fic work but in a very indirect way. The choice of such a subjective concept is certainly not fortuitous. Physicists are facing today contradictions which are the origin of the frustration they project in their scientific writing. They want to invest in physics and they are disturbed by the increasing pressure of social and economical problems.

The concept of frustration is now also used by experimentalists who will measure it in the near future! The use of the word frustration should reach a peak and then decrease, reflecting the fact that after expressing their problems, the physicists are ready to face and solve them: Frustration would be transformed into liberation and the "frustrated" spin would become a "liberated" spin.

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10/81

Japanese mode of thinking

As an inventor living in Japan for the past 11 years, I found Makoto Kikuchi's article "Creativity and Ways of Thinking: the Japanese style" (September, page 42) refreshing; he explained the way Japanese think in a very straightforward "Western" mode that was clear and to the point. The feel of the article, however, was very Japanese, and I would like to add a few words from quite a different perspective, necessarily a personal view.

In itself a "personal perspective" does not exist for the Japanese. Dull conformity is the rule, and mothers warn their children from an early age not to be different from others, that the nail which sticks out is sure to be hammered down! Conformity as such need not be dull, and the Japanese are sensitive enough to subtle changes in situations and make delicate creative steps in many aspects of their social, research, manufacturing and other activities. It is the collective inability of the system to make quantum jumps in creativity that I find so dull and frustrating, especially when I try to introduce my inventions to Japanese companies. The basic ideas are very quickly grasped by a large group of technicians, each one studying the matter from a different angle. It is when the group has to make a decision to do something new that a general timidity is perceived, and on some occasions I was told "this idea will work in the States only." The Japanese group is a very compact matrix in which every element has a special place and function. A new idea must be very carefully screened, because it might disrupt the

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whole works, like the proverbial wrench. Nor does one feel any sense of apology for this situation; imitation is somehow as natural for a scientist or artist in Japan as the need to be creative in the West. At its best, Japanese art is an exquisite blend of already known and experienced forms. Young Japanese musicians excell at playing baroque music, but it is almost inconceivable for me to think of the system giving birth to a Japanese Bach or (heaven forbid) a Beethoven. Both are sincerely loved here, but always with a kind of distant noncommitment to the emotions involved.

The Japanese way of thinking is a unique experience for any foreigner coming to these shores. It has many positive aspects, especially the resultant harmony that pervades the whole country. As an individual, the Japanese is humble and self-effacing, but that is counterbalanced by a strong national ego: the "we Japanese" syndrome. "Made in Japan" of course no longer means a shabby product. In the years to come I hope that "Created In Japan" would mean truly original ideas and inventions, not the refinements and re-creations of some concepts born elsewhere, arrived at by some individual or group that thought freely and ventured courageously into the unknown. The commercial successes of the Japanese system must not blind other societies to their own intrinsic worth. A "pattern recognition" mode of thought is exactly that: a kind of remote sensing of the creative possibilities of life and nature that somehow fails to do the truly new. I hope that enough people like Kikuchi will courageously speak out about this limitation in the national character. It might lead to a change, or at least to a sense that something is somewhere amiss in this amazing country.

VLADIMIR TAMARI
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10/81

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I find it curious that the author postulates the Western mind to be better suited than the Oriental mind for analysis based on fundamental principles. It seems inconsistent with the notion that Oriental language and concept formation are more intuitive, as exhibited by pattern or associative thinking. A number of compelling arguments have been made in recent years that Oriental concepts of time, change and unity may be an advantage in understanding nature at the quantum level.

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10/81

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Makoto Kikuchi's article on the Japanese style was very interesting. One wonders if the pattern recognition capability differential of Oriental children is also displayed by Chinese- and Japanese-Americans nurtured in English-speaking environments. I believe it is, though I cannot quote chapter and verse. In that case perhaps the Lamarckian notion that the exposure to ideograms promotes such ability should give way to the Darwinian concept that this ability, intrinsic to Oriental races, gave rise to ideograms in the first place, just as our script is a monument to the Roman passion for engraving decrees in stone. Unfortunately, such hypotheses inevitably lead to conjectures which no one would mention in public. Too bad the differences between the races of man, which should be cause for rejoicing, always become a cause of sorrow.

RONALD BLUM
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10/81

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As a student of the Japanese language, I found Makoto Kikuchi's article "Creativity and ways of thinking: the Japanese style" very interesting. I believe, however, that he underestimates the utility of Japanese as a scientific language. Because the indeterminate ("grey channel"), analog and "pattern" nature of the language makes it more difficult to follow exactly the author's track from A to B, the reader is forced to think more for himself, thereby increasing the probability that he may gain some new insight along the way.

Recently, I was reading a scientific article in Japanese, and came across the character 硅 , "silicon." 石 means "rock" or broadly "mineral," while 圭 means "scepter," or "jade." Deviating from the article, I consulted a chemistry book. Indeed, jade is primarily silicon! Had I read the article in English, I would have never been so enlightened.

