Tamotsu Kanai (Japan) described a novel transcriptional regulator, Tgr (Thermococcales glycolytic regulator) that functions as both an activator and a repressor in hyperthermophilic archaeon *Thermococcus kodakaraensis* KOD1. In response to sugar availability, the Tgr was shown to simultaneously control both glycolytic and gluconeogenic metabolism via direct binding to the Thermococcales glycolytic motif (TGM). Phil Wright (UK) discussed the potential of alcohol metabolism in crenarchaeon *Sulfolobus solfataricus* that possesses 13 putative alcohol dehydrogenase (ADH) genes. This bacterium is able to metabolize and survive solely on ethanol or *n*-propanol as carbon source, and zinc-dependent alcohol dehydrogenases, ADH-10 and the putative ADH-2 were shown to be integral to ethanol and *n*-propanol metabolism. Patrick Forterre (France) presented an updated phylogenetic analysis of gyrase and the archaeal domain. Reverse gyrase was suggested to originate from a branch common to Crenarchaea and Euryarchaea, and the mesophilic archaeon *Cenarchaeum symbiosum* could form the third archaeal phylum.

The poster session provided a sufficient time for interaction with scientists working on various aspects of thermophiles ranging from isolation, identification and characterization of newer heat-loving microbes, to the structural determination and directed mutagenesis of their thermostable proteins/metabolites to improve their performance, and their potential applications in biodegradation, oil recovery, ethanol, hydrogen and enzyme production and others. The conference successfully highlighted the recent advances, but also pointed out that much about the microbial world in hot environments remains unexplored. The tenth and eleventh thermophiles conferences will be held at Beijing (China) and Montana (USA) in 2009 and 2011 respectively.

ACKNOWLEDGEMENT. I thank Mr Pradeep Kumar for help in preparing the report.

T. Satyanarayana, Department of Microbiology, University of Delhi South Campus, New Delhi 110 021, India.
e-mail: tsnarayana@gmail.com

MEETING REPORT

Science and technology in Karnataka*

A one-day State-level conference on 'Science and Technology in Karnataka: Past, Present and Future' was recently organized in Bangalore. Eminent scientists and technocrats of Karnataka who are internationally renowned in their fields were invited as resource persons to deliver special lectures. Achievements made in the State during the last 50 years in various fields of science and technology (S&T), the present status and future scenario were lucidly explained by each one of them during their presentations.

In his welcome address M. R. Gajendragad (Member, Karnataka Science and Technology Academy (KSTA)), explained in brief about the activities of the Academy. The State Minister Ramachandra Gowda, inaugurated the conference and gave an overview on S&T in ancient India and S&T initiatives and programmes of the Government of Karnataka. He also unveiled the website of the KSTA http://kstacademy.org.

C. N. R. Rao (JNCASR, Bangalore), Chief Guest at the inaugural function, released the first volume of the quarterly journal of the Academy edited by P. S. Shankar. In his keynote address, Rao delved on different aspects, including poverty, equity between the poor and rich and how to compete with Western countries. While providing the statistics of contribution to science by Indian scientists, he noted that it is 2.74% quantitatively and only 0.5% qualitatively. Contribution to scientific research by Indian universities was 60% in the 1950s, which has now come down to 10%, he revealed. India's contribution to science was far better in the 1980s as universities contributed a great deal and that trend needs to be revived, he said. Rao regretted to mention that India spends only about 3% of its GDP on education, while China and South Korea spend 6% each. India should at least spend 5%, which would hopefully help in the development of education in the State. 'We need to catch up with other countries which are ahead in education' Rao opined. He felt sorry to mention that there is no separate budget for research in our universities. Democracy and science are the two important cornerstones for development of any nation, and according to Rao, finding even a single new idea is a big contribution to science. His advice to the young researchers/scientists was to work, finish and publish their findings without wasting time. According to Rao, India is on a low profile in three fronts: (i) number of Ph Ds in science, (ii) number of papers submitted and published, and (iii) number of universities contributing to scientific research. He compared India with Brazil, China, South Korea and the US on science indicators and found that India was ranked below all of them. If India has to do well in science, we should have more resources, as well as commitment and dedication to the scientific spirit. Many more young people need to come into science, he urged.

U. R. Rao (Chairman, KSTA), in his presidential address, gave an account of various action plans taken up by the Academy since its inception in September 2005 under his Chairmanship. The Academy has taken up various activities to popularize S&T and to create awareness about the innovations in these fields among the students and public especially those living in rural areas. To mention a few – conducting science quiz competitions for high-school students, science exhibition for degree students, training for high school teachers/students, institu-

*A report on the one-day State-level conference on 'Science and Technology in Karnatak: Past, Present and Future' organized by Karnataka Science and Technology Academy (KSTA), Department of Science and Technology, Government of Karnataka on 23 August 2007 at Central College, Bangalore.

tion of scholarships for science graduates, arranging special lecture series in basic science subjects for postgraduate students of science in six universities of the State, taking mobile laboratories to village schools, identifying the achievements of research institutions and awarding prizes, implementation of S&T policy, encouraging rural young researchers by awarding prizes, establishment of a science city, giving suggestions for establishment of science centres at regional and sub-regional levels, and conducting annual S&T conferences in different district headquarters of the State. Rao mentioned that this workshop, organized for teachers, university teaching faculty, scientists, representatives of government departments and NGOs in the State – is the first of its kind in the country.

