

# January

*“Ladies and gentlemen: on this day, at this hour, it is still within our power to shape the outcome of this battle. Let us find our resolve, and turn events toward victory.”*

U.S. Pres. George W. Bush, asking for support for his planned troop “surge” in the Iraq war in his state of the union address, January 23

**1** With the beginning of the new year, Chancellor Angela Merkel of Germany assumes the presidency of the European Union.

Bulgaria and Romania officially accede to the European Union, bringing the number of member states to a total of 27.

Slovenia becomes the 13th member of the European Union to adopt the euro as its official currency.

Belarus achieves a last-minute agreement with the Russian natural gas monopoly Gazprom to pay \$100 per thousand cubic metres of gas, up from \$46 but still well below market prices, to avert a cutoff of gas supplies.

The name of the Indian state of Uttaranchal officially changes to Uttarakhand.

**2** The annual Hajj to Mecca, Saudi Arabia, concludes without incident.

A new constitution comes into effect in the British dependency of Gibraltar; it grants more powers to the residents and fewer to the government of the U.K.

In Australia, the Aboriginal Githabul tribe reaches an agreement with the state government of New South Wales that gives the Githabul joint ownership with the government over an area of 6,000 sq km (2,300 sq mi), including national parks and forests.

American television personality Oprah Winfrey officially opens the Oprah Winfrey Leadership Academy for Girls in Henley-on-Klip, S.Af., with an initial class of 152 11- and 12-year-old girls; the eventual enrollment will be 450. (Photo right.)

**3** The U.S. government announces that John D. Negroponte will resign as director of national intelligence in order to

become deputy secretary of state, filling a post that has been vacant since the resignation of Robert B. Zoellick.

Pres. Hugo Chávez of Venezuela dismisses his interior minister and his vice president, citing unacceptably high levels of violent crime and prison violence in the case of the former but giving no explanation for the action against the latter.

Kenya closes its border with Somalia in an attempt to prevent Islamist militia members from entering the country.

Robert L. Nardelli resigns as chairman and CEO of home-improvement company Home Depot.



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**4** In Fiji, coup leader Frank Bainimarama restores Ratu Josefa Iloilo as president and dismisses Jona Senilagakali, whom Bainimarama had appointed interim prime minister after the coup; the following day Bainimarama is sworn in as interim prime minister.

Democratic Rep. Nancy Pelosi of California becomes speaker of the U.S. House of Representatives; she is the first woman to hold the post.

**5** U.S. Pres. George W. Bush names Zalmay Khalilzad, currently U.S. ambassador to Iraq, as his choice to become UN ambassador.

A bomb on a bus in Nittambuwa, Sri Lanka, in a usually peaceful area, kills at least 5 people and injures 30; the following day a bomb on a passenger bus near Hikkaduwa kills some 11 people.

**6** Government officials in India say that a series of attacks by the United Liberation Front of Assam over the past two days have left at least 55 people dead in that state.

Rioting breaks out in Mogadishu, Somalia, in protest against Ethiopian troops and against a government disarmament program that protesters were unaware had already been canceled.

**7** At an enormous Fatah rally in Gaza City, Palestinian Authority leader Mahmoud Abbas reiterates his demand for early elections.

The U.S. Air Force conducts a raid in southern Somalia, using a gunship against suspected al-Qaeda operatives.

On the occasion that he was to be enthroned as Roman Catholic archbishop of Warsaw, Bishop Stanislaw Wielgus instead resigns after having admitted collaboration with the Polish secret police during the communist era; Jozef Cardinal Glemp is reappointed archbishop.

**8** Russia shuts down its oil pipeline that runs through Belarus, accusing Belarus of siphoning off fuel intended for other European countries; the cutoff affects supplies in Ukraine, Germany, Poland, Hungary, the Czech Republic, and Slovakia.

Venezuelan Pres. Hugo Chávez announces plans to nationalize CANTV, the country's main telecommunications company, as well as the rest of the telecommunications industry and the electricity industry; the Caracas and U.S. stock markets react sharply negatively.

Daniyal Akhmetov resigns as the prime minister of Kazakhstan.

For a second consecutive day, in the midst of India's Ardh Kumbh Mela celebrations that involve pilgrims' ritual bathing in the Ganges River, Hindu holy men, or *sadhus*, protest the pollution of the river, saying it is too dirty to wash away sins.

The University of Florida defeats Ohio State University 41-14 in college football's Bowl Championship Series title game in Glendale, Ariz., to win the national Division I-A championship.

**9** Hundreds of American and Iraqi troops fight insurgents in a daylong battle in Baghdad.

A third day of violent protests intended to force

the postponement of elections takes place in Dhaka, Bangladesh.

Cal Ripken, Jr., who played in 2,632 consecutive games, and slugger Tony Gwynn are elected to the National Baseball Hall of Fame; former home-run king Mark McGwire is rejected.

