

Decade-long High-tech Program Bears Fruit

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adjustments on our plan according to the CIMS information and put some products in short supply on the market two and a half months ahead of our counterparts. In the first half of 1994, despite a sluggish market, we still earned 200 million yuan, well over what we had planned."

The technology of CIMS has been successfully applied to a

dozen other large and medium-sized enterprises. "By the year 2000, hundreds of enterprises will be using CIMS," Wu says.

Right now many large and medium sized state-owned enterprises are doing poorly in market competition, some even on the verge of bankruptcy. CIMS is deemed as a way for them to survive and revive by sharpening their competitive edge, Wu says.

While the new technology of automation is upgrading the traditional industry and actuating the development of pillar industry, Zhu says, breakthroughs are made in biotechnological studies, which are playing an important role in agricultural and medical development, with food of higher quality and new pharmaceuticals.

One of the world-level

achievements is the technique of two-line hybridization of rice. A test in an experimental plot of 267,000 hectares showed a 10-15 percent increase in the yield over routine three-line hybrid varieties.

"So far China has extended the technique to 173 million hectares and acquired an yield increase of 260 billion kg," says Prof Hou Yunde, chief scientist of the China National Expert Committee for Bio-Technology Development in Program 863.

With regard to plant breeding, Chinese scientists have successfully improved some crops via plant genetic engineering and cultivated agronomically important traits such as insect resistance, disease resistance, stress tolerance, and higher nutritional quality, says Prof Jia Shirong, another leading scientist in the field of biotechnology.

"We have bred new varieties of wheat which can resist yellow dwarf and powdery mildew viruses," he says. "Meanwhile we are planting on a trial basis a strain of wheat to which we have transferred genes resistant to wheat scab. In 1995, we planted the wheat in a 467-hectare experimental plot. The per hectare yield increased by 450 kg."

Insect attack is a major problem in crop cultivation. In 1991-93 the yield losses due to cotton bollworm in China amounted to nearly 10 billion yuan. "Now we have bred transgenic cotton which is resistant to bollworm," Jia says. Particularly suitable to the environment of the Yangtze River Valley and North China, the country's major area for cotton growth, the bollworm-resistant cotton has developed to the third generation, and shown a radical insecticidal rate of over 80 percent. It will be tried in a 133-hectare experimental plot in 1996.

Another achievement in the biotechnological field of Program 863 is a series of special pharmaceuticals developed over the past decade, Hou says.

Hou and his colleagues have developed a genetic vaccine of hepatitis B virus (HBV). Compared with the former plasma-derived vaccine, the new vaccine is "cheaper but more effective and safer," Hou says. It was put on market in 1992.

Also put on market that year was a-interferon (IFN), which can apparently effect on chronic hepatitis B. Hepatitis C, leukaemia and so on.

Both medicines "mean much to a country like China," Hou says, since China has 120 million HBV carriers, more than half of the world total.

Altogether, he says, seven new medicines and vaccines developed under Program 863 have been put on the market: 17 items under biological preparations will soon finish clinical trial and come into the market; and 50 others are at the stage of laboratory research.

Across the country, some dozen of factories are manufacturing the new pharmaceuticals. Preparations are under way to set up a dozen more similar plants.

By the end of this century," Hou says, "the annual output value of those high-tech pharmaceuticals will reach five billion yuan."

In a word, he says, the foundation of bio-technological industry is being laid.

Two other rising industries — information and new material high-tech industries — also benefit from the country's high-tech program. Supported by the research achievements of Program 863 workers, a number of information high-tech enterprises have come into being in China, and are getting internationally competitive, says Zhu Lilan.

One of them is the Dawning Information Industry Corporation Ltd. founded in 1995 to industrialize Dawning series computer systems developed by the National Research Centre for Intelligent Computing Systems (NICIS) as key projects of Program 863. Its revenue in 1996 is expected to reach 150 million yuan.

As the first Symmetric Multiprocessor (SMP) system developed by China, Dawning-1 exploits the most advanced techniques of the 1990s. More important, it helped Chinese scientists find the right road to develop high performance computers, says Prof. Li Guojie, NICIS director and President of the Dawning Company.

Considered as a milestone of Parallel Processing technology in China, Dawning 1000 Massively Parallel Processing systems (MPP) demonstrates NICIS's mastery of the key MPP techniques of the 1990s, and establishes a solid foundation for manufacturing commercialized MPPs in China, Li says.

Both Dawning-1 and -1000 have won prizes of Science and Progress Award respectively granted by the Chinese Academy of Sciences and the State Science and Technology Commission.

"Instead of selling computers, we hope to make computers a productive force or tool of production all across the country and therefore help promote the computerization of the national economy," Li says.

"The total import of computers, mostly high performance ones, in 1995 was over US \$2.75 billion. The success of Dawning-1 and Dawning-1000 built up a sound foundation for China to manufacture high performance computers with our own property right," Zhu Lilan says.

In southern China's Guangdong province, the Shenzhen Sunshine Corporation Ltd. is manufacturing products of Chinese language intelligence interface. The group comprises 12 subsidiaries, and its agency is distributed all over the country. It has developed and produced over ten kinds of products and transferred them into industrial production.

Meanwhile, a new high-tech material industry has emerged in an embryonic form, Zhu Lilan says.

As a country lagging far behind the world's advanced level in the research, preparation and production of new material, Program 863 workers chose to develop a number of products highly needed in the national economic construction which China claims advantages to work out.

