

Rao Yi: The hidden dangers — China's future and science

Note: These are Jeffrey Ding's translations. Jeffrey Ding is a researcher at the Future of Humanity's Governance of AI Program. As a Boren Scholar, he directly enrolled in classes with Chinese undergraduates at Peking University, and interned at a Chinese law firm. Others are welcome to share **excerpts from these translations as long as my original translation is cited. Commenters should be aware that the Google Doc is also publicly shareable by link. These translations are part of the ChinAI newsletter - weekly-updated library of translations from Chinese thinkers on AI-related issues: <https://chinai.substack.com/>*

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Original Source: *zhishi fenzi* ("知识分子") - a mobile media platform founded by three scholars, Rao Yi, Lu Bai and Xie Yu, dedicated to thoughts on the sciences and humanities

All three are big shots. For example, Rao Yi was a faculty member at WashU/Northwestern before going back to China to take up deanship of life sciences at Peking University; recently, he has been very outspoken about talent policy/visa issues in US/accusations of spying against Chinese scientists.

Bai Lu tenured Professor in the School of Pharmaceutical Sciences at Tsinghua University -- former Associate Director of Gene, Cognition and Psychosis Program (GCAP) at the NIH

XIE Yu is a Professor of the Office of Population Research at Princeton University, and is also described as "Professor of the Thousand Talents Plan at Peking University" on some websites.

Original Mandarin:

http://m.china.caixin.com/m/2016-01-05/100896108_1.html?fbclid=IwAR3QvmYbX6HydFK-EDRqFnU4604Lz9v6czc3fmdIU0uXrjbmBBL_TXXR5Z8

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The Chinese nation lacks scientific traditions, the history of science in China is short-lived, and with a pragmatic culture, there will be great challenges in the future.

Pragmatism/practical-ism has prevailed in the ethnic Chinese community for a long time

Will we be able to develop quickly, in the long run, and in a stable fashion? Many people, including myself, hope so. The distance between hope and reality is related to the third point: Pragmatism/practical-ism has prevailed in the ethnic Chinese community for a long time, both in China and overseas. Pragmatism may promote science and may also hold back science.

"Learn math, physics, and chemistry well, and you can go anywhere in the world without being afraid" is the slogan of pragmatism. From 1950 to 2000, more people may be interested in science and technology. But this 50-year interest was not because we really pursued the truth, or that we were curious about nature; rather it was because we discovered in 1949 that it was impossible to get promoted through government and make a fortune, as former officials lost their lives and the rich were deprived of property — which is to say, the officials of the 1950s and 1960s were often criticized and in a precarious position. As a whole, many of us in China are interested in science because of pragmatism. Although the slogan at the time was to advance science forward, I am afraid that practicality is the biggest reason why Chinese people are willing to do science. Once this reason disappears, there will be problems with talents in science and technology.

Now that the economy is developing fast, rising in government ranks to make one's fortune is once again the pursuit of the Chinese. Overseas Chinese are also very pragmatic in nature. Even if many overseas Chinese say they don't return to China because the creativity in the country's educational environment is relatively poor, affecting their children's education, but looking closely at overseas Chinese, most of their second generation are studying a practical profession, based on local earning standards. Among them, those studying medicine are noble and ethical earners, Chinese children who are engaged in the "swindling" industries are more common. The second and third generations of overseas Chinese who study natural sciences and take natural sciences as their profession are quite low, revealing that we Chinese people are unchanging in our pragmatism.

Even though Chinese people have a relatively high level of surface-level interest in science in the 50 years from 1950 to 2000, science (capabilities) are actually quite weak in China and among Chinese people, as it has not become a part of the culture. Today, we can see that scientific funding and other environmental conditions are getting better and better for China's development of science. At the same time, we must consider the lack of a pursuit of truth and a lack of curiosity about nature. Pragmatism will have a large, negative impact on the next step of development for Chinese science. There is a naive view that Mo Yan's Literature Prize and Tu Youyou Medicine Prize are the first of a gushing well for China's Nobel Prizes. The important scientific work we have done will increase with each passing day, but the increase is not unlimited. One of the limitations is that we have fewer and fewer scientific talents. The rising trend of environmental conditions and the declining curve of talents will determine the ultimate level of our Chinese science. It will not necessarily be constantly rising but a plateau may appear, and the height of the plateau may not reach the heights we hope.

If you use the simple, easy-to-remember, and somewhat superficial Nobel Prize statistics: Switzerland, a small country with a small population of just over 7 million, has won more than 20 Nobel Prizes in Natural Science; neighboring Japan, which won its first Nobel Prize in 1949 has already won more than 20 Nobel Prizes so far. We can foresee that the 100th anniversary of the founding of the People's Republic of China in 2049 will also be the 100th anniversary of Japan's first Nobel Prize. It is likely that the number of our Nobel Prize winners will not catch up with Japan. Of course, the question of whether China's science as a whole can surpass Japan in 2049 is currently difficult to answer, and we have to wait and see.