At the Macworld Expo trade show in San Francisco, Apple CEO Steven P. Jobs introduces the novel touch-screen based iPhone, combining music player, camera, Web functions, and phone with other innovations; he also announces a change to his company's name, from Apple Computer to Apple Inc.

**10** In a televised speech to the country, U.S. Pres. George W. Bush acknowledges difficulties in Iraq and announces that he will send 20,000 more U.S. troops to Iraq in what he calls a “surge” to end the violence in Baghdad.

China reports a record trade surplus for 2006 totaling \$177.47 billion.

Pres. Omar Hassan al-Bashir of The Sudan and leaders of several rebel groups in Darfur agree to a 60-day ceasefire in a truce brokered by New Mexico Gov. Bill Richardson.

The Sudan begins circulating a new currency, to be known as the sudani, to supplant the dinar, in circulation since 1992; the dinar will not be accepted as currency after July 1.

**11** Alfred Gusenbauer is sworn in as chancellor of Austria at the head of a grand coalition government.

Bangladeshi Pres. Iajuddin Ahmed declares a state of

emergency, postpones elections, and resigns as caretaker prime minister.

The Los Angeles Galaxy announces that it has signed Real Madrid star David Beckham to play Major League Soccer in the U.S. starting in the summer.

**12** Ukraine's Supreme Council (legislature) passes a law that removes the right of the president to reject a prime minister chosen by the council as well as the right to choose the foreign and defense ministers, and it limits presidential decrees.

Mexico's minister of the economy, Eduardo Sojo, announces plans to suspend tariffs on corn products to relieve pressure on the price of tortillas, which has risen 25% in a week.

Pres. Iajuddin Ahmed of Bangladesh names Fakhruddin Ahmed head of the interim government ahead of elections and relaxes some controls imposed under the state of emergency.

**13** Meeting at Cebu, Phil., the members of the Association of Southeast Asian Nations (ASEAN) agree to create a free-trade zone in the region by 2015 and approve the outline of a governing charter.

Pres. Mahmoud Ahmadinejad of Iran makes his second visit in five months to Venezuela to meet with that country's president, Hugo Chávez.

**14** Nicolas Sarkozy, French minister of the interior, is chosen as the presidential candidate of the ruling centre-right Union for a Popular Movement Party.

U.S. Secretary of State Condoleezza Rice meets with Palestinian Authority Pres. Mahmoud Abbas in Ram Allah in the West Bank; she will spend the next two days shuttling between Israeli and Palestinian officials in an attempt to bring them to an agreement.

**15** A temporary constitution that makes the prime minister, rather than the king, head of state is approved in Nepal, and 83 Maoist rebels take the seats in the interim legislature that the document grants them.

Rafael Correa is sworn in as president of Ecuador; he orders that a referendum be held on March 18 on amending the constitution to decrease the power of traditional parties.

**16** Two car bombs and a suicide bomber kill at least 70 people at Mustansiriyah University in Baghdad, and other assorted acts of violence kill 15 others throughout the city.

In Burundi the High Court clears former president Domitien Ndayizeye and former vice president Alphonse Kadege of charges that they plotted the overthrow of the current government.

Blizzard Entertainment releases *Burning Crusade*, the first full retail expansion of the online role-playing game *World of Warcraft*, which has more than eight million subscribers.

**17** In a speech to the European Parliament as president of the European Union, German Chancellor Angela Merkel states her goals of reviving the drive to pass the



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EU constitution and completing the Doha round of trade talks.

On the eighth day of a general strike intended to force the resignation of Pres. Lansana Conté of Guinea, security forces and demonstrators clash in Conakry, and street protests begin taking place in other cities.

**18** U.S. government officials reveal that China carried out a successful test of an antisatellite weapon some days earlier, destroying an old weather satellite; it was the first antisatellite test since the U.S. tests in the mid-1980s.

In China the *People's Daily* reports that dams, overfishing, and pollution have resulted in the extinction of one-third of all fish species in the Huang Ho (Yellow River).

**19** After reports that United Nations Development Programme money may be being misused in North Korea, UN Secretary-General Ban Ki-moon calls

for systemwide outside auditing of all UN activities.

The newly appointed government of Czech Republic Prime Minister Mirek Topolánek wins a vote of confidence.

Prominent ethnic-Armenian journalist Hrant Dink is shot to death outside his office in Istanbul.

In a change in policy, Mexico extradites to the U.S. four people believed to be major drug traffickers as well as seven lower-level drug dealers.

**20** A U.S. helicopter crashes—possibly shot down—north of Baghdad, killing all 13 aboard, and five American soldiers are killed in battle in Karbala'.

Philippine officials report that DNA tests have confirmed that a man killed in battle with Philippine troops in September 2006 is Khadaffy Janjalani, leader of the militant Islamic group Abu Sayyaf; Abu Sulaiman, Janjalani's apparent successor, had been killed a few days previously.

The innovative Olympic Sculpture Park opens in Seattle on the site of a former fuel-storage depot. (Photo above.)