After inauguration of the conference, the technical session was held. There were nine special lectures on different aspects of S&T, which were delivered by experts in the field. A brief description of which is highlighted in the ensuing sections.

In the first special lecture of the technical session, U. R. Rao delivered a talk on 'India in the exciting space frontier'. He deliberated on four decades of the Indian space programme, role of space technology for developmental programmes for resource management, telecommunication, drinking water supply, poverty eradication, literacy, disaster management, telemedicine, weather monitoring, etc. India's first mission to the moon and future plans were also lucidly explained by him. He also delved on colonization of Mars by man.

A talk on 'Energy scenario' was given by M. R. Shrinivasan. The facts and figures about various energy sectors as revealed by him are: coal, 50%; oil and gas, 45%, and others, 5% as energy resources. In the production of electricity, the contribution of coal was 75%, hydropower 15%, gas 5% and others 5%. Oil would get exhausted in another 10–15 years and gas in another 20–25 years. Hence, he pointed out that there is an urgent need to switch over to non-carbon mode of energy sources such as hydropower, nuclear, bio-fuels, wind, solar energy, etc. He strongly felt that the use of solar energy should be made mandatory in cities.

A talk on 'Aeronautics developments: Past, present and future' was delivered by Roddam Narasimha (JNCASR, Bangalore). According to him, even though we are up-to-date in aeronautics research and design in the country, we lag behind in the civil aviation sector. He explained various designs and the materials used in different prototypes. He lamented that some of the tested prototypes were not yet commissioned. Designing, development and delivering aeroplanes in time are the three key issues in this field, he stressed.

In the second session, 'Road map for evergreen revolution' was the first lecture by R. Dwarakinath (UAS, Bangalore). The main points to be noted in his lecture are: (i) agriculture policy was introduced four times in Karnataka, (ii) it is essential to utilize the available technology properly, (iii) seed and fertilizer are responsible for the green revolution, and (iv) revolution cannot be continuous but the policy can be. He wondered whether there could be 'Ever Green Revolution', as revolutions are transient!

Deviprasad Shetty (Narayana Hrudayalaya, Bangalore) held a video-conference on 'Emergence of Karnataka in healthcare facility'. He explained about Yashaswini – a successful collaborative healthcare programme by the Government of Karnataka and Narayana Hrudayalaya for the low-income group people of the State. Documentaries on children and cardiac ailment, rural healthcare, open heart surgery, etc. were also presented. Shetty illustrated the importance of micro health insurance in rural healthcare programmes with a case study in Amethi constituency, Uttar Pradesh. He also spoke about the importance of telemedicine in rural healthcare and the commendable services rendered by Narayana Hrudayalaya.

Another lecture on 'Knowledge-based villages in Karnataka: Twenty development paths for implementation' was delivered by Chidananda Gowda (Kuvempu University, Shimoga). He reminded all that India belonged to the farmers as stressed by Mahatma Gandhi. In order to annihilate the problems faced by the farmers, Gowda opined that efforts should be made to provide basic requirements such as availability of good quality seeds, sufficient water for irrigation, maximum yield, reasonable price, proper roads, electricity, agro-food processing facilities, etc. He also mentioned that an enormous quantity (one-third) of food products gets spoiled every year due to lack of storage facility. The agriculture sector should draw lessons from the success story of the dairy sector in the country, he opined.

T. K. S. Gowda (UAS, Bangalore) delivered a talk on 'Biotechnology in agriculture'. He touched upon five important areas of biotechnology, namely micropropagation, diagnostics, fingerprinting, molecular markers and transgenics. He emphasized that the barriers between sciences – medicine, veterinary and agriculture – are removed in biotechnology. He gave an account of the various ongoing research activities in the field of biotechnology in the country in general and in the State in particular. The scope and the expected developments in the near future in the field of biotechnology were also highlighted by him.

A lecture on nanotechnology was delivered by G. V. Shivashankar (NCBS, Bangalore). He elucidated the origin and growth of nanoscience and technology, nanomechanics, tools, laser traps, biosensors, nanotubes, and applications of nanotechnology in medicine, manipulation and visualization of matter on the nanoscale.

The last lecture was on 'Intellectual property rights and patents' by Nandish Hiremat (National Institute for Rural Banking, Bangalore). He explained about WTO, GATT, copyright, patent, trademarks, trade secrets, industrial designs, etc. Hiremat stressed that public–private partnership is essential for the growth and development of S&T in any country. He said that the number of patents obtained by Indians was minuscule compared to advanced countries and that countries like China, South Korea, North Korea and Brazil have more patents than India. He pointed out that patents may have global applications but there is no global patent as such.

About 600 people, including teachers from various schools, teaching faculty from colleges and PG departments, scientists from research institutions/organizations and Government Departments of the State participated in the Conference. The conference was successful in highlighting the aims and objectives of the KSTA.

K. S. Jayappa, Department of Marine Geology, Mangalore University, Mangalagangotri 574 199, India.
e-mail: ksjayappa@yahoo.com