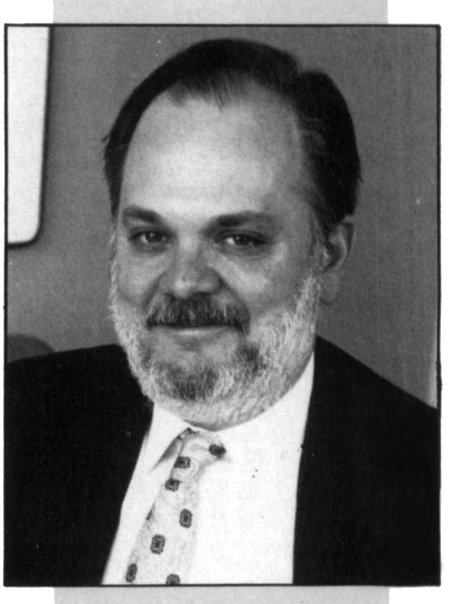
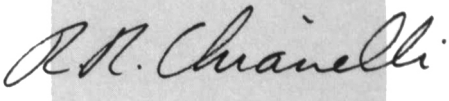
National Treasures





Nobody can deny the current-day success of the Japanese economy in setting the pace by which the economic efforts of all other countries are now measured. Long-range planning, attention to the desires of the ultimate consumer, and a remarkable constancy of purpose have combined to show the way into the future for industrial and technological enterprise. The United States should take some pride in the accomplishments of the Japanese because in part these accomplishments are a result of U.S. ideas implanted in Japan during the post World War II occupation. In fact, the Japan of today very much approaches and perhaps exceeds the vision of its occupiers.

The time has now come for the two nations to recognize their special relationship, which arises from the intimate intertwining of their recent histories and cultures. We in the United States must clearly recognize the Japanese contribution to their "economic miracle" and not view it as some unfair perversion of our system. Of course tensions arise in a competitive situation between two economically powerful countries. But this is natural and can be negotiated because of the basic mutual respect, common goals and underlying friendship that exist between the two nations.

We still have much that we can learn from each other in a mutually beneficial way. The power, creativity and productivity of U.S. science still invokes admiration and wonder in Japan. U.S. institutions of higher learning continue to be the Mecca of aspiring scientists and engineers throughout the world, and many Japanese scientists desire to come to the United States to pursue research careers because of the broad range of open opportunities available here. Many Japanese scientists of my acquaintance speak of much more limited possibilities in the Japanese system for the aggressive young scientist than exist in the United States. We would be foolish, however, if we were to conclude that our position in science is inherent. The Japanese continue to improve at a rapid pace—just look at the increasing number of first rate Japanese publications.

What, then, can we learn from the Japanese? Much has been written about the "Japanese secret of success" and I would like to add only one point to this voluminous subject. When I visited Japan several years ago, I was greatly impressed by their respect for and utilization of their "National Treasures," a designation given to the most skilled craftsmen who devote their lives to a particular area of Japanese culture. I witnessed a Samurai sword maker, endowed by the government, preserving this thousand-year-old technology. In other fields, experts with lifetimes of experience and accomplishments were granted National Treasure status and with it the ability to continue to be productive and pass on their expertise to the next generation. The contrast in the United States is striking.

I'm sure every member of MRS under the age of 60 can tell stories about scientists who taught and inspired them but now find themselves in deep trouble. Without funding and without respect, we are discarding them. To mention them by name would take pages and add to their public embarrassment after lifetimes of accomplishment. Not limited to any field, they are the "fathers" of the current generation of U.S. solid state chemists at two northeastern universities, the founders of the fields of amorphous semiconductors and thin film technologies at two Ivy League universities, a group of professors at western universities whose thinking built the petrochemical industries. The list goes on and on, and we each have our own list. Very simply—we cannot afford this wholesale disposal of our National Treasures.

> We must find ways to identify and preserve our scientific National Treasures.

It is easy to understand the dilemma of the national funding agencies. In the face of decreasing budget allocations, the premise has been that young scientists must be given the chance to make their marks. We all agree that this is essential, and doing this well has been to a large degree responsible for the health and vigor of U.S. science. But until recently it has not been an either/or situation. It does not have to be this way. We must find ways to identify and preserve our scientific National Treasures.

Not to do so will make U.S. science much poorer. A complete and healthy science community requires the active participation of those with experience, differing points of view, and most importantly the scientific historical perspective developed over a lifetime. In the absence of this historical perspective, science in my view tends to become driven by short-term economic concerns and dominated by "fashion."

But the effective utilization of our National Treasures goes beyond just the important contribution of the individual. It reflects how we view ourselves as a people. I believe it significant that the Japanese, while being enormously successful in competing in a high-tech world market,

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also retain a sense of the enormous value of their historical roots. Japan today is a potent blend of "future think" and value for the past. Perhaps this is the key to that country's success. U.S. industrial management, with its enormous influence on government funding patterns, seems incapable of "future think" and has had little use for learnings from the past. Only the immediate seems important. To think only of today robs us of the full measure of human capability.