**21** The National Art Center, a large new museum designed by Kisho Kurokawa, opens in Tokyo with a collection on loan from several museums, including the Museum of Modern Art in New York City; the National Art Center has no permanent collection.

Winners of the 29th annual Dakar Rally are French driver Stéphane Peterhansel in a Mitsubishi, Frenchman Cyril Despres on a KTM motorcycle, and Dutch driver Hans Stacey in a MAN truck.

**22** Two car bombs in a market in Baghdad explode at noon, a very busy time, and kill at least 88 people.

In fighting between anti-government protesters and security forces in Conakry, Guinea, some 20 people are killed.

In the field of children's literature, the Newbery Medal is awarded to Susan Patron for *The Higher Power of Lucky*, a somewhat controversial book, and David Wiesner wins the Caldecott Medal for illustration for his book *Flotsam*.

In Thoroughbred horse racing's 2006 Eclipse Awards, Invador is named Horse of the Year.

**23** U.S. Pres. George W. Bush delivers his sixth state of the union address; he asks for support for his strategy in Iraq and makes modest health care proposals and plans to reduce gasoline consumption.

From today, U.S. citizens returning by air from any country in the Western Hemisphere must show a passport to reenter their home country; citizens of Canada and countries of the West Indies are also now required to show a passport when arriving in the U.S. by air.

Ethiopian troops begin pulling out of Somalia.

Fighting breaks out on the streets of Beirut between supporters of Hezbollah and partisans of the government; at the end of a full day of conflict, at least three people have been killed.

The Ministry of Justice of Israel announces that the attorney general intends to indict Pres. Moshe Katsav on charges of rape, sexual harassment, abuse of power, and obstruction of justice.

Government figures show that by 2006 the Chinese territory of Macau had become the world's biggest gambling centre, with gambling revenue exceeding that in Las Vegas.

**24** Sheikh Hassan Nasrallah, head of Hezbollah, declares that the opposition has decided not to bring down Lebanon's government.

For the second time this month, U.S. military forces conduct an air strike in Somalia.

**25** Charles Rabemananjara is sworn into office as prime minister of Madagascar.

A committee of the Israeli Knesset (parliament) approves the request of Pres. Moshe Katsav to be suspended from duties; Dalia Itzik is named acting president.

The Ford Motor Co. announces a loss of \$12.7 billion for 2006, its largest single-year loss ever.

Composer Steve Reich and jazz saxophonist Sonny Rollins are named winners of the Polar Music Prize by the Royal Swedish Academy of Music.

**26** UN mediator Martti Ahtisaari presents his proposals for the future of the region of Kosovo in Serbia; the plan would allow Kosovo to declare independence but envisions international supervision to protect the rights of the Serbian minority there.

A gathering of representatives from 60 countries in Kobe, Japan, reaches the first global agreement on a plan to protect the declining numbers of tuna in the world's oceans.

**27** Two car bombs go off at a busy market in Baghdad where crowds had gathered for a preparatory ritual

for the Shi'ite holy day of 'Ashura'; at least 15 people are killed.

A suicide bomber kills 14 people, mostly police officers, just before a planned religious procession in Peshawar, Pak.

American Serena Williams defeats Mariya Sharapova of Russia to win her second Australian Open women's tennis championship; the following day Roger Federer of Switzerland defeats Chilean Fernando González to win the men's title for the third time.

**28** A battle takes place in an orchard outside Al-Najaf, Iraq, between Iraqi and American forces and a group of militants apparently intent on disrupting observations of the holy day 'Ashura'; at least 250 people are killed.

The Roman Catholic party Sinn Fein agrees to endorse the Northern Ireland police force, which is to change over the next 15 years from being mostly Protestant to being proportionately representative of both the Protestant and the Roman Catholic communities.

The automobile endurance race 24 Hours of Daytona in Florida is won by the team consisting of former Formula 1 driver Juan Pablo Montoya of Colombia, Scott Pruett of the U.S., and Salvador Duran of Mexico.

**29** China announces a plan to lend \$3 billion in preferential credit to countries in Africa without political or other conditions.

Meeting in Addis Ababa, Eth., the African Union chooses Pres. John Kufuor of Ghana to assume the organization's rotating

presidency, rebuffing The Sudan for the second consecutive year because of worsening violence in Darfur.

**30** In violence connected with the observance of 'Ashura' in Iraq, some 50 people are killed, at least 23 of them by a bomb in Karbala'.

Lord Levy, the top Labour Party fund-raiser in the U.K., is arrested for the second time in an inquiry into whether seats in the House of Lords had been made available in exchange for financial considerations.

Supporters of Pres. Rafael Correa of Ecuador try to storm the National Congress, which has been at odds with the president; violent clashes with the police ensue.

Vice Pres. Cassim Chilumpha of Malawi goes on trial for treason; he is accused of having hired hit men to assassinate Pres. Bingu wa Mutharika.

