general adult population. Objective measures of changes in physical health await in-person follow-up assessments, but one remarkable finding from the surveys is that the impact of health insurance on subjective well-being, at least in this context, is equivalent to what would be produced by a doubling of one's income. — GJC

Q. J. Econ. **127**, 10.1093/qje/qjs020 (2012).

MICROBIOLOGY

Corrosion Conundrum

Corrosion of iron leads to damage and failure of a variety of structures, including bridges and underground pipes. The electrochemical process occurs by the oxidation of metallic iron (Fe^0) to ferrous iron (Fe^{2+}), which creates iron oxide rust in the presence of oxygen. In anaerobic sediments,

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