



DREAM 2047

December 15, 1998

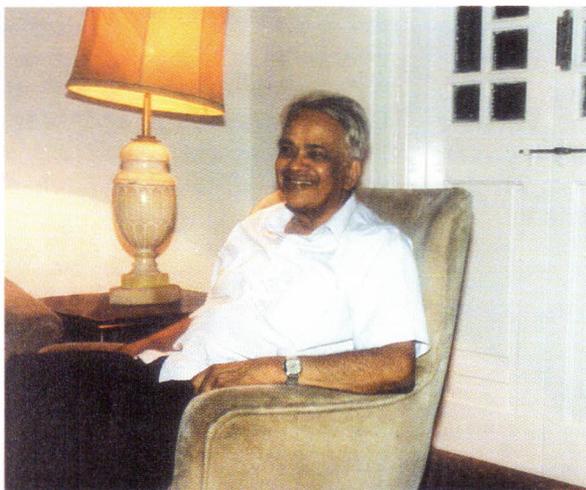
Vol. 1

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VP News

Vigyan Prasar has a new President

Shri M V Kamath is the new President of Vigyan Prasar. Born at Udupi in Karnataka, he is a journalist of great repute and much recognised for his services as an editor to the Free Press Group of Papers and the Illustrated Weekly of India. His career as a journalist spans many years and he continues to write regular columns for periodicals. He



has also had a teaching stint at Schools and Institutes of journalism and Communication and has been the Honorary Director of Manipal Institute of Communications, Manipal. He has to his credit over 30 books including *The United States and India 1776-1976*; *Kissinger, The Incomplete Diplomat*; *The Innovative Banker*; *The Journalist's Handbook*; *The Pursuit of Excellence* and *Rediscovering Karnataka*.

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Strange are the ways ...

Vigyan Prasar VHF ham repeater station becomes operational

The Vigyan Prasar and NCSTC VHF ham repeater station, VU2DLR, became operational on December 9, 1998. Presently it is being operated on an experimental basis from the Technology Bhavan with a low antenna height (approximately 45 feet only). The repeater can be accessed by any licensed ham radio operator operating in Delhi. Uplink frequency of the repeater is 145.00 MHz and the downlink frequency is 145.60 MHz. Mobile VHF ham radio operation in semi-duplex mode is thus made easier at Delhi. Even with its low antenna height, it is being accessed by hams from Ludhiana, Chandigarh, and Agra. □

Watch out for the Vigyan Prasar's Stall at
the first ever Indian Internet Book Fair

1st January to 1st March 1999

<http://www.indiabookfair.com/stall8>

... think scientifically, act scientifically ... think scientifically, act scientifically ... think scientifically, act ...

Let's Make Counting In Hindi Simpler and Friendlier

Hindi (along with English) is our country's official language, and is used in everyday life by the largest number of people in our population. We also celebrate a Hindi day/week every year to promote use of Hindi in official work. One frequently hears exhortations from different quarters to the effect that, to promote wider acceptance of Hindi as a link language, it needs to be simplified by including words and expressions from other Indian languages, including English. This happens to be a controversial issue. But we have no intention of either adding to or reviving any controversies. We merely want to pass on a very sensible suggestion concerning 'counting in Hindi' which can make life a lot easier for those trying to learn the language for practical, everyday use. The suggestion came our way quite accidentally during an official meeting (which, incidentally, had nothing much to do with the subject of language).

All of us know that, among other things, non-Hindi speaking

individuals find it very difficult to master the correct use of gender and the correct system of counting in Hindi. We don't have anything at present to suggest about the correct use of gender!

But we do have a very simple and practical suggestion to convey on the system of counting. To learn counting, in any language, one has to begin by learning the basic numerals. In Hindi, they are: shoonya(0), ek(1), do(2), teen(3) char(4), paanch(5), chheh(6), saat(7), aath(8), nau(9), dus(10), gyarah(11), barah(12), terah(13) etc. Thereafter, in many languages, it is a relatively simple matter to learn to count further following a simple, easy to remember, system. Not so in Hindi! One would have to learn to count numbers all the way till ek sau(100), before one can hope to master the counting system — not to mention tough ones, in between, like unnassi(79) and navassi(89), which can be confusing at times even for the Hindi-speaking persons. But here is a simple suggestion which can make things at once simpler and easy to learn and master:

After counting till nine, i.e. nau(9) in Hindi, we say ek-tee(for ten), ek-tee ek (for eleven) ... ek-tee nau (for nineteen) and then do-tee (for twenty), do-tee-ek (for twenty one), teen-tee-ek (for thirty one), ... nau-tee-ek (for ninety one), nau-tee-nau (for ninety nine) and dus-tee or ek sau (for hundred) and so on and on. In this system, 5679 will be spoken as paanch hazaar chheh sau saat-tee nau. And 15689 would be spoken as ek-tee-paanch hazaar chheh-sau aath-tee-nau, instead of 'pandrah hazaar chheh sau navassi'. Using this suggestion, we go by the place value system; it is easy to remember, quite scientific and not at all confusing. (see table below)

What do you think? If you like the idea, let us spread it and try getting more and more proponents behind it, to press for its official adoption everywhere. This will enormously help people who are trying to learn the language and master the counting system in Hindi. We would love to hear from our readers.