We often like to say that the Chinese nation is a diligent, courageous, and wise nation. We certainly hope that this is the case, and I especially hope that this is the case, but wisdom is not easy to measure. If you want to use the natural science to measure it, and if you want to use the Nobel Prize statistics to quantitatively measure it, then we are still far away. If the Jewish people claim to be a wise nation, there is data to support it. The Jewish people have won more than 20 Nobel Prizes in Chemistry, more than 50 Nobel Prizes in Physics, and more than 50 Nobel Prizes in Physiology or Medicine. Our Chinese nation - a nation of more than a billion people - is unlikely to surpass the Jewish nation in Nobel Prizes even by 2099.

So we can only say that if we want to prove that we are wise, there is still a considerable distance, and there is quite a lot of work. For us, proving that we are wise people is a very challenging thing, and it is not something that has been proven already, and definitely not something that is universally recognized.

China needs the natural sciences in the future

For any big/major/great country, science and technology are closely related to the future of the country -- for quite a long time period at least. The strength of Britain, the rise of Germany, the rise of the United States, and the rise of Japan all had a strong scientific foundation. At the end of the 19th century, when its economy had not yet developed, the United States actually made a lot of preparations for its science (system). One of the most important aspects is that a group of American entrepreneurs promoted and supported the establishment of modern American universities, which played a big role in the twentieth century. Harvard and Yale in the 19th century were insignificant globally because they did not have a strong scientific foundation.

The most prominent American university in terms of research was Hopkins University. After its establishment in the 19th century, it learned from German research universities, so it had teaching and research. Hopkins trained a number of important scientists in the late 19th and early 20th centuries, such as the geneticist Morgan, who was a Hopkins graduate; Carnegie and Mellon also supported a university, today, Carnegie Mellon is a very good school for computer sciences; Rockefeller was born in the middle and lower class in the United States. He started donating money when he only had \$25 in three-month income. He didn't donate money after he

had money, but started donating when he was poor. His charity was exceptional and the results were very good. The University of Chicago, which his donation supported, is an extraordinary achievement in economics. He donated money to establish the The Rockefeller Institute for Medical Research (now Rockefeller University), a graduate-only, non-undergraduate school. Today, there are only more than 70 professors in the school, half of them are academicians of the American Academy of Sciences, and 1/10 are Nobel Prize winners. In this institute's history, the most important scientific work of the 20th century appeared - the discovery of DNA as the hereditary material in 1944. Rockefeller also donated money to establish the Peking Union Medical College, and he also donated funds to black female institutions of higher education in the United States. This was all very very far-sighted and played an important role in very different ways.

World War I and World War II made it so that European scientific and technological talents flowed to the United States, which is an important factor for the rapid development of the United States. However, beforehand, the development of American universities provided the necessary foundation for the admission of S&T talents. Moreover, the impact of Jewish immigrants (on scientific and technological breakthroughs) in the United States still required them to receive university education after immigrating to the United States in order to possess talent later.

The U.S. using government funds to support scientific research is a 20th century phenomenon. One factor is the military-relevant physics research in the United States was first supported by the state, and the Manhattan project greatly affected the development of the physics discipline in the United States. And after the Second World War, especially in the 1950s, after being provoked by the Soviet Union's launch of a satellite, the US's investment in natural science research increased rapidly, and the increase in biomedical research is closely related to the health of the population. The National Institutes of Health (NIH) in the United States had very little funding in the early 1950s, but afterwards it has become an institution with more than \$30 billion in funding this year.

Science and technology for China, the main role so far may be to cultivate personnel who can copy/imitate (*shanzhai*) foreign results. Science does not produce much original work in China, and there are not many (breakthroughs) that can directly support the industry.

However, if we want to be among the front ranks of the world one day, we must have original works supported by science and technology. If our output cannot exceed the West and cannot exceed the United States, it is hard to imagine that we can get to the front ranks simply through our skills in transforming business models and distribution channels.

As for letting others invent while you do the distribution, I am afraid there is no good thing like that. One can only lead in distribution when the output is strong. And changes in business models involves changing one commercial channel into another, which is like the relationship between the left and right pocket, sometimes it increases and sometimes it does not increase the total amount. For a major country, although distribution methods and business models are

important, output is more important and may always be the most important. And leading in output must be based on original scientific and technological results. Science and technology have a close relationship with China's future for a long time. If the country does not take measures, the current trends in our scientific and technological talents are worrying. China's future also has considerable hidden dangers, at least when talking about natural science talents who are decreasing in number day by day.

Our Chinese nation lacks scientific traditions, the history of science in China is short-lived. Combined with the culture of pragmatism, how do we reverse the decline in the quality of scientific and technological talents, the reduction in the number of people, and inspire a certain number of high-quality talents to join science and technology, and positively affect China's future? This is a very great challenge.