

fiscal year. Several years of such tricks have created a "snowball" of delayed spending obligations that now consumes as much as 10% of the total money in some spending bills, congressional aides say. Large programs such as NASA's Earth Observing System further limit congressional flexibility by locking legislators into a programmed schedule of annual budget increases.

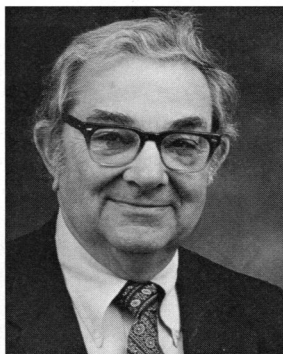
The priority-setting choices forced by such fiscal pressures are magnified in an election year, when the entire membership of the House faces the voters. Unsurprisingly, Congress is not eager to take the potentially unpopular step of increasing basic science funding while trimming domestic programs, especially when the economy is stagnant. For that reason, few legislators seem willing to accept the Bush Administration's proposed budget, which found the money for an overall 7% increase in civilian R&D by cutting social programs such as affordable housing support and mass transit subsidies. "It's clear the Administration is trying to maintain a very high priority in science funding," says California's Brown. "Of course, [majority] House Democrats will do anything to alter

presidential priorities, particularly where support for nonscience programs is concerned.... In a situation where they're forced to make choices [between R&D and social programs], the historic support of Democrats for the poor and deprived tends to take the upper hand."

The budgetary crystal ball.

Brown, however, doesn't believe that the research budgets under consideration in the House represent "a major falling off of support for science," and says he hopes to see healthy budgetary growth restored soon. His reason for optimism: Next year, the budget law drops the "fire walls" that have prevented legislators from funding domestic programs with money cut from the defense budget. "The good news is that this is probably the worst year we'll encounter," Brown says. "The budget walls come down next year, so we'll have some more slack."

But the situation may not improve as much



Tough sell. Science committee chairman George Brown.

as Brown hopes. Although the fire walls will fall, a new, and lower, overall ceiling for all discretionary spending—domestic, military, and international—will drop into place at the same time. Under the new cap, says Jan Paul Acton, CBO's assistant director for natural resources and commerce, Congress would need to cut defense spending by roughly \$70 billion over the 2 years of 1994 and 1995 just to maintain level funding for domestic and international programs.

(A cut of that magnitude would amount to just under a quarter of the full defense budget.) "In 1994, there are going to be some really hairy choices," says a CBO analyst. How research funding will fare under such circumstances—which are potentially much worse than those faced today—is anyone's guess. But the scene is unlikely to be pretty.

—David P. Hamilton

With reporting by Joseph Palca.

FAMILY MATTERS

Are Chemists Girl Crazy?

Chemists, and scientists generally, are quick to chastise the public for entertaining notions for which there's little more than anecdotal evidence, so surely there's plenty of data showing that chemists specialize in daughters.

You hadn't heard this one? For decades, members of the profession, when not exchanging or debating the latest research findings, have marveled over an apparent trend that they believe to be unique to their community: Chemists, some like to say, produce more girl babies than boy babies.

A girl thing. "I believe it," hazards University of California, Berkeley, polymer chemist Bruce Novak, a father of two daughters who first heard the idea when he was in graduate school. "Many people think this is true," concurs Brent Iverson, a bio-organic chemist at the University of Texas in Austin and the father of three girls. "When I was an undergraduate I worked for a guy who had four daughters, and my wife worked for someone [a chemist] with five daughters." Electrochemist Nate Lewis of the California Institute of Technology was so sure it was true that when his wife, also a chemist, became pregnant with their first child a year ago, "I was expecting a girl." It was a boy.

That won't change the mental

chemistry of the true believers, even though some are considerably less global in their claims. For example, several theoretical chemists told *Science* that the tendency to have daughters shows up only among theoretical chemists. Then there were the NMR spectroscopists and x-ray crystallographers who claimed similar honors for their own specialties. "My version of the myth is that organic chemists have more girls," said Robert Bergman, father of two boys and an organic chemist at Berkeley. At least he used the word "myth," but before you biologists and physicists sneer out loud at this seemingly gullible group of reasoning beings, think about fighter pilots.

A similar story had been circulating about the pilots when Bertis Little, assistant professor of obstetrics and gynecology at the University of Texas Health Science Center in Dallas, and his colleagues took off on a study of the intrepid breed. In the July 1987 *Aviation, Space, and Environmental Medicine*, Little *et al.* announced that, in a small survey

of 62 pilots and astronauts exposed to high G forces, they found that about 60% of their offspring were girls. Because the bias didn't show up among 220 bomber pilots, transport pilots, and other personnel whose aeronautic routines involve far less fast and sharp maneuvering, Little and his colleagues suggested that exposure to high G forces might influence the survival of the sex-

determining chromosomes.

But even the highest fliers in the chemistry community experience few G's in their daily lives—and no similar study has been done for chemists and their offspring. So what's the evidence? Hoping to remove any stain



EUDOXIA WOODWARD



Father of the myth? Robert B. Woodward (above), second wife Eudoxia, and three daughters.

from the reputations of the earnest chemists who were willing to go public with their beliefs, *Science* asked the U.S. Census Bureau if the agency might be able to extract telling numbers from its databases. Maybe, was the response, but the search fee would be hefty, and the wait would be at least a year. How about the American Chemical Society? Unfortunately, it doesn't keep track of the gender of its members' offspring. Princeton University's Office of Population Research? No dice.