Vista, Microsoft's new Windows operating system goes on sale.

Archaeologists in England report the discovery at Durrington Walls on Salisbury Plain of what seems to be ruins of the largest Neolithic village ever found in Great Britain.

**31** Venezuela's National Assembly grants Pres. Hugo Chávez the power to govern by decree for the next year and a half.

After two weeks of ethnic unrest in the Terai region of Nepal, Prime Minister Girija Prasad Koirala says in a televised address that he will press for Nepal's new system of government to be a federal one, a key demand of the Madhesi people of Terai.

# Nobel Prizes

Nobels in 2007 were **AWARDED** to a former U.S. **VICE PRESIDENT** (and a **UN** agency); to a British writer whose works **CHRONICLED** the social and political **UPHEAVALS** of the 20th century; to scientists for work on surface chemical **REACTIONS**, electrical **RESISTANCE** related to **MAGNETISM**, and targeted genetic **ALTERATIONS** in mice; and to economists who formulated mechanism design theory.

## PRIZE FOR PEACE

**T**he Nobel Prize for Peace was shared in 2007 by the Intergovernmental Panel on Climate Change (IPCC), an international organization of some 2,000 scientists, and by Al Gore, former vice president of the U.S. and long an advocate for better stewardship of the environment. In announcing the award, the Norwegian Nobel Committee said that climate change could have far-reaching consequences, including “increased danger of violent conflicts and wars.” The committee cited the recipients’ “efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change.”

The IPCC was established in 1988 by the World Meteorological Organization and the United Nations Environment Programme to study the science of climate change, along with the impact on humans and ways of reducing and coping with such change. The Nobel committee said that “the IPCC has created an ever-broader informed consensus about the connection between human activities and global warming.” The IPCC did not itself conduct research but rather reviewed the published work of scientists in the field. It had three sections—one to examine climate and climate change, another to study the social and economic effects of such change and methods of adapting to it, and a third to analyze ways

Al Gore



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in which the emission of greenhouse gases and other harmful activities might be controlled. In addition, the IPCC maintained the Task Force on National Greenhouse Gas Inventories. The IPCC regularly published reports, and it provided comprehensive assessments of its findings in 1990, 1995, 2001, and 2007.

Albert Arnold Gore, Jr., was born on March 31, 1948, in Washington, D.C., the son of a U.S. representative and senator from Tennessee. He received a B.A. degree (1969) from Harvard University and from 1969 to 1971 served in the U.S. Army in Vietnam as a military

reporter. From 1971 to 1976 he was a reporter for the *Nashville Tennessean* and studied philosophy and law at Vanderbilt University. He was elected in 1976 to the first of four terms in the U.S. House of Representatives and was elected in 1984 to the Senate and re-elected in 1990. During his years in Congress, he gained a reputation for knowledge of foreign affairs, technology, and environmental issues. His book *Earth in the Balance: Ecology and the Human Spirit* was published in 1992. That same year he was chosen by Bill Clinton as his vice presidential running mate, and Gore served as vice president from 1993 to 2001. He was the Democratic nominee for president in 2000, and although he won a majority of the popular vote, he lost the election to George W. Bush in the electoral college. Following his defeat, Gore taught and renewed his attention to environmental problems. His 2006 film *An Inconvenient Truth* won the 2007 Academy Award as the best feature-length documentary. In announcing the Nobel award, the committee said that Gore’s “strong commitment, reflected in political activity, lectures, films and books, has strengthened the struggle against climate change.” Although he was derided by the political right and sometimes criticized for his alarmist approach, the committee praised Gore as “probably the single individual who has done most to create greater worldwide understanding of the measures that need to be adopted.” (ROBERT RAUCH)

## PRIZE FOR ECONOMICS

In 2007 the Nobel Memorial Prize in Economic Sciences was awarded equally to Polish American Leonid Hurwicz and Americans Eric S. Maskin and Roger B. Myerson for the initiation and development of mechanism design theory, a branch of game theory that allows people to distinguish those situations in which markets work well from those in which they do not. The tools the three men developed enabled economists to determine which institutions, or allocation mechanisms, are most

appropriate for minimizing the economic losses generated by private information. The theory also explained why there is often not a good market solution to the problem of providing public goods in situations in which the consumption by one person does not prejudice consumption by another (as in the case of television programs). Their work provided a better understanding of why centrally planned economic systems often fail. Mechanism design also was able to find, or create, alternatives to a competitive market system when action was required for the greater public good.

Hurwicz originated (1960) mechanism design theory, defining it as a game in which the players send messages to each other or to a central message centre. At the same time, a previously specified rule to every collection of messages assigns an outcome, such as an allocation of goods and services. On the basis of assumptions about the participants’ preferences, each rule induces at least one predicted outcome (equilibrium), and this enables the outcomes of markets or marketlike institutions to be compared with those of alternative trading institutions. In 1972 Hurwicz introduced the concept of incentive compatibility, which was integral to fostering later developments.

