mann book."

By that time, Hamburger had launched the last major effort of his career: a series of books and articles reviewing embryology's history, including an English translation of papers by his German mentor, Spemann. Hamburger wrote it all by hand, reliving a century's worth of science in even, steady pen strokes. "I never did own a typewriter," he reflects. "I guess I trusted myself more than a machine." Recounting his achievements in print, he understood all that he had accomplished. "I know what I've contributed," Hamburger says.

And so do his colleagues. Visiting Hamburger last month, Fischbach expected to find him frail or fatigued. Had life finally caught up with the man who helped define it? Yes, Hamburger had lost some hair and some hearing. He moved slowly. And yet there he sat, grinning in his chair, telling stories, gesturing past stacks of books yet to read. This, perhaps, is Hamburger's most personal contribution. "Viktor," says Fischbach, "has taught us how to overcome life's challenges." **–KATHRYN BROWN**

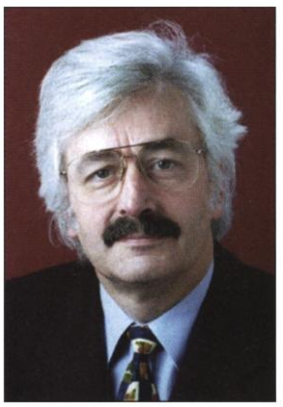
Kathryn Brown is a writer in Alexandria, Virginia.

EUROPEAN SPACE AGENCY

New Science Chief Must Juggle Missions and Politics

Space scientists hope David Southwood can balance ESA's research with its widening interests

Early in his career, David Southwood says, he had to choose whether to apply his training in plasma physics to fusion research or to space. "I didn't have any doubt which way I wanted to go," he says. "I particularly find the solar system fascinating, because I'm interested in why the place we live is the way it is—why the Earth is like it is, why the planets are like they are." That career choice, Southwood says, has landed him "one of the most interesting jobs in Europe, and equally so in space science": Next May, he will take over as the European Space Agency's (ESA's) science director.



Can do. David Southwood says Europe "must be successful" in space.

Southwood, 55—who has spent most of his career at Imperial College in London, where he headed the physics department from 1994 to 1997—will take on a clutch of ambitious projects that ESA hopes to pull together in the coming decade. Two bright stars are European participation in the Next Generation Space Telescope—the Hubble's replacement, which is scheduled for launch in 2008—followed the next year by a half-billion-dollar mission to Mercury called Bepi-Colombo. Others to fill out the constellation include an orbiting gravity wave detector, a satellite for monitoring storms in Earth's magnetosphere, and a mission to determine the positions of stars with high precision (*Science*, 22 September, p. 2019).

But perhaps the most daunting task Southwood faces is to walk a political tightrope: He must balance the aspirations of scientists from ESA's 15 member states with calls to tie the agency more closely to the business and security sectors (see sidebar). "The scientific challenges are great, but I also like the political challenges of getting a European program together," says Southwood. Experts say he's up to the task. Southwood "has a good background of relevant experience," says Britain's Astronomer Royal, Martin Rees. Adds Stamatios Krimigis of the Johns Hopkins University Applied Physics Laboratory, "You know he is a leader when you meet him."

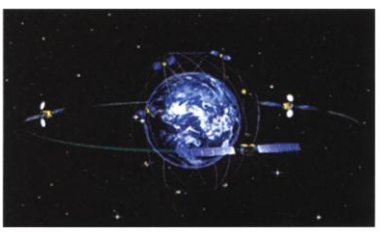
Southwood is no stranger to ESA politics. He has contributed to several ESA projects, including the Cluster mission to explore the interplay of the solar wind and Earth's magnetic field, and the SOHO mission to study solar storms. And he led the team that built a magnetometer for NASA's Cassini mission, now on its way to Saturn. "I became a theorist and then realized it was more fun working with experiments as well," he says, "and ultimately I became an experimentalist by leading the building of instruments."

Perhaps crucial to Southwood's appointment was the time he spent earning his management stripes in ESA's Earth Sciences Division from 1997 until last April. South-

Getting More Out of Space

Space is too important to Europe to be left to scientists alone, according to a report on the future of the European Space Agency (ESA) released last week. The report (available at www.esa.int) concludes that better coordination between ESA and the business and defense sectors is essential to Europe's development. "We see the need to integrate space efforts, or space activities, with European political and other activities much more clearly than has been the case in the past," says former Swedish Prime Minister Carl Bildt, who led the study.

The report refers to the $2.5 billion Galileo project (image, right)—a satellite navigation system intended to rival the U.S.'s Global Positioning System (GPS) and Russia's GLONASS system—as a case in point. The first of Galileo's 30 satellites is slated for launch in 2004. For Europe, Galileo offers self-sufficiency in global navigation and a break from foreign military hegemony. Telecommunications and other commercial opportunities seeded by this joint ESA–European Union project are expected to be huge. Galileo "will give strategic autonomy to Europe in a sector which is vital for the evolution of the European economy," says ESA Director-General Antonio Rodotà. But the report points out that at present there is no mechanism to decide how to limit access to Galileo in times of conflict. Other unsettled questions that ESA should get involved in include how to guarantee a return on private-sector investments and how to organize a single public entity for operating it.