Industrialization of high technology will be one of the "three major campaigns" in the last five years of Program 863. Another two campaigns will be enhancing the scientific, technological and productive level of agriculture, and transforming the traditional industry, Zhu Lilan says.

At the same time, the scientists and experts will try hard to break the back of key technologies of each domain and transfer the research results into productive force.

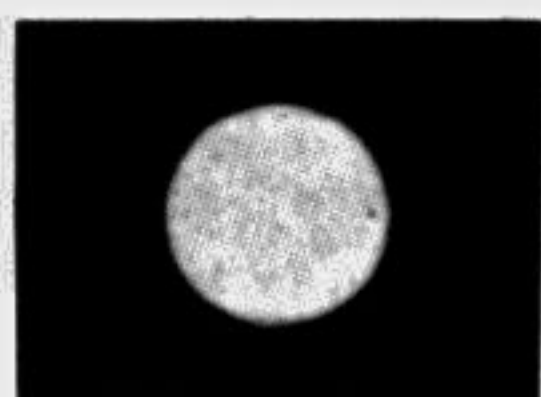
(Abridged)

New Era

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from Xinjiang in the far northwest to Hainan Island in the South China Sea, and from Tibet to Inner Mongolia.

Thanks to Deng Xiaoping's open policy, China has become increasingly integrated with the rest of the world economically. With the "open wider" policy of the Chinese government, the process is expected to continue, at a higher level, in years to come.

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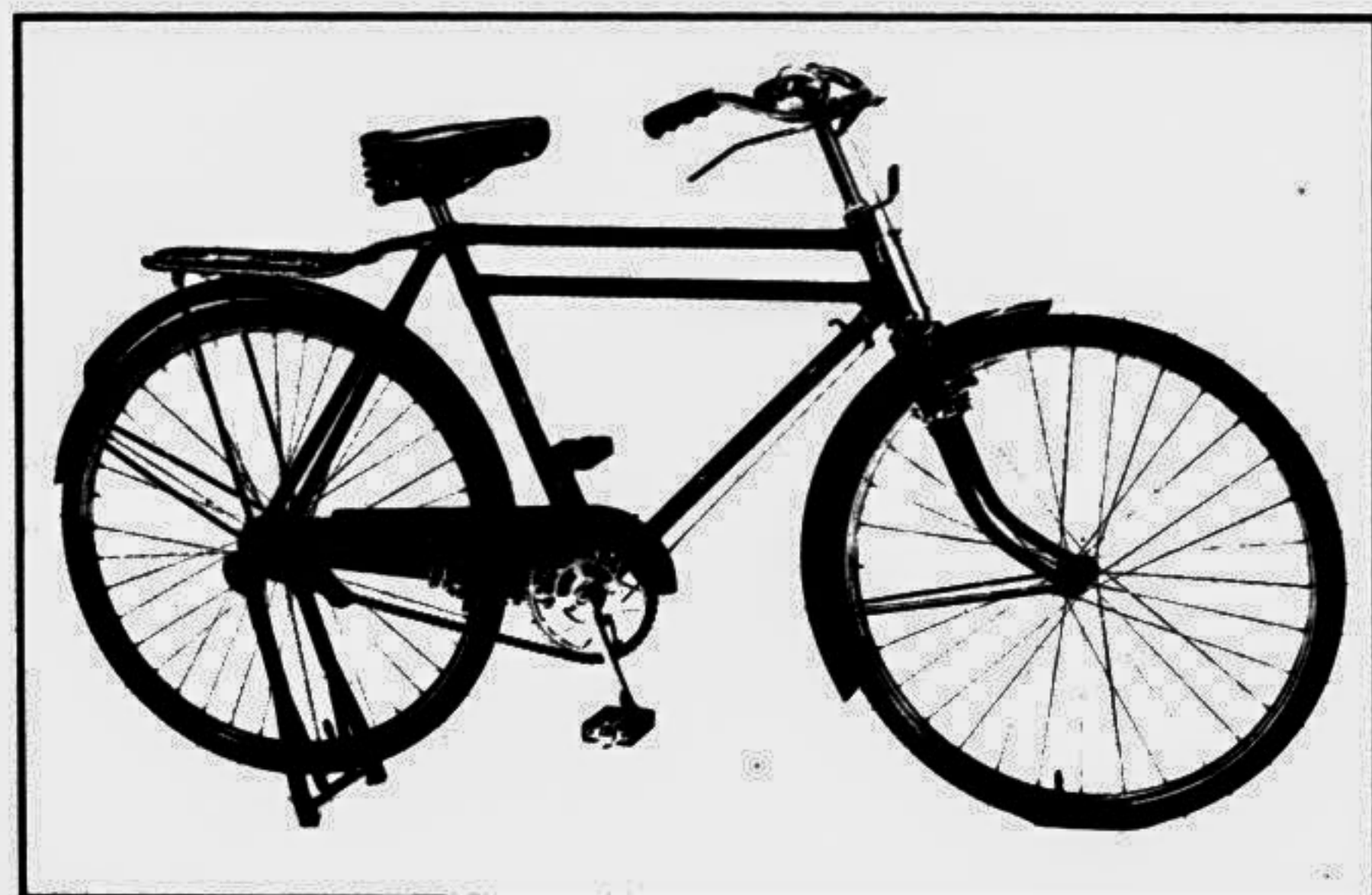
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