Maskin helped to broaden the scope of mechanism design by developing (1977) a concept known as implementation theory. While the revelation principle (formulated in 1973 by philosopher Allan Gibbard) simplified the analysis of mechanism design by allowing the researcher to isolate small subclasses of mechanisms (direct mechanisms), a significant problem remained. In many cases one equilibrium might offer the best outcome within a mechanism, but there could be other, inferior equilibria if, say, the parties involved were not totally honest about the information that they held. To overcome this, incentives could ensure that each party achieved its objective by being honest.

Myerson discovered a fundamental connection between the allocation of resources to be implemented and the monetary transfers required to persuade participants to disclose their information honestly. His revenue equivalence theorem was adopted widely in the design of auctions, in which mech-

anism design theory frequently specifies the type of auction that will yield the most revenue for the seller. In 1979 Myerson, Maskin, and others extended the revelation principle and pioneered its application to specific economic problems, including auctions.

Hurwicz, the oldest person ever to receive a Nobel Prize, was born on Aug. 21, 1917, in Moscow, but in 1919 his family returned to their native Poland. He was educated at the University of Warsaw (LL.M., 1938) and at the London School of Economics, where he attended courses taught by Hungarian economist Nicholas Kaldor. In 1939 Hurwicz’s studies at the Graduate

bridge, he served on the economics faculties of the Massachusetts Institute of Technology (1977–84) and Harvard (1985–2000). Maskin was named the Albert O. Hirschman Professor of Social Science at the Institute for Advanced Study, Princeton, N.J., in 2000.

Myerson was born on March 29, 1951, in Boston and met Maskin while attending Harvard (B.A., M.S., 1973; Ph.D., 1976). From 1976 to 2001 he was on the faculty of Northwestern University, Evanston, Ill., in the Kellogg School’s managerial economics and decision sciences department, where much of his Nobel-winning research was carried out. In 2001 he became professor of economics at the University of Chicago, where in 2007 he was made the Glen A. Lloyd Distinguished Service Professor. Myerson was the author of two books, *Game Theory: Analysis of Conflict* (1991) and *Probability Models for Economic Decisions* (2005).

(JANET H. CLARK)

## PRIZE FOR LITERATURE

The 2007 Nobel Prize for Literature was awarded to Doris Lessing, an author whose literary career of more than 50 years was marked by imaginative resilience and introspection. The Swedish Academy’s citation extolled her as “that epicist of the female experience, who with skepticism, fire and visionary power has subjected a divided civilization to scrutiny.” Lessing became the



Doris Lessing

Institute of International Studies in Geneva were aborted because of World War II, and a year later he immigrated to the U.S., where he completed his studies at the University of Chicago and at Harvard University. From 1942 to 1944 he taught meteorology at the University of Chicago; he also became a researcher there with the Cowles Commission. In addition, Hurwicz served as a consultant to the U.S. Army Air Forces (1944–45) and later to the RAND Corporation. He joined (1951) the School of Business at the University of Minnesota as a professor of economics and mathematics and in 1969 was awarded its highest faculty honour, Regents professor (emeritus from 1988).

Maskin was born on Dec. 12, 1950, in New York City and was educated at Harvard (B.A., 1972; M.A., 1974; Ph.D., 1976). After a year (1976–77) as a research fellow at Jesus College, Cam-

bridge, she earned the distinction of becoming the first British woman to be so honoured. Emerging in the post-World War II era as a distinct and prophetic voice within contemporary fiction, Lessing gained an international reputation beginning in the mid-1950s as a writer of vibrant reflection and inventiveness on a broad spectrum of thematic issues, ranging from racial tension and prejudice, left-wing politics, feminism, and sexuality to psychoanalytic theory, mysticism, fantasy, and global terrorism. Known primarily as a novelist and short-story writer, Lessing was also an accomplished dramatist, poet, librettist, and essayist. In addition, she produced two volumes of autobiography, *Under My Skin* (1994), which received the James Tate Black Memorial Prize, and *Walking in the Shade* (1997).

Lessing was born Doris May Tayler to British parents on Oct. 22, 1919, in Kermanshah, Persia (now Bakhtaran, Iran). As a child she immigrated with her family to Southern Rhodesia (now Zimbabwe), where she lived an isolated existence on a farm near the border with Mozambique. Largely self-educated, she attended a convent boarding school and later a school for girls in Salisbury (now Harare), ending her formal education at age 14. Determined to escape the loneliness and confinement of her upbringing, she left home while still a teenager to live on her own in Salisbury, earning her livelihood in various capacities as an office worker and typist. Her short-lived first marriage, which produced two children, ended in divorce, and in 1945 she married Gottfried Lessing, a German émigré to Southern Rhodesia, with whom she had a son, Peter. In 1949, with the failure of her second marriage, she immigrated with Peter to England, and in the following year she made her debut as a novelist with the publication of *The Grass Is Singing*, which was praised for its vivid depiction of colonial Rhodesian society and as a candid exposé of apartheid. Throughout her career, Lessing was intensely committed to social and political responsibility, and she was a member (1952–56) of the British Communist Party. Openly opposed to the racist policies of the repressive South African government, Lessing was declared a “prohibited alien” in 1956 and in that same year was banned from her former homeland.