If we as a nation wish to change our declining world position perhaps we can start by drawing on the talents of all our scientific community by nurturing our National Treasures. I propose that government, academia and especially industry combine to develop a Scientific National Treasures program—not in competition with regular funding channels but in parallel with it. The program would recognize that certain individuals had achieved a level of success that demonstrates that they should be funded as long as they can be productive. The level need not be excessive but sufficient to enable them to maintain their skills and participate in and continue to contribute to the scientific community. I believe such a program would greatly enrich our scientific community. I also believe this program would begin to significantly change the character of our competitive position by moving us toward a broader world view.

If anyone still wonders what a Scientific National Treasure is, think back to the 1989 Spring Meeting when MRS had as its plenary speaker a "Crown Jewel," Linus Pauling...Linus Pauling who at over 90 years of age stayed up all night to write an article for *Nature* attacking cold fusion because, as he said, "If anything new happens in the Universe I want to know about it"...Linus Pauling who underscored that we obtained degrees as "Doctors of Philosophy" by recalling many debates about the nature of solids which we thought we knew the answers to...Linus Pauling who reminded us that when we think we know all the answers we can't ask any questions.

It is not the point to say whether we agree with Pauling's view of science. But it is certainly the point to say that the community of science would be at a great loss without his active participation and interest. Perhaps we as a nation may formally designate Linus Pauling as the first Scientific National Treasure, paving the way for many more and signaling that at last we acknowledge the debt we owe to those who have gone before us.

R.R. Chianelli

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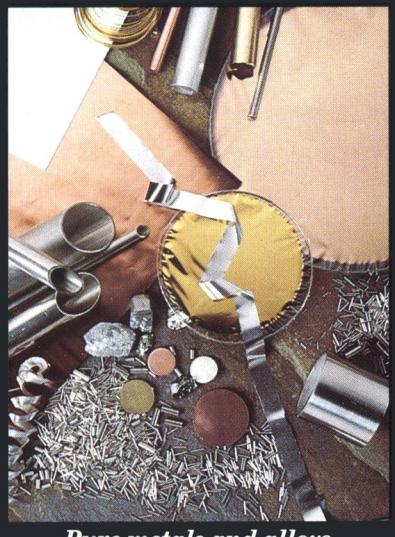

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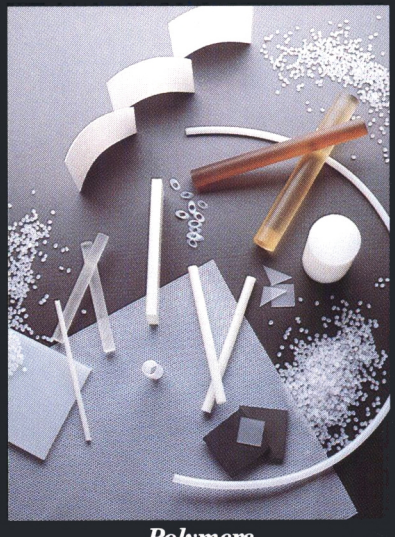

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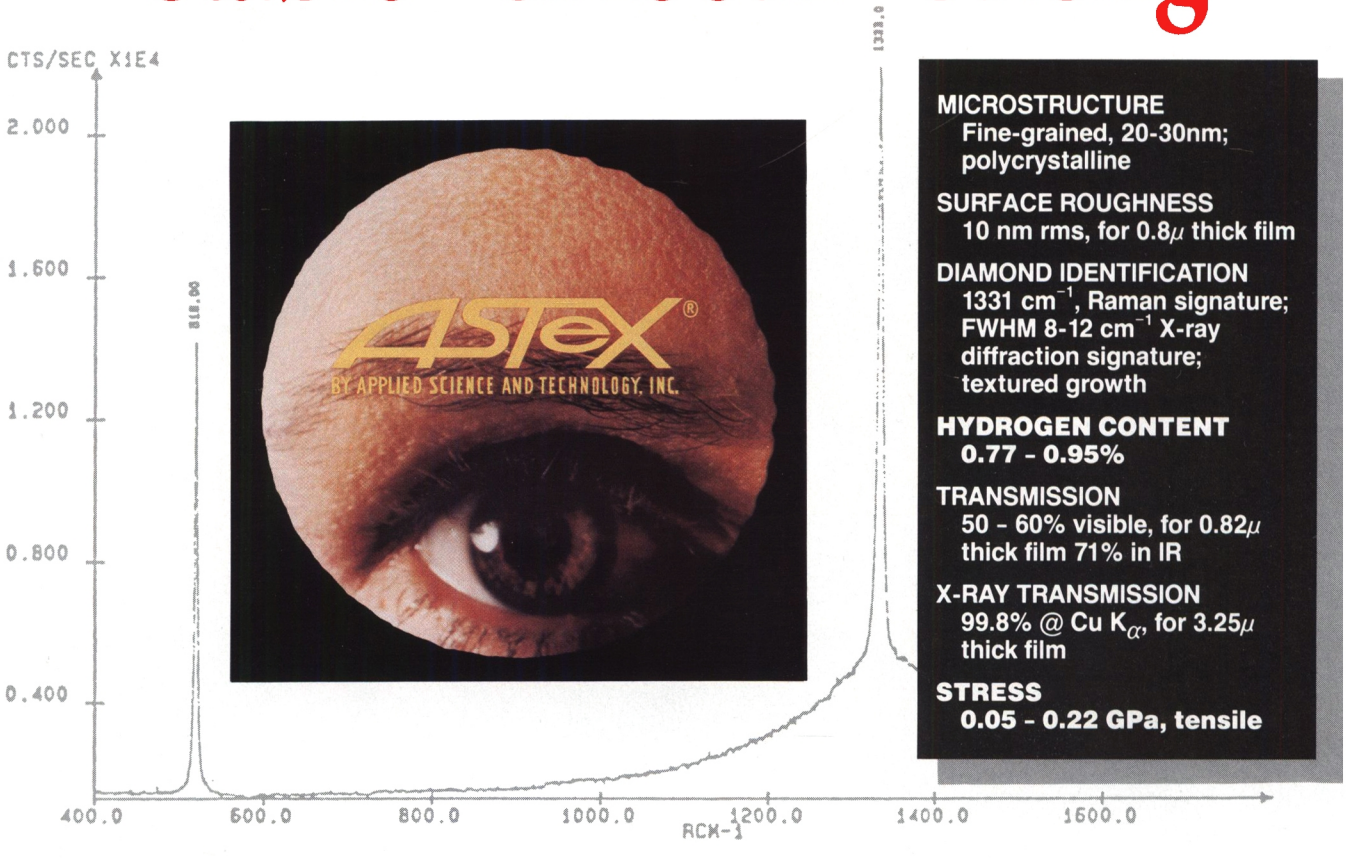

