MATHEMATICAL APTITUDE IN CHINA

by Julian C. Stanley

My wife and I recently completed a 41-day tour of Taiwan, Hong Kong, and the People's Republic of China. We spoke and consulted for 5 days in Taiwan, spent an evening in Beijing at the Chinese Academy of Sciences, a week in Hefei at the University of Science and Technology of China, and a week at the Shanghai Teachers University conducting an intensive national workshop. We dined in the apartments of friends in three different cities, were feted at many banquets, and talked endlessly to countless people, often through an interpreter. In addition, we took a 16-day tourist tour of China to see attractions such as the Taroko Gorge of Taiwan, the Great Wall of China, the terra cotta warriors near Xian, the thousands of picturesque hills around Guilin, and the gardens and 500 Buddhas of Suchou.

All these concentrated experiences helped us sense the complexity and contrast of the two Chinas, Taiwan being the more westernized and prosperous but the PRC laboring mightily to "catch up." Not being a political scientist, an economist, nor an old China hand, I shall not comment further about that. As an educational psychologist and specialist in the study of individual differences, however, I feel impelled to call attention to the incredible amount of potential mathematical talent in the Chinas, especially the PRC.

Even if the average 12-year-old there *reasons* no better mathematically than the average American youngster — and I suspect that the Chinese boy or girl does — China's one and two-tenths *billion* inhabitants swamp us in mathematical aptitude by a factor of about 5. If China can preserve its devotion to education of the talented and avoid another debacle such as the Cultural Revolution, by the year 2025 or earlier it may have challenged us industrially far beyond what Japan has already done.

The devotion of the Chinese to learning as the open sesame to progress is awesome. *Be my teacher* is their slogan. My wife and I found a lecturer's paradise, despite the formidable difficulties serial translation entails. (The vocabularies of even the best translators were not adequate for simultaneous translation.) For example, in Shanghai professors of mathematics, physics, education, psychology, and other disciplines from a number of universities sat intently taking notes for 3 hours each morning, 3 hours in the afternoon, and 2 hours more the third evening. So did high-school teachers and administrators. Few left the room even for a moment. Their gratitude seemed unbounded. We were overwhelmed with gifts and honors, even being made honorary professors of the Shanghai Teachers University.

My associates-by-mail and I had already found 21 twelve-year-olds in Shanghai who scored 700 or more on SAT-M. They came from only 279 highly selected youths who took the test, translated into Chinese (Stanley, Huang, & Zu, 1986). We talked with 19 of them and their mathematics teachers for 2 hours. They were virtually indistinguishable from Chinese-Americans in appearance and demeanor, but somewhat less advanced in their knowledge of mathematics than many members of SMPY's 700-800M group are (Moore & Stanley, 1986). They attend highly selective middle or high schools, but, as in many US schools, have a tight curricular lock step.

A recent World Bank conference in Beijing (Heyneman, 1985) concluded that China sorely needs to use multiple-choice testing extensively in order to find talent efficiently and reliably. I agree fully. That was the central core of our message to China.

Four months ago, the PRC participated in the International Mathematical Olympiad for the first time. It was held in Warsaw. Two old rivals, Russia and the United States, tied for first place. Mathematically formidable West Germany was third. The inexperienced Chinese team ranked fourth among the 37 nations competing! That is astounding. With better, more widespread selection via tests of mathematical reasoning ability such as SAT-M and the benefit of further experience they should quickly become No. 1 in the IMO and, within 25 years or so, No. 1 in mathematics, science, and engineering in the world.

The scientific and technological superiority of China will be contingent on politics, an increase in their GNP, and retention and enhancement of the work ethic in schools and industry. Nevertheless, when one considers how much SMPY, with a small staff, has been able to do for 292 youths in the brief period since November of 1980, one might be tempted to wish for China such American luxuries as commercial TV, ear-splitting popular music, McDonald's, and short school years in order to dissipate some of their educational energy!

It will certainly be interesting to watch that giant population stride into the 21st century. A major key to its development could be SMPY's model for identifying youths who reason extremely well mathematically and providing them special educational opportunities. China now knows about the model, so the next move is theirs. Watch the results of subsequent IMOs. Great success there should predict phenomenal advances in mathematics, science, and engineering.

It remains to be seen whether or not precocious educational accomplishments do lead to creative professional achievements. Evidence thus far indicates that they will. A straightforward 60-item 60 minute test, SAT-M, has far greater predictive power than I could have imagined in 1971.

References

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