Influenced by 19th-century literary realism, Lessing placed her early fiction in an African setting as a means of self-projection and exploration. Her first collection of short stories, *This Was the Old Chief's Country* (1951), was followed by *Martha Quest*, the inaugural novel of a five-volume semi-autobiographical sequence that came to be known as the *Children of Violence* series (1952–69). Lessing further enhanced her reputation with the publication in 1962 of her postmodern novel *The Golden Notebook*, a complex and disjointed narrative of analytic progression in which a female protagonist endures an intense psychological and emotional struggle to regain a sense of fulfillment and self-worth.

In the 1970s and '80s, Lessing turned to more-experimental

fiction with novels such as *Briefing for a Descent into Hell* (1971), inspired by the psychoanalytic theory of R.D. Laing; *The Summer Before the Dark* (1973); and *The Memoirs of a Survivor* (1974). During this time she also embraced the ideology of Sufism and especially the writings of the Indian-born mystic Idries Shah; the latter altered her worldview as well as her artistic sensibility. From 1979 to 1983 she produced a five-volume science-fiction series under the collective title *Canopus in Argos*; this was followed by *The Diary of a Good Neighbour* (1983) and *If the Old Could...* (1984), both written under the pseudonym Jane Somers. Later fiction included *The Good Terrorist* (1985), *Love, Again* (1996), *The Sweetest Dream* (2001), *The Story of General Dann and Mara's Daughter, Griot and the Snow Dog* (2005), and *The Cleft* (2007). Notable works of nonfiction included *African Laughter* (1992), a bittersweet account of revisiting independent Zimbabwe; *A Small Personal Voice* (1994); and *Time Bites* (2004).

(STEVEN R. SERAFIN)

#### PRIZE FOR CHEMISTRY

The 2007 Nobel Prize for Chemistry was awarded to German chemist Gerhard Ertl, professor emeritus of physical chemistry at the Fritz Haber Institute of the Max Planck Society, Berlin, for work that explained in detail how

Gerhard Ertl



gas molecules react on solid surfaces. As common as the rusting of iron, surface chemical reactions were important in industrial chemistry (such as in the production of fertilizer from nitrogen) and in everyday use (such as in the oxidation of carbon monoxide in a car's catalytic converter).

Ertl was born on Oct. 10, 1936, in Bad Cannstadt, Ger. He received an M.A. (1961) in physics at the Technical University of Stuttgart (now Stuttgart University) and a Ph.D. (1965) in physical chemistry at the Technical University of Munich. He was professor and director of the physical chemistry department at the Technical University of Hannover from 1968 to 1973 and at the Ludwig Maximilian University (University of Munich) from 1973 to 1986. During the late 1970s and early 1980s, he was also a visiting professor at several universities in the United States. In 1986 Ertl joined the Fritz Haber Institute, and he served as director of the department of physical chemistry until 2004, when he was named professor emeritus.

When Ertl started his investigation of surface chemical reactions, little was known about how they took place. Their study was difficult because the presence of air or of small amounts of impurities could interfere with the results. Ertl was able to overcome these limitations by making use of newly developed high-vacuum technology. He then made fundamental contributions to the study of surface chemistry by applying modern analytic techniques, including a variety of spectroscopic techniques such as Auger electron spectroscopy and Fourier-transform infrared spectroscopy. By using multiple techniques to examine a surface and get results that he could reliably interpret, Ertl was able to determine the individual steps by which atoms and molecules of gases interact with a solid surface and the way they then react with each other on the surface. Among the applications of Ertl's work was the development of processes used to create electronic components from semiconductor materials and to make catalytic surfaces for producing renewable fuels such as hydrogen.

One of the early studies that Ertl made of surface reactions concerned the Haber-Bosch process. In this process nitrogen

gas (N<sub>2</sub>) and hydrogen gas (H<sub>2</sub>) react in the presence of an iron catalyst to produce ammonia (NH<sub>3</sub>). Introduced in the early 20th century, the Haber-Bosch process soon became commercially important as a way of using nitrogen gas from the atmosphere to produce synthetic nitrogen fertilizer for crops. Until Ertl's research, beginning in the 1970s, chemists were uncertain how the process worked, however. In particular, they did not know at what point in the process the strong triple bond was broken between the two nitrogen atoms that form a molecule of nitrogen gas. Using several spectroscopic techniques to identify the atoms and molecules on the iron surface, Ertl showed that nitrogen molecules were broken apart into atoms on the catalyst surface once the molecules had been adsorbed (become attached) to it. Hydrogen molecules were also broken apart into atoms on the catalyst surface. One by one, three adsorbed hydrogen atoms then joined with an adsorbed nitrogen atom to form ammonia.

