

PHYSICS UPDATE

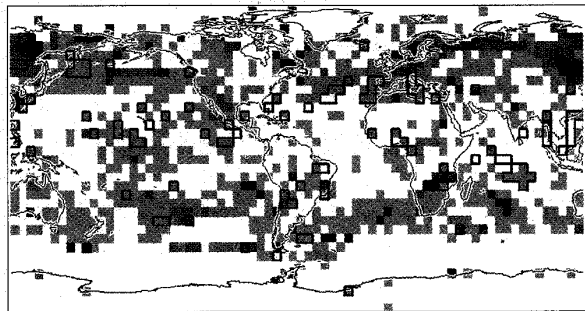
► **SUPERCONDUCTIVITY GOES PLATINUM.** It is ironic that some of the best insulators (such as perovskite ceramics) should make the best superconductors, whereas some of the best conductors (the noble metals gold, silver, and copper, as well as platinum and palladium) should fail to become superconductors. The electron-phonon interactions that bring about low-temperature superconductivity are apparently so weak in these metals that superconductivity is precluded. Now, though, physicists at the University of Bayreuth (Germany) have overcome the recalcitrance of platinum, which, in the form of a high-purity compacted powder, becomes superconducting at millikelvin temperatures. The origin and type of the superconductivity in the platinum powder is unknown, but the researchers rule out impurities—either inside or on the surface of the sample—as giving rise to the effect. (R. König, A. Schindler, T. Herrmannsdörfer, *Phys. Rev. Lett.* **82**, 4528, 1999.) —PFS

► **THE BIGGEST LAVA OUTPOURING** in Earth's history probably took place about 200 million years ago. An international team of geophysicists has just put the final piece into a jigsaw puzzle that connects basaltic layers in places as far flung as Canada, Brazil, Europe, and Africa. What started out as an Australia-sized blacktop in the heart of the ancient supercontinent of Pangea was torn asunder by tectonic forces as the Atlantic Ocean opened; the fragments were carried to places all around the Atlantic rim, making the full extent of the lava flow difficult to ascertain until now. The immense flow, referred to as the Central Atlantic Magmatic Province, took place roughly when mass extinctions occurred, at the boundary between the Triassic and Jurassic eras. (A. Marzoli *et al.*, *Science* **284**, 616, 1999.) —PFS

► **PACEMAKERS IN A PETRI DISH.** Pacemakers are cells or groups of cells that provide regularly repeating stimuli to a large network of cells. In humans, roughly 5000 cells in the right roof of the heart's atrium generate the signals that regulate the rhythmic contractions of that organ. Now, researchers at the Technion—Israel Institute of Technology excised muscle cells and connective tissue from the heart ventricles of rats, and incubated them in a petri dish under a microscope equipped with a CCD camera and real-time computerized image processing. The cells formed a monolayer and, after 1–3 weeks, a hardy network of fibers. In continuously monitoring the network's contractile activity as it self-assembled, the researchers detected rhythmic contractions as well as rhythm disorders, such as skipped-beat patterns and alternations between irregular and regular rates of contraction. This suggested to them that one or more pacemakers had formed within the network. Although *in vitro* pacemaker activity has been ob-

served before, the group's optical technique is able to monitor the cells noninvasively and continuously long enough to watch a pacemaker system emerge from an evolving cellular network. (Y. Soen *et al.*, *Phys. Rev. Lett.* **82**, 3556, 1999.) —BPS

► **THE TEMPERATURE OF THE WORLD** is 14.0 °C. At least that's the global average surface temperature. The Northern Hemisphere is somewhat warmer than the Southern, averaging 14.6 °C versus 13.4 °C. A team of scientists led by Phil Jones at the University of East Anglia (UK) has reviewed the surface temperature data gathered during the last 150 years from around the globe, plotted them on a one-degree grid superimposed on a map of the world, and found some trends. Shown here is the annual temperature trend for the years 1978–97, with reds and yellow indicating warming, and blues and green indicating cooling (white indicates areas with insufficient data). Here are a few other findings. Over the period 1861–1997, the average global temperature rose 0.57 °C. The warmest years of the 20th century have all occurred in



the 1990s, with 1998 the warmest, followed by 1997, 1995, and 1990. The two periods of greatest warming were 1925–44 and 1978–97. Much of the net warming is at night; for the period 1950–93, nighttime average minimum temperatures increased 0.18 °C per decade while daytime average high temperatures increased only 0.08 °C per decade. (P. D. Jones *et al.*, *Rev. Geophys.* **37**, 173, 1999.) —PFS

► **INSTANT HOLOGRAPHY.** Polaroid succeeded in creating instant photography, the appearance of an image very soon after exposure. Now, scientists at the Risø National Laboratory in Denmark have done the same for holography. The group showed that a single 5 ns pulse of blue-green laser light can record an image in the surface relief of a sheet of photosensitive polymer (azobenzene), without any chemical processing. Furthermore, heating the film to about 80 °C for a minute completely erases the hologram, allowing the film to be reused. Applications for this type of process could include three-dimensional hologram movies, waveguides for instantly reconfigurable optical switching, and tracking the movement of particles. (P. S. Ramanujam *et al.*, *Appl. Phys. Lett.* **74**, 3227, 1999.) —PFS ■