SCIENCE AWARDS

FOR WHOM NOBEL TOLLS

It is Nobel Prize time again. This October three or more scientists will be awarded the coveted distinctions for physics, chemistry and medicine. If it goes according to form, most if not all the winners will be Europeans or North Americans (especially from the US).

Since the first prizes were given out in 1901, only three of the 79 awards for chemistry have been from other areas, and only one – Argentina's Luis Leloir – from the Third World; only seven of the 94 prizes for physics – even counting the Indian S Chandrasekhar, now a US citizen – and four out of 115 in medicine. Of these, nine undertook their award-winning work in the US and the UK. Of the 12 living Third World science Nobelists, only two maintain their original nationality.

Pakistan's Nobel winner, Abdus Salam, says that the Third World share of Nobel Prizes matches the level of its spending on science and technology. "Third World countries spend around 5-6 per cent of GNP on defence, a figure similar to that of the developed countries; 4 per cent on health, also comparable. But they spend less than 0.2 per cent of GNP on R&D. The figure for developed countries, at 2.5 per cent, is 12 times higher. How are we going to make any progress in these circumstances?"

It would be chauvinistic to suggest there is a bias in the way the Nobel winners are chosen, Salam says. The Third World Academy of Sciences, of which he is president, has a hard job finding candidates for its annual prizes, even though the award is new. "We have to blame our own countries and our own governments for this state of affairs," Salam says.

"Scientific excellence is the last thing that worries these countries," says Argentine-born Nobel winner César Milstein. "They win so few Nobel Prizes precisely because they have low educational standards and lack a scientific culture." Milstein cannot recall any Third World scientist whose achievements have been ignored by the Nobel selection panel.

About 10 per cent of the world's 3,756,100 research and development scientists and engineers come from Asia, Africa and Latin America. The three continents spend only 6 per cent of the total R&D expenditure of US$207-million a year and while there were 125 researchers per million people in the South in 1980 there were 2,954 per million in the North.

The comparisons cannot, however, help explain Japan's low profile in the Nobel league in recent years. Japan's US$33.5-billion of R&D expenditure in 1983 is almost twice that of West Germany and two and a half times that of France. And it has three times more researchers than West Germany and more than four times more than France.

Only a handful of names, including Hideki Yukawa, Shinichiro Tomonaga, Leona Esaki and Kenichi Fukui, highlight the Japanese contribution to the 20th-century sciences in the Nobel honour roll.

Figures reported last year showed that of 500 breakthroughs in technology considered seminal between 1953 and 1973, only 5 per cent were made in Japan, against 63 per cent in the US. US scientists had then won 142 Nobel Prizes since the awards were first given in 1901, in contrast to four won by Japanese.

Yet Japan, too, had its pioneers in modern sciences. During the first 25 years of Nobel awards, Shibasaburo Kitasato, Jokichi Takamine, Hideo Noguchi and Kiyoshi Shiga were among the giants of the biomedical sciences. For one reason or another, they did not win Nobel recognition – even though Noguchi and Takamine spent half their lives in the US.

Another significant limitation for Japanese scientists is the restriction of prizes to chemistry, physics and physiology or medicine. It is unfair to scientists contributing to the disciplines of biology (especially botany), agricultural sciences, earth sciences, marine sciences, technology and ecology. In some of these branches of natural sciences, Japanese scientists held a lead for a long time.

Nearly a decade ago, a Columbia university sociologist, Harriet Zuckerman, proposed the concept of Nobel class, ranking scientists whose contributions to research merited Nobel recognition even if they did not win prizes.

The information expert and president of the US Institute for Scientific Information, Dr Eugene Garfield, identified three prime characteristics of most Nobel class research contributions: high productivity, long-lasting impact on the research front, and work opening up new and exciting areas of knowledge.

This category would certainly include Japanese trendsetters. Shoichi Sakata's composite model of hadrons influenced much of Murray Gell-Man's 1969 Nobel prizewinning work in physics, for example. Similarly, the experimentation on the integral quantized Hall effect, which won the 1985 Nobel Prize for Klaus von Klitzing, was predicted in 1975 by the Japanese theorists Ando, Matsumoto and Uemura. And although Japanese bioscientists have yet to win a Nobel Prize, some of the trend-setting discoveries of Kitasato, Shiga, Takamine, Noguchi and Katsusaburo Yamagiwa have opened new vistas for western Nobelists. ■

Sachi Sri Kantha in Tokyo and María Elena Hurtado

THE OUTSIDERS

(Nobelists in science from non-western countries)

		Country	Contribution
Chemistry			
1970	Luis F Leloir	Argentina	Discovery of sugar nucleotides and their role in the bio-synthesis of carbohydrates.
1981	Kenichi Fukui	Japan	Orbital symmetry interpretation of chemical reactions.
1982	Aaron Klug	South Africa	Structure determination of complex nucleoproteins by X-ray crystallography.
Physics			
1930	C V Raman	India	Discovery of Raman light-scattering effect.
1949	Hideki Yukawa	Japan	Prediction of the existence of mesons.
1957	Tsung-Dao Lee	China	Discovery of violations of the principle of parity.
	Chen Ning Yang	China	
1965	Shinichiro Tomonaga	Japan	Basic principles of quantum electrodynamics.
1973	Leona Esaki	Japan	Tunnelling in semiconductors and superconductors.
1979	Abdus Salam	Pakistan	"Weak" interactions of subatomic particles.
1983	S Chandrasekhar	India-US	Fundamental studies in astro-physics.
Medicine			
1947	Bernardo Houssay	Argentina	Pituitary hormone function in sugar metabolism.
1951	Max Theiler	South Africa	Discoveries related to vaccine for yellow fever.
1968	Har Gobind Khorana	India-US	Deciphering the genetic code.
1984	Cesar Milstein	Argentina-US	Contribution to production of monoclonal antibodies.

Note: while Nobelists Theiler, Lee, Yang, Khorana and Chandrasekhar spent their productive professional careers in the US, Klug, Salam and Milstein carried out their award-winning studies in Britain. All the Japanese Nobelists conducted their research in Japan; Esaki left for the US in 1960.

● Physics winner Raman

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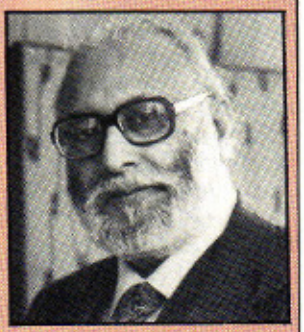

● Abdus Salam

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