Among other processes that Ertl examined was one that takes place in a vehicle's catalytic converter to make the vehicle's exhaust less toxic. In the catalytic converter a platinum catalyst helps oxidize carbon monoxide (CO) to carbon dioxide (CO<sub>2</sub>). (Carbon monoxide in the exhaust is produced through the inefficient burning of gasoline or other fossil fuel in the engine.) The chemical reaction on the platinum surface proved far more complicated to study than the Haber-Bosch process. Unlike the Haber-Bosch process, the overall reaction was affected by how the molecules covered the metal surface, and the reaction could be chaotic and was irreversible. Ertl creatively used a new set of spectroscopic methods in a number of investigations (beginning in the 1980s) to observe and describe the complexities of the catalytic reactions.

When Ertl received the call from Stockholm that he had won the Nobel Prize it was, coincidentally, his 71st birthday. He told reporters that the prize was “the best birthday present that you can give to somebody.”

(SARAH WEBB)

#### PRIZE FOR PHYSICS

The 2007 Nobel Prize for Physics was awarded to French physicist Albert Fert and Czech-born German physicist Peter Grünberg. The two scientists led research groups that independently

discovered the phenomenon known as giant magnetoresistance (GMR), in which weak changes in a magnetic field strongly affect electrical resistance. The discovery quickly revolutionized the technology of magnetic storage in devices such as computer hard-disk drives, and it opened the door to a new field of solid-state science.

Fert was born on March 7, 1938, in Carcassonne, France. He received master's degrees (1962) in mathematics and physics from the École Normale Supérieure, Paris, and a doctorate (1970) in physical sciences from the University of Paris-Sud (Orsay, France) for studies on the transport properties of nickel and iron. Fert became an assistant professor at the university in 1964 and a professor of physics in 1976. He led the university's condensed-matter physics laboratory from 1970 until 1995, when he became scientific director of the Joint Physics Unit, a research facility operated at the university in association with the French National Center for Scientific Research (CNRS) and the technology firm Thales (then known as Thomson-CSF). Fert became a member of the French Academy of Sciences in 2004 and was a recipient of the 2003 Gold Medal of the CNRS among many other awards.

Peter Andreas Grünberg was born on May 18, 1939, in Plzen, Czech. (now Czech Republic). He studied physics at Johann Wolfgang Goethe University, Frankfurt am Main, Ger., and then at Darmstadt University of Technology, where he received a master's degree (1966) and doctorate (1969). In 1972 he became a research scientist at the Institute of Solid State Research of the Helmholtz Association's Research Centre Jülich (Ger.). Although he officially retired from the institute in 2004, he continued working. Grünberg was the recipient of many awards, including the 2007 Stern Gerlach Medal of the German Physics Society, and in 2003 he became an external scientific member of the Max Planck Society.

The fact that the resistance of an electrical conductor can be altered by an external magnetic field, a phenomenon called magnetoresistance, was observed in 1857 by English physicist William Thomson (Lord Kelvin), who noted that the electrical resistance of ferromagnetic metals, such as iron, cobalt, and nickel, was affected by the direction of the magnetic field relative to the current. In general, the effect is small, with changes of the order of at most a

few percent. Nevertheless, magnetoresistance was important technologically, particularly in iron-nickel sensor units for reading magnetic media such as magnetic disks in early computer hard drives.

In 1988 the research groups led by Fert and Grünberg independently discovered materials that showed a magnetoresistive effect that was dramatically greater than ordinary magnetoresistance—by as much as an order of magnitude. They detected this giant magnetoresistance (a term coined by Fert) in materials in which a layer of a nonmagnetic metal that was only nanometres thick (just a few layers of atoms) was sandwiched between layers of a ferromagnetic metal. Both research groups studied GMR in materials with an iron-chromium-iron construction. Grünberg's group used a three-layer system, whereas Fert used a multilayer system with up to 60 alternating layers.

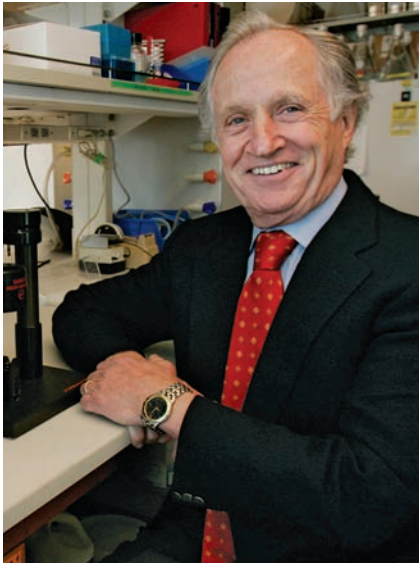
GMR very quickly became the subject of a major international research effort because of its numerous potential applications, and the technology became widely adopted. The increased sensitivity of GMR made possible the construction of much smaller magnetic readout heads in computer hard drives, and as a result the amount of magnetic data that could be stored per unit area of a magnetic disk greatly increased. In addition, GMR found use in such devices as solid-state compasses, non-volatile magnetic memory, and landmine detectors. The discovery of GMR also helped lead to a whole new field of science called spintronics, or magnetoelectronics. Spintronics depends on the manipulation of two fundamental properties of the electron—its charge and its spin. Because electron spins are quantized and can take only one of two values, it was possible to envisage spintronic devices of nanometre dimensions in which the spin of an individual electron could be used to store a binary digit. GMR was a fascinating example of a fundamental scientific discovery that very quickly gave rise to new technologies, new commercial products, and new fields of science to explore.