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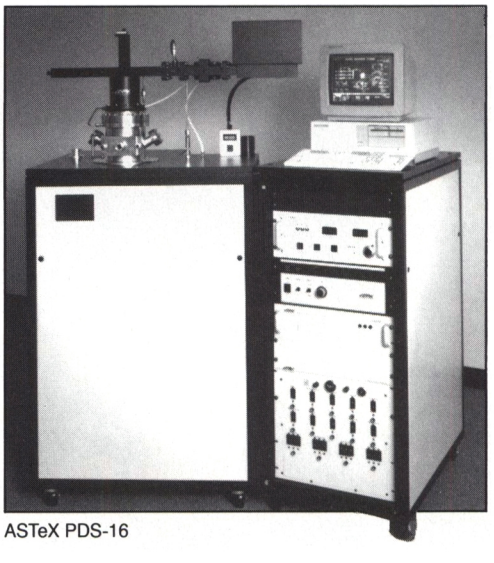

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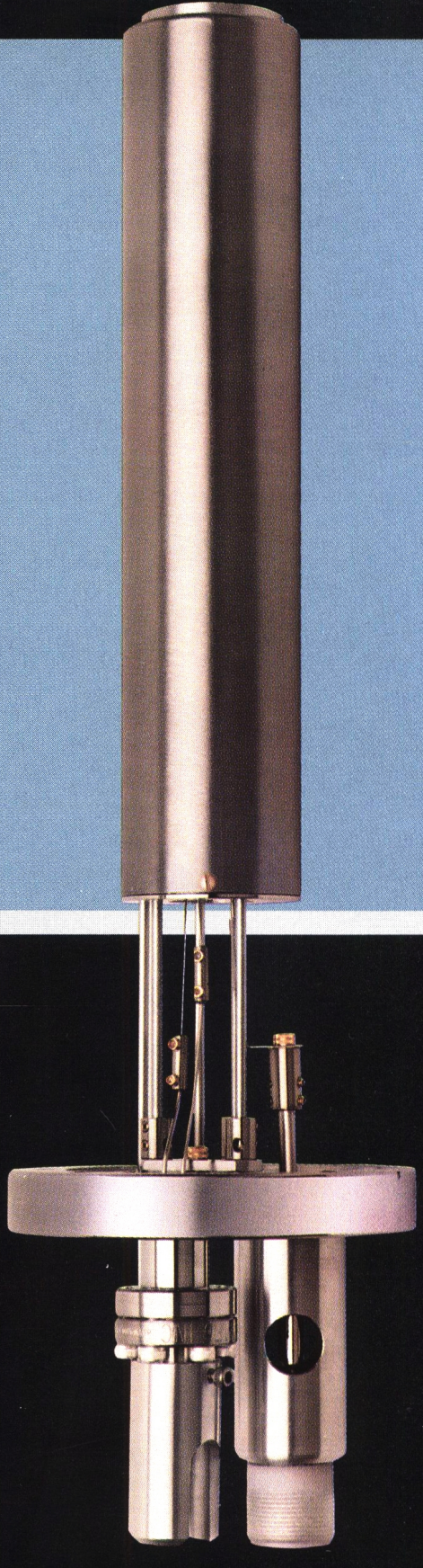

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