A Section

Nobel Feathers in Japan's Cap; Awards Surprise Nation Where Scientists Are Underfunded and Exploited

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TOKYO, Oct. 11 -- Once the hope of a rising economic power, Japanese scientists are now a beleaguered lot. By their government's admission, they are underfunded, unoriginal, unchallenging and often exploited by the companies they helped succeed.

So the pictures this week of two modest, flustered Japanese scientists reacting to their **Nobel Prizes** -- in physics and chemistry -- came as a surprise to people trying to improve the level of research here.

The awards mean that Japan has won four Nobels in three years, and three in a row for chemistry. Prime Minister Junichiro Koizumi came close to voicing superlatives at the news: "Not only is Japan not all that bad, but it's truly something," he said.

At the science and education ministry, which is in charge of boosting Japanese research, the reaction was even more startled. "Incredible . . . incredible," Education Minister Atsuko Toyama said.

Saddled in gloom by a tumbling stock market and a bank crisis, Japan needs a boost. So the nation was especially charmed by the endearing character of the two winners.

Koichi Tanaka, 43, is Japan's "average salaryman," observed one government official. Tanaka works for a relatively obscure instrument-making firm, Shimadzu Corp. of Kyoto.

When the announcement came Wednesday that he shared the award with an American and a Swiss national, Tanaka's colleagues were described as astonished, and Tanaka said he didn't understand the phone call informing him he'd won the Nobel Prize.

"I got a phone call in English and I could make out 'Nobel something' and 'congratulations,' but I really didn't understand," he said. He thought winners got more advance notice; he apologized for meeting reporters in his company work coat. Tanaka was honored for his work developing methods of identifying proteins using mass spectrometry.

Masatoshi Koshiba, 76, is more the rumpled academic. He got the prize for heading up a large, government-sponsored particle observatory studying neutrinos, the smallest cosmic particles. He shared the honor with two U.S. researchers.

Koshiba graciously credited younger assistants and insisted that he wanted only to get back to his "quiet life" as a researcher. But his path to the prize had been dramatic. He overcame polio as a child and struggled through with poor grades in college. In 1978, he won a large government grant to build a particle observatory in an abandoned zinc mine half a mile underground only to find that the Americans were building one three times larger in the United States.

He changed plans, moving instead to improve the detection equipment in the mine, and in 1987 was able to detect the ghostly neutrinos from a distant supernova. But last November, his observatory suffered a catastrophic, chain-reaction blowout of thousands of the specially made light sensors.

Japanese researchers are known more for improving existing ideas than for coming up with new ones -- for instance, the mass commercialization of the transistor, a U.S. invention, starting in the 1950s. Neither the government nor industry has been much interested in research that doesn't produce a profit pretty quickly, analysts here agree.

"Our science and technology research system still has lots of problems," acknowledged Yoichi Ito, director of the planning division in the Bureau of Science and Technology. A recent government survey showed declining enthusiasm for novel inquiry and creativity among young researchers, though they are proficient.

In Japanese education, "an abundance of knowledge is appreciated, instead of original thinking," said Ikuo Kushiro, former vice president of Tokyo University and now director of a large geophysics research project.

Concerned over this state of affairs, Koizumi launched an effort last year to boost government subsidies for research and to foster competitiveness. He set a goal of winning 30 **Nobel Prizes** in 50 years. It is a tall order; Japan has had only 12 winners in the last 53 years.

In a society that deeply values avoidance of confrontation and respect for elders, the government's campaign faces a host of institutional and cultural obstacles. Japanese researchers are loath to criticize senior colleagues, and their work suffers from the lack of a professional peer-review process with its crystallizing criticism, Ito acknowledged.

Research in Japan also is balkanized. Unlike in America, there has traditionally been little cooperation between private enterprise and university research, and there was little government funding for basic research.

"When I was president of the University of Tokyo in 1989, the total government budget for research and development was something like $500 million" at his university, said Akito Arima, an upper house lawmaker who is championing the cause of more money for research. "A single large company would typically have a research budget eight times that."

The government's annual budget for research is now $29 billion and rising, Ito said. Arima acknowledged that things are improving.

The forte of Japan's corporate researchers has been practical work, and any electronics store is evidence of their success. But the corporate inventors are increasingly feeling betrayed.

Shuji Nakamura, 48, worked for a small company called Nichia Corp. in 1993 and developed the first blue LEDs, an invention that revolutionized lighting in uses as diverse as flat-screen computer monitors and video billboards.

For his patent, he got $170. Nichia got the rights. The compensation was typical for companies, a symbolic tip to employees who were supposed to remain loyal and work for the corporate good, according to Takehide Ito, vice president of the Japan Patent Attorneys Association.

Nakamura, now a professor at the University of California at Santa Barbara, sued for a share of the patent proceeds, a move watched closely by similarly underpaid inventors. Last month, the Tokyo Regional Court ruled against Nakamura's claim for patent rights, but said it would reconsider his compensation.

Rising resentment at the standard arrangement among researchers threatens to cause a brain drain, analysts said. So companies are beginning to respond. Mitsubishi Chemical Corp., for instance, raised its top reward for a successful patent to $2 million.

Nakamura "lost the battle, but he may win the war," said Michael O'Keeffe, managing director of the Tokyo office of **Kroll**, an international risk consulting firm.

But not all companies have joined the move. Prize winner Tanaka's company, Shimadzu, has about 10 patents for his work. According to a company spokeswoman, the now-celebrated researcher got a bonus when each patent was filed: $50.

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