In this issue

Charles Townes

Prof. Charles Townes is one of the remarkable scientists of today. He was among the first to use molecules for making electronic device. In 1951 he wrote his paper on the maser and later in 1958 he wrote his famous paper (with Schawlow) which led to the invention of laser. For this he was awarded the Nobel Prize. With coming of many honours the US wanted to 'use' him. He was appointed Prevost to the reputed Massachusetts Institute of Technology and also made a member of the science advisory council to the president of US. He gave up all these administrative chores, took up a Professorship at Berkeley to go back to science. What a reentry it was for him, he made one of the most outstanding discoveries of this era, molecules in space. *Integrity* is the word that could describe Charles Townes. When I heard his lecture 'Surprise and sociology in multidisciplinary sciences' (reproduced on **page 116**) in Sydney, I was so impressed with its philosophical importance, that, I felt, that all our administrators of science and scientists (many of whom are administrators) must read this article. It contains many interesting personal experiences and many charming but illustrative anecdotes. I reproduce below the speech that Dr Bob Frater, Director of CSIRO Institute of Information Science and Engineering, made while introducing Townes when he delivered his lecture: 'Professor Charles Townes is from the Space Science Laboratory, University of California, Berkeley. It is clear that, throughout his life, Professor Townes has been attracted by a series of fundamental challenges. He was already an acknowledged molecular spectroscopist when, in 1951, to solve the problem of short wavelength oscillators, he conceived a system for using excited ammonia molecules that became the ammonia beam maser oscillators. That had far-reaching benefits in science. In 1958 he followed this by publishing a paper with his brother-in-law, Arthur Schawlow, that laid the foundations for the development of the laser. These two activities, flowing as they did from the pursuit of the most fundamental physics, paved the way for some of the key elements of modern communications.'

'He turned his spectroscopic interest to radio astronomy and discovered that interstellar molecules, like water, were natural masers. There is a story about one of Charles' students who was looking for the water molecule in Orion. The student was astounded by the strength of the signal he received, and I'm told that he rang Charles saying: "It's raining in Orion!" More recently Charles Townes has turned his attention to the application of radio astronomy techniques to the infrared at the 10 m wavelength – a hundred times shorter than the shortest wavelength normally used by radio astronomers. He has spent the past fifteen years, at any age when most people would be quietly retired, on heterodyne interferometry. The results are unmatched in accuracy and resolution!'

S. R.

Changing landscapes of Uttar Kannada

With over 80% of its 10,000 sq. km area under dense evergreen forests, Uttar Kannada is one of the most richly forested districts of India. Over the last two decades, however, there has been an inexorable decline in the forest cover, primarily due to the Kali Hydel Project. What exactly is the extent of the damage to the forests? The pro-dam and the anti-dam lobbies are generally known to give widely differing estimates. The labour, cost and time involved in making an independent survey are unfortunately prohibitive.

An extremely effective solution to this dilemma using satellite imagery and photo-interpretation techniques has been illustrated in the article by V. R. Hegde, V. Shreedhara and V. S. Hegde on **page 128** of this issue. By combining information from a number of sources such as the Survey of India toposheets, district gazetteers and other published material, the authors have been able to assign land-use patterns corresponding to forest cover, agricultural land, water bodies, settlements, etc. to specific portions of satellite photographs of the district, with a high (85%) degree of accuracy. An analysis of nine satellite images of Uttar Kannada, spanning the period 1975–1990 enabled them to obtain reliable estimates of the extent of changes in the land-use/land-cover patterns.

The most drastic change of course is a reduction of about 100 sq. km of forest lands in the Kali basin area, and the corresponding increase in waterbodies/reservoirs. Another crucial and grim feature uncovered by this study is the fact that none of the reservoirs has so far filled up to their estimated capacity. A more positive aspect is the disappearance of the deforested/cleared area, due to the successful raising of plantations.

Hegde *et al.* have also used their technique to examine the impact of the proposed Bedthi and Aghanashini Hydel projects, and have provided the estimates of the extent of deforestation and, more importantly, of the magnitude of the rehabilitation problem. With many eco-destructive projects currently on the anvil, the potential utility of satellite imagery-based analysis for providing speedy and reliable impact assessment can hardly be overemphasized.

N. V. J.