Science's own sex survey. So *Science* boldly ventured where no group has gone before: A totally nonscientific questionnaire was sent to about 250 chemists at eight small and large chemistry departments, yielding 140 usable responses. Thanks to the tireless efforts of Gayla Bradfield, a secretary in the chemistry department of the Indiana University, Bloomington, who was well aware of the importance of the survey, all 45 members of that department complied. That rules out statistical biases that might arise through self-selection if, say, chemists with more daughters were especially apt to respond. Of the Indiana chemists, 34 had children in a collective ratio of 53 girls to 41 boys, or a 56% to 44% split, respectively. But when these numbers are pooled with those from the other hundred or so returned questionnaires, the apparent preponderance of female offspring virtually disappears—out of 326 children, 158 or about 51.5% were reported to be girls.

Too shaky a sample for you? *Science* plunged on by combing the 1985 edition of *Who's Who in Frontiers of Science and Technology* for information. Of the 151 chemists found in a random search amounting to 10% of the volume, 29 listings had no information about children and six proved unusable because the children's names (for example, Leslie or Jody) didn't reveal gender. Of the remaining 116 listings, the gender tally came to a near dead heat—144 boys to 147 girls.

And there's more: A random sampling of 10% of the nearly 1400 listings of chemists in the more general and up-to-date *Who's Who* database indicated a slight and insignificant preponderance (51.5%) of boys.

So pending better data, the verdict looks to be, in chemistry anyway, "myth." Who's to blame for the tall tale? John D. Roberts, a long-time physical organic chemist at Caltech, affectionately points to Robert B. Woodward, a giant in the history of organic chemistry who won a Nobel Prize for his work in 1965 and died in 1979. Woodward had three daughters in a row. That "caused the legend to grow, and he fostered it," notes Roberts (father of three boys and a girl). Evidently, sample sizes of three are perfect for starting a myth. Oh, and you'll want to know that Woodward's fourth and last child was a boy.

—Ivan Amato

HIGH-ENERGY PHYSICS

CERN Reacts Cautiously to SSC's Woes

LONDON—When the U.S. House of Representatives dealt a severe blow to the Superconducting Super Collider (SSC) on 17 June, it wasn't just the U.S. high-energy physics community that was sent reeling. Across the Atlantic, members of the CERN Council—the governing body of Europe's showpiece laboratory—meeting on 25–26 June at their Geneva headquarters, suddenly found themselves face-to-face with an unanticipated question: What if Europe's rival machine—the \$1.4 billion Large Hadron Collider (LHC)—becomes the only game in town?

Many council members consider that if the SSC is canceled, CERN will be forced to rethink its role, and they are talking openly about possible changes in CERN's status. Instead of remaining a European center, they say, CERN could make positive moves to become a true "world laboratory." But others say the House decision could set a frightening precedent for European governments, perhaps tempting the Germans to slow the pace of investment in the LHC while they struggle to pay the costs of reunification.

For once, the usually outspoken Carlo Rubbia, director general of CERN, is choosing his words very carefully. He refuses to comment on the likelihood of the SSC being canceled and says that until the U.S. Senate has decided its fate, it would be counterproductive for CERN to start making "demagogical offers" to the U.S. high-energy physics community. And Rubbia is being just as diplomatic in describing what impact canceling the SSC might have on Europe. If that were to happen, "it's not conceivable that [the LHC] will be a hunting ground for Europeans only," he says. But then he adds: "Neither is it conceivable that our member states would then be prepared to pick up the complete tab." Or to put it another way, Americans would be welcome at LHC, but Europe would not want to pay all the bills.

Other scientists are expressing their hopes more bluntly. "There would really be a good opportunity to build at CERN a machine which could be the opportunity for world cooperation—as we are doing for ITER [the international tokamak fusion reactor]," says Pierre Petiau, a former high-energy physicist and a senior official in the French research ministry. And the possibility that if the SSC fails to survive the Senate, the United States might make a major financial contribution to the LHC brings a gleam to the eyes of some senior European science policymakers. "It might be seen as a way of easing the financial problems,"

says Mark Richmond, chairman of the U.K. Science and Engineering Research Council (SERC) and a CERN council member.

Some physicists are even talking about the more radical possibility of admitting the United States and Japan to full CERN membership. If so, they would be expected, like other members, to pay CERN's bills in proportion to their gross national products (GNPs). But don't hold your breath—Rubbia says that such a move is only likely if U.S. and Japanese involvement at CERN became so great that they were already *de facto* members.

The final outcome could, in any case, be the second and far more depressing possibility—that delays to the SSC will have a knock-on effect in Europe. Germany, in particular, is "not in a hurry" to build the LHC, given the tight squeeze on public spending forced by unification, says Klaus Tittel, a University of Heidelberg high-energy physicist and CERN council member. Although Tittel denies that the SSC question is influencing the German position, many physicists believe that if the SSC is seriously delayed or canceled, the LHC's start-up date will slip back from today's optimistic target of 1999.

Ugo Amaldi, who heads the Delphi experiment at CERN's existing centerpiece, the Large Electron Positron collider, says that small delays won't matter much, naming 2004 as the latest date by which the LHC, complete with detectors, should be on line. If it's any later than that, he says, Europe's brightest young physicists will lose interest in the project. "If you tell people: 'Your physics will come out 15 years from now,' it will be difficult to recruit," he says.

If the SSC is not canceled outright, but instead limps along with a reduced budget, the impact on the LHC would be hard to estimate. A wounded SSC, one school argues, will encourage nonmember nations—read Japan—to put their financial clout behind the LHC rather than the U.S. project. But that's far from certain. "In Japan, we have a long way to go," says CERN's Rubbia, acknowledging that SSC officials have been making the most headway in wooing the Japanese. And if the SSC does get back into the race with Europe on full funding, the Europeans' confidence in their own machine will not be shaken. "The feeling [always] was at CERN, that in any race with the SSC, they were going to win," says SERC's Richmond. "I think they are probably right."

—Peter Aldhous



No demagoguery. CERN director Carlo Rubbia.