The report from the "Three Wise Men"—the other two are Jean Peyrelevade, president of the Paris-based Credit Lyonnais bank, and Lothar Späth, CEO of JENOPTIK AG, an optoelectronics firm in Jena, Germany—offers few surprises, says ESA science director–designate David Southwood. "The aim, I am sure, is to try to wake European policy-makers and politicians up to the fact that space capability and space-derived information provide part of a modern developed society's infrastructure," he says. His only reservation is that in broadening ESA's horizons, science could lose out. "Space science cannot be ignored or downgraded," he says, "as one broadens the perception of space's use." **–A.W.**

CREDITS: (TOP TO BOTTOM) IMPERIAL COLLEGE; ESA

wood is credited with breathing life into a mundane monitoring effort by creating the Living Planet program, leading to upcoming missions that will study everything from ocean circulation to Earth's gravitational field. The overhaul is widely viewed as a success story, says Krimigis, but Southwood faces a tougher job in getting ESA's upcoming big-ticket missions to fly on budget without diluting the science. Toward this end, Southwood says he gained valuable experience at the instrument bench. "You have to get a firm hold on the engineering of a project if you are going to get the project done to time and to cost," he says. Says Krimigis, "I wish him good luck."

At ESA, Southwood will succeed the highly respected Roger Bonnet—"an incredibly hard act to follow," he says. With European countries struggling to reconcile their national aspirations with their pan-European goals, Southwood views both ESA and CERN, the European particle physics laboratory near Geneva, as models for how a wider European integration might work. "If Europe can't get its act together in something like science, big science where it has to, what's the hope of it doing something in more politically complex areas?" he asks. "European space activities have to be successful if they are going to make people feel positively about Europe."

–ANDREW WATSON

Andrew Watson writes from Norwich, U.K.

DEMOGRAPHY

A Billion and Counting: China's Tricky Census

Officials try to keep politics out of the world's biggest enumeration as they gather data on mobility, fertility, and other sensitive demographic indicators

BEIJING—It was a few minutes past midnight on 1 November when the police knocked on his door. "Census," they announced as their reason for rousting the young Beijing pedicab driver out of bed. The police were helping census takers locate migrant workers who might otherwise flee or avoid participating in the largest enumeration in history. But when the driver failed to produce the appropriate papers, he says the police also fined him $6 and threatened to send him back to his home in Henan province. "Their attitude was violent," says Bai, who gave only his last name. "They were not conscientious or considerate."

The brusque behavior of the police is an unintended offshoot of the fact that census-taking is serious business in China. This month some 6 million clipboard-carrying workers knocked on 350 million doors in the fifth census since the founding of the People's Republic in 1949. For weeks Beijing's streets have been covered with slogans like "truthful reporting is every citizen's duty" and "the census is good for the country and good for the people." The central government has gone to great lengths to emphasize the benefits of providing accurate data to set national policies on housing, education, the environment, and other social issues. "The census is very important for us," says Chen Shengli, a spokesperson for the State Family Planning Commission, one of a score of ministries anxiously awaiting the results, expected out in preliminary form in February.

For millennia, the central government has sought accurate demographic information to manage its vast population. The first four PRC censuses were remarkably good by international standards, says Judith Banister, the former head of the U.S. Census Bureau's China branch and now a professor at the Hong Kong University of Science and Technology. The counts, she says, were bolstered by a strict household registration system, a relatively immobile population, and a vast supply of low-cost labor. But more than accuracy is at stake. The wrong numbers could have political ramifications if they raise questions about compliance with such policies as the one-child-per-family rule. They could also—despite stern warnings to the contrary—lead to reprisals at the local level.

Counting on them. The Chinese government has heavily promoted the value of cooperating with census takers to answer questions on the long form (opposite).

This census will produce a much fuller picture of Chinese society than the last one, done in 1990. It marks the first time that Chinese statisticians have felt confident enough to use a long form, says Y. C. Yu, former head of demographic and social statistics at the United Nations and a trusted adviser to the Chinese government. A randomly selected 10% of the population is being asked additional questions about their movements, housing, sanitary and cooking facilities, employment, education, and fertility rates (see graphic). At the same time, census officials rejected requests from researchers to include questions about income and household possessions after pilot runs showed that the Chinese, like citizens in many other countries, would refuse to cooperate.

Answers to the long form are intended to illuminate the numbers and migratory patterns of China's populace, including the 60 or so million people who have left their farms and villages in search of a better life since China began to relax economic and social controls in the 1980s. This "floating population" represents a potential powder keg for a government trying hard to control urbanization and maintain order. But using the census to monitor their movements is tricky. Asking how many family members are away, for example, may lead to an accurate total for migrants, but it won't say anything about where they are and what they are doing. At the same time, respondents are unlikely to implicate themselves in any wrongdoing. "People employing peasants or [illegally] housing migrants really have an incentive not to tell the truth," says Dorothy Solinger, a political scientist at the University of California, Irvine.

To reassure the public, the government has repeatedly proclaimed that its census takers are ordinary citizens, that the information will remain confidential, and that the census won't be used as an excuse to send migrants back to their hometowns. But as Li Xiru, a census manager at the statistics bureau, acknowledges, census takers are told to "find out the real situation" by talking to other grassroots sources. That's what happened in Bai's case, where the same police who often treat migrants harshly were enlisted to make sure those migrants were counted.

Despite the government's promises, many citizens equate the census-taking process with the police. "I don't like the census because I'm an illegal resident of Beijing," says a recent college graduate surnamed Wan who worries about being discovered. Indeed, rising expectations of privacy have become a problem for the government in this year's enumeration. "People's ideas have

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