The characters give the language a dimension that alphabetical languages can never share. Also, with only about 2000 characters many of which share common elements, there is less material with which to construct specialist "jargon." In English-speaking countries, the words "momentum," and "photon" are hardly household words. In Japanese they are, respectively, written

運動量 (un-do-ryo)

and 光子 (ko-shi). In the first character 辶 denotes motion (as it does in all other characters in which it appears) while 車 can be visualized as a sedan chair. The second character also denotes "motion" with the meaning being derived differently. The third means "quantity," so we have "quantity of motion." 里 is the flame carried by a runner 儿, and 子 is "child" or by

extension "particle," so the second combination means "light particle." These characters can be understood by any Japanese who can read at the sixth- grade level. While the information conveyed may not meet the needs of the specialist, the characters make many scientific words accessible to the general reader, and so have the effect of democratizing science. Latin and Greek roots notwithstanding, what do the letters in "silicon," "momentum," or "photon" tell us? In Japanese these words could also be written

けいそ うんどうりょう こうし

(using the alphabet called "hiragana"), but it would take the average Japanese longer to comprehend. Not all the Chinese characters have such analyzable meanings as the ones given here, which is why the Japanese have dropped many, and now write their language using two alphabets in addition.

JAMES B. COLE
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10/81

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Makoto Kikuchi devoted much effort in explaining the Chinese characters on page 50. I was quite disturbed by the errors in the English interpretations of some of the words.

For example, in figure 6, the character 壽 is far from meaning "lucky" or "congratulations" as the article says. Rather, it is one of the two characters meaning "life" or "life span," 壽命.

In figure 7, the English translation of the characters (d), (e) and (f) are also wrong. The word (d) 太 means "too (much)" or half of the two characters 太太 meaning "wife" or half of the two characters 太陽 meaning "sun"; it definitely does not mean "thick." The word (e) 天 means "heavens," "sky" or "day," and definitely not "heavy." The word (f) 丈 means half of the word for "husband" (that is 夫夫) or "man," "-er," '-or" and not just to mean "husband." The word (1) 口 means "mouth" not "month."

Conversely, the following are the characters describing the English words that the author was discussing:

Lucky	幸運
Congratulations	慶祝祝賀
Thick	厚
Heavy	重
Month	月

As we all know, it is difficult to master a language such as Chinese. With misinterpretations such as found in this article and programmed into the computers, who needs more misunderstandings?

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I hope that in the future PHYSICS TODAY consults a Chinese reviewer first before publishing an article concerning the Chinese language.

JOHN T. C. KAN
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10/81

THE AUTHOR COMMENTS: Many of Chinese letters used in Japan at present have considerably different meanings from the original meanings in China. I learned this "modification" during my visits to China in 1975 and 1980. In my article published in September I mentioned the Japanese meanings of some Chinese letters, but never tried to treat the original Chinese meanings. The letter in figure 6 definitely means "congratulations" in Japan.

The letter in figure 7 (d) definitely means "thick." Figure 7 (e) is "heaven" which is mistyped as "heavy" in the figure caption as pointed by John Kan, but it is correctly read as "heaven" in the text, in the bottom of the third column of page 48. Figure 7 (f) really means husband in Japan. Figure 7 (1) is "mouth," but my correction of the galley proof was not in time for the press deadline.

As mentioned above, many Chinese letters are used in Japan with modified meanings, which again shows our adaptation to foreign cultures.

For your reference, the Japanese pronunciation of Chinese letters discussed above are listed below.
Figure 6: "kotobuki"
Figure 7 (d): "hutoi"
Figure 7 (c): "ten"
Figure 7 (1): "kuchi"
which reveals the Japanese meanings.

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11/81

More on POPA

Louis Rosen's comments (August, page 11) on the greatest danger to society are quite right, including the dependence on arms control for our survival and the importance of verification if we are to have confidence in arms-control agreements. But it isn't sufficient that physicists merely help to make it unattractive for anyone to start a war, and contribute to technical aspects of verification. Physicists need more than ever to be aware of what is going on politically, and how the actions of their government are viewed elsewhere. For example, acting collectively, physicists could have brought to bear significant influence in the US towards getting SALT II ratified. If arms control is as important as Cohen says, then SALT II is important.

Physicists also should be aware of undercurrents, either hypocritical or contradictory that taint many government dealings. For example, a government can be paying more than lip service to arms control, and at the same time be undermining the arms-control process itself. The US currently adheres to several arms-control agreements and principles, but now seems insistent on deploying cruise missiles in Europe, which may well undermine efforts at reaching an arms control agreement on "long-range theater nuclear weapons." The reason is simple: It is unlikely the US and USSR (if they finally agree on numbers of weapons and so on) will agree on what is acceptable as a means of verification for cruise missiles. The Soviet Union's position is just as self-contradictory if one considers the chemical weapon stockpile they have developed. All attempts at arms control in this area have failed on the question of verifiability, yet that nation has been crying out for arms control in other areas.

There was a time when it was militarily smart to have a secret weapon at one's disposal. In today's climate even a nonsecret but "unverifiable" one is a liability, because it cannot be brought under arms control and contributes to international suspicions and tension. As long as the Soviet Union and the US remain in a state of severe ideological conflict, our security will lie in deterrence and arms control, preferably minimum deterrence with very good arms control. Efforts to undermine either deterrence or arms control work against our security; nevertheless, several such efforts are in full swing at the present time. An example of efforts at undermining deterrence is research in antisubmarine warfare (advertisement, August, page 82). One could hardly expect the US to cease research in an area where the USSR is very actively engaged, but surely a bilateral or multilateral agreement should be reached on this as on other vital questions. There is much for the physicists to concern themselves with here, and maybe POPA should create a special task force to address such concerns.

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10/81

Moral code for scientists?

Seldom do I find a concise phrase with which I am in such total accord as that used by D. H. McNeill as he closed his reply to G. H. Stumpff II: "At best it (the so-called defense industry) wastes money . . . at worst, empty of human value, it is suicidal." (May 1981, page 102).