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SPECIAL ISSUES

Capacity Building for Popular Science

Not long ago, an official circular was jointly issued by an array of government agencies to enhance the capacity building of popular science activities. The advocators include the Ministry of Science and Technology, Department of Publicity, State Development and Reform Commission, Ministry of Education, State Commission of Science, Technology and Industry for National Defense, Ministry of Finance, China Association for Science and Technology, and Chinese Academy of Sciences.

The document, under a title "Comments on Enhancing the

Capacity Building of Popular Science”, defines the following missions for improving China’s popular science activities during the 11th Five-year plan period (2006-2010): 1) prosper popular science writing, and enhance the originality of China’s popular science works; 2) enhance the construction of infrastructures for public S&T dissemination system and popular science activities, and create more channels for disseminating scientific knowledge; 3) perfect the science education system at primary and middle schools, and raise the level of science education; 4) strengthen communication mechanisms between government and the public, and promote public understanding of science; 5) enhance demonstration and guidance, and further raise the capability of popular science activities in mobilizing the society; 6) build a high caliber personnel contingent for popular science, with the combination of both professionals and amateurs.

The document also lines up detailed support measures, including strengthening the steering and coordination part of popular science activities, increasing investment, perfecting incentive policies, enhancing national popular science infrastructures, establishing a monitoring and evaluating system for national popular science capacity building, strengthening theoretical study of popular science, and enhancing resources sharing.

China Wants More Intelligent Traffic

During the 11th Five-year plan period, China’s National S&T Support Program has deployed a range of technology, application, and demonstration projects for developing intelligent traffic systems, in an attempt to meet the needs of the Beijing Olympic Game in 2008. The initiative will lead to the establishment of a comprehensive traffic information platform, made up of four centers, including traffic control center for the Olympic Game, and traffic data center. The effort will put 80% of urban trunk traffic lines under abduction, allowing dedicated traffic flows for the Game not less than 60 km per hour, and providing monitoring service for 5,000 vehicles employed by the Game. It will also help authorities to render an efficient, safe, and humanistic service for the game participants and local folks.

As a major project listed under the National S&T Support Program to establish a support platform for China’s intelligent traffic system, the project will focus on an array

of missions, including intelligent management, dynamic abduction, complex traffic data integration and management, cross-region network for non-stop toll service, and online ocean-going ship and freight monitoring. While working on the needed key technologies, the project will stage applications and demonstrations in Beijing, Shanghai, and Guangzhou, in an attempt to facilitate large international events and traffic needs, establish a non-stop tolling and service system for the nationwide highway system, and create an online ocean-going ship and freight monitoring system.

INTERNATIONAL COOPERATION

China-Sweden Cooperation on Post 3G

A strategic talk on post 3G was held on February 5, 2007 between the Chinese Ministry of Science and Technology, Swedish Governmental Agency for Innovation Systems (VINNOVA), and Swedish SSF.

After listening to detailed proposals made by Swedish counterparts on cooperation, MENG Shuguang, Deputy Director of MOST Department International Cooperation, said that MOST would closely work with the Swedish side to promote collaborations in the area of post 3G mobile telecommunication and network development, in line with China's National 863 Program. China has defined a number of domestic vendors, including HUAWEI and ZTE, as the key players in the area of post 3G mobile telecommunication. MENG welcomes a funding proposal, worth 23 million Swedish Kronor, or RMB 30 million, made by the Swedish side for the collaboration. MOST promises to work out a list of collaborating projects for the strategic cooperation, and proposes to establish an implementing mechanism for the purpose. Based on internal coordination, MOST will authorize an expert panel to select collaborating projects for the planning purpose. Swedish side shared the work plan proposed by the Chinese side, and suggested detailed areas and contents for cooperation be defined in June 2007.

Oldest Animal Embryos Found in China

A team of Chinese and US paleontologists have unearthed

the fossilized animal embryos that are believed to be the oldest animals so far discovered in the world. The findings, derived from the joint archaeological investigations by both Chinese and US paleontologists in Weng'an, China's Guizhou Province, appeared in the February issue of journal *Geology* as a cover story.

In 1995, the research team discovered spheroidal fossilized animal embryos in Weng'an, China's Guizhou Province. An in-depth analysis of the fossils led to a conclusion that each division of cells in the embryo cuts down the size of individual cells by half, compared with parent cells, though the cell conglomerate itself sees almost no change in size. This feature bears strong resemblance to the development process of animal embryos. In this context, they are believed the fossilized embryos of unknown animals in the Ediacaran age.

Researchers also believe that the fossilized embryos can eventually grow into tubular organisms, based on their spiraling development pattern. The finding could relate to a new animal unknown to humans, as there have been no animals so far found in this world similar to it.

RESEARCH AND DEVELOPMENT

Progresses in Multipartite Entanglement

Prof. PAN Jianwei, and his colleagues YANG Tao, LU Chaoyang and others at the University of Science and Technology of China have recently created the largest ever photonic "Schroedinger cat" state, and the six-photon "cluster" state, which could bring the physical realization of a quantum computer one step closer. The findings, making two world records in photon entanglement and quantum computation, was published as a cover story in the February 1st issue of *Nature Physics*.

Researchers found that multiparticle entanglement makes an essential condition for developing a super quantum computer. In the early 1935's Erwin Schrödinger published a legendary paradox way of thinking, believing that the cat in the box he designed is either a live cat or a dead cat. Scientists have been trying to create a Schroedinger cat in the micro world, using photons or atoms, even though the

Schroedinger cat does not exist in a macro world. "Cluster" state, on the other hand, is a newly discovered state that is more closely entangled than the "cat entanglement". Its unique property makes it a desirable physical carrier for a one-way quantum computer.