(DAVID G.C. JONES)

#### PRIZE FOR PHYSIOLOGY OR MEDICINE

The 2007 Nobel Prize for Physiology or Medicine was awarded to three scientists—two Americans and one Briton—for their development of a

AP



*Mario R. Capecchi*

Cardiff University



*Sir Martin J. Evans*

AP



*Oliver Smithies*

technique for introducing modified genes into mice. The technique, which involved introducing a gene that “knocks out” (replaces) a mouse’s own version of a targeted gene, became extremely useful in genetic research as a way of finding out what specific genes do. Sharing the prize equally were Mario R. Capecchi, professor of human genetics at the University of Utah School of Medicine; Sir Martin J. Evans, director of the School of Biosciences and professor of mammalian genetics at Cardiff (Wales) University; and Oliver Smithies, professor of pathology and laboratory medicine at the School of Medicine of the University of North Carolina at Chapel Hill.

Capecchi was born on Oct. 6, 1937, in Verona, Italy. During World War II, when he was only four years old, his mother was arrested and taken to the Dachau concentration camp in Germany. Capecchi had to live on the streets. Soon after the war, he and his mother were reunited and moved to the United States. Capecchi received a Ph.D. (1967) in biophysics from Harvard University. He taught at Harvard Medical School from 1969 to 1973, when he joined the faculty at the University of Utah as a professor of biology. In 1982 he also joined the faculty of the university’s School of Medicine. Capecchi was appointed as an investigator at the Howard Hughes Medical Institute, based in Maryland, in 1988, and he was elected to the U.S. National Academy of Sciences in 1991.

Evans was born on Jan. 1, 1941, in Stroud, Gloucestershire, Eng. He re-

ceived an M.A. (1966) in biochemistry from Christ’s College, Cambridge, and a Ph.D. (1969) in anatomy and developmental biology from University College, London. Evans taught at University College until 1978, when he joined the genetics research faculty at Cambridge. In 1999 Evans became a professor of molecular genetics at Cardiff University, where he also directed the School of Biosciences. Evans was made a fellow of the Royal Society in 1993 and was knighted in 2004.

Smithies was born on June 23, 1925, in Halifax, Yorkshire, Eng. He earned an M.A. and a Ph.D. (both 1951) in biochemistry from Balliol College, Oxford. He moved to the United States in 1960 and joined the genetics faculty at the University of Wisconsin. After he became a naturalized U.S. citizen, he joined the faculty at the University of North Carolina’s School of Medicine in 1988, where he held an appointment in pathology and laboratory medicine. Smithies was elected to the U.S. National Academy of Sciences in 1971.

Working independently to find a way to modify genes in mammals, Capecchi and Smithies sought to manipulate a natural mechanism, called homologous recombination, in which genes are exchanged between paired chromosomes during the division of sex cells (meiosis). Capecchi showed that DNA that was introduced into the reproductive cell of a mammal could recombine with native chromosomes in the cell, and Smithies demonstrated that any gene could potentially be targeted with such

recombination. Their early efforts were limited to working with cultured cells. Evans, meanwhile, worked with mouse embryos to isolate and study embryonic stem cells—undifferentiated cells of an embryo that have the potential to develop into any cell type. The three scientists later collaborated to use their findings to develop gene targeting. In this technique a gene is introduced into embryonic stem cells in culture and undergoes recombination. The genetically modified cells are inserted into mouse embryos, which develop into chimeric mice—that is, mice that are composed partly of their own cells and partly of cells derived from the introduced modified stem cells. The mice are then crossbred to produce a line of mice whose genetic makeup corresponds to that of the introduced stem cells.

Initially skeptical about the feasibility of developing the technique, the scientific community quickly embraced gene targeting once the first results were published in the late 1980s. Gene targeting and knockout mice revolutionized biomedical research, with applications that eventually appeared in almost every area of biomedicine, from research to clinical therapy. It allowed scientists to understand the roles of genes in organ development and was applied to the development of mouse models for human diseases such as cystic fibrosis and thalassemia. The combined work of the trio was previously honored with the 2001 Albert Lasker Award for Basic Medical Research.

(LINDA BERRIS)