PAN and others have created a six-photon Greenberger-Horne-Zeilinger state, or Schroedinger cat, through developing a sophisticated technology to manipulate multi-photons. They also created on the same device the six-photon "cluster" state that can be directly used for quantum computation. The progress indicates that China has maintained a leading position ahead of the United States, Germany, and Austria, in multiparticle entanglement. The European Physical Society reported the story on its website under a title "Photonic Schroedinger cat breaks record". In the meantime, the journal Nature reported the largest photonic "Schroedinger cat" ever created in the world under "Live cat" or dead cat", in the column of Research Highlight.

Mutualistic Pests and Plant Viruses

Chinese scientists recently discovered, through a study, that an invasive whitefly has developed mutualistic relationships with the plant viruses it transmits, and is able to increase its population much faster on virus-infected plants than on healthy plants, whereas its indigenous counterpart is unable to do so. The findings, derived from the joint research of the Institute of Entomology, and the Institute of Biotechnology, both affiliated to Zhejiang University, and the Institute of Plant Protection, part of the Chinese Academy of Agricultural Sciences, was published in the January 31, 2007 online issue of *Public Library of Science One (PLoS One)*.

Chinese scientists compared development, survival, fecundity and population increase of the invasive B whitefly and an indigenous whitefly (called ZHJ1) on both virus-infected and healthy tobacco plants. Compared to its performance on healthy plants, the invasive B whitefly had higher fecundity and longevity by 11-17 fold and 5-6 fold respectively, when feeding on plants infected by one virus. Population density of the B whitefly on virus-infected plants reached 2-13 times that on healthy plants in 8 weeks. Apparently, increase of infectious whiteflies speeds up virus pandemics.

China's Proprietary High Speed Train

China's first proprietary high-speed train (CRH) made on January 28, 2007 its first commercial run from Shanghai to Hangzhou.

Thanks to 3-year efforts of import-digestion-absorption-reinnovation, Chinese engineers have mastered nine key technologies involving high-speed locomotive assemble, locomotive body, bogie, traction conversion, traction control, traction transformation, traction motor, network control, and braking system, and ten key support technologies, including pantograph and air-conditioning system. China's proprietary CRH is a world-class locomotive, equipped with a range of advanced technologies, including AC-DC transmission, computer aided braking control, lighter train body made up of aluminum alloy and stainless steel, computer aided network control, and sleeperless high speed bogie.

According to a briefing, designed with room for further scalability, China's CRH will become the dominant traction vehicles running at a speed of 200 km or above in the domestic rail system.

New Compass Navigation Satellite Launched

At 00:28, February 3, 2007, China successfully blasted off an experimental navigation satellite aboard a CZIIIA launch vehicle, from the Xi'chang Satellite Launch Center. 24 minutes later, the satellite was separated from the launch vehicle, and accurately entered the preset orbit.

The new satellite is one of the four Compass series navigation satellites launched by China for the experimental purpose, with other three being launched on October 31 and December 21, 2000, and May 25 2003 respectively. With a laudable reliability, the navigation satellites so far launched have worked smoothly, and played an important role in numerous areas, including mapping, telecommunication, water resources monitoring, traffic and transport, fishery, resources prospecting, forest fire fighting, and national security.

As a performance and reliability enhancement, the newly launched satellite will work on a range of experiments

designed to test the compass navigation satellite system.

Embryo Transfer for More Milk

Technology integration and breeding demonstration for cow embryo transfer in tropical and sub-tropical regions, an initiative launched under a national fund for S&T findings transfer, has staged demonstrations for massive embryo transfer in tropical and sub-tropical regions, using 400 high-yield cows, based on existing embryo engineering technology, cow breeding bases, and fine species resources. The project also works on upgrading and integration of a range of related technologies, including embryo production, embryo freezing, embryo gender control, and embryo transfer, in an attempt to raise both the quantity and quality of embryo production.

The project has so far absorbed an investment worth RMB 5.63 million, for expanding breeding bases, and importing and selecting high-yield cow embryos. A demonstration has been staged for embryo production.

Under the role model of the project, a number of bases have been established, including an advanced cow breeding base possessing an 8000-mu(1 mu= 0.0667 hectare) artificial pastureland, a fine cow species breeding base made up of 5 core clusters and 25 sub-clusters, workshops that are able to produce semen, egg, and embryo, and store milk, 2 research centers for embryo transfer, and 32 counties serving as the bases for providing quality commercial cattle. The project has established a well functioned system consisting of basic and applied researches, embryo production and transfer, and scale breeding. It has also created different embryo transfer systems for beef, cow, and mutton, equipped with advanced technologies for in vivo and in-vitro fertilization, embryo production, and embryo transfer.

New Marine Satellite Ready for Launch

SUN Zhihui, Administrator of State Oceanography Bureau

recently told reporters that China would send its Marine-1B satellite into orbit in April 2007. The new satellite, the second of its kind developed by Chinese scientists, marks an effort for enhancing China's capacity of collecting ocean color data.

Designed with a service life for 3 years, the new marine satellite will produce a spatial resolution of 1.1km for ocean color from an altitude of 798 km, with an enhanced sounding capability, compared with its predecessor Marine-1A that was launched 5 years ago. It only takes one day for the new satellite to complete an observation cycle, compared with three days needed by the older one.

According to a briefing, Marine-1B is able to produce 1664 elements for ocean color, a great enhancement compared with 1A that only produces 1024 elements. With a widened scanning capability, Marine-1B works in a capacity equivalent to that of three IAs. In addition, the greatly improved data recording capability allows the new system to cover the data over four to five tracks simultaneously, compared with one-track a time by its predecessor.

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