	Present	Proposed	Present	Proposed	Some Examples	
0 shoonya 1 ek	10(dus) 11(gyarah)	Ek-tee Ek-tee-ek	19 (unnis) 28 (unntis)	ek-tee-nau do-tee-nau	340 6,581 paanch sau	teen-sau-char-tee chheh hazaar
2 do 3 teen	12 (barah) 13 (terah)	Ek-tee-do Ek-teeteen	39 (untalis) 49 (unnchaas)	teen-tee-nau char-tee-nau	67,890 hazaar	aath-tee-ek sau-aath-tee-ek chheh-tee saat
4 char 5 paanch	: 20 (bees)	do-tee	59 (unsath) 69 (unnhattar)	paanch-tee-nau chheh-tee-nau	27,69,799	aath sau nau-tee do-tee-saat-lakh chheh-tee nau hazaar saat sau nau-tee nau
6 chheh 7 saat 8 aath 9 nau	21 (ekkis) : : 31 (ekktis) 41 (ektalis) 51 (ekyavan)	do-tee ek teen-tee ek char-tee ek paanch-tee ek	79 (unasi) 89 (nawasi) 99 (ninyanwe) 100 (ek-sau) 1,000 1,00,000 1,00,00,000	saat-tee-nau aath-tee-nau nau-tee-nau dus-tee (ek sau) hazaar lakh crore		

NKS

Programmes on the anvil

Amateur Radio Club & Electronics Laboratory

Electronic devices have made amazing inroads into all activities of man. Be it in medicine, communication or for that matter in all business and industrial ventures their impact is there for all to see. While the impact is amply visible in urban areas, the rural scenario is not bereft of its influence. The revolutionary communication technologies together with advances in satellite communication, which have linked the remotest villages of the country, are good examples.

Now a days there is hardly a household without an electronic gadget. When such is the case, an average individual would surely benefit by having at least a rudimentary knowledge of electronics. Those few, who have chosen the science stream for formal education, are imparted with training in basic electronics, but there are lots more who may not encounter electronics in the course of their study. It is this group that Vigyan Prasar intends to majorly target.

"Catch them young" is a phrase very popular with all educationists. The present education system provides ample scope for organizations like ours to contribute towards strengthening and supplementing the learning



The 40M/7 MHz Ham CW low power Transceiver (for Morse code) developed at Vigyan Prasar



Inside the 7MHz CW Transceiver

experiences of children by designing well focussed programmes, especially in electronics, that encourage self-learning via electronics kits and toys; initiation into hobbies like amateur radio; etc.

Efforts in this direction are underway at Vigyan Prasar. Realizing that the number of active hams in the country is far from satisfactory, intensive programmes are being chalked out to popularise the exciting hobby of amateur radio. According to the Indian Wireless Telegraph (Amateur Service) Rules 1978, "Amateur Radio Service" means - "A service

of self training, inter-communication and technical investigations carried on by amateurs that is by persons duly authorised under these rules, interested in radio technique solely with a personal aim and without pecuniary interests." An examination conducted by the Ministry of Communications tests awareness in basic radio theory; rules and regulations for setting up a ham radio station and the ability to send and receive Morse Code, before awarding the Amateur Radio Station Operator's Licence. For a new entrant, intensive training for about one and a half weeks is sufficient to become familiar with all these. Organising such training programmes is thus a major activity that Vigyan Prasar intends to pursue, especially through VIPNET (please see November issue).

The electronics laboratory at Vigyan Prasar is sprucing up to meet the requirements of youngsters. Educational toys and kits are gaining popularity as they offer greater challenges when compared to the often less demanding schoolwork. Fusing a learning component with play and ensuring that children have access to educational kits and toys is the first task for VP's electronics lab. The details of such initiatives either being undertaken or being conceptualised will find elaboration in subsequent issues.

For more information regarding ham training and examination syllabus (and a free booklet titled "Be a Ham! Talk to the World!!), please write to: **Shri Sandeep Baruah, Vigyan Prasar, C-24, Qutab Institutional Area, New Delhi - 110 016.**

Contributions to the popular science section of Dream 2047

In line with our objectives and of course the name of our newsletter Dream 2047, we would like to highlight, in the popular section, the S&T achievements of our nation. This would then act as a basis for our dreams for the year 2047. It would be ideal if scientists and technologists who are really instrumental in shaping up the S&T infrastructure of our country could contribute to this newsletter, thereby presenting, in the proper perspective, the true S&T scenario. It can be said here that the general awareness of such aspects is depressingly low and we are keen on filling the gaps. We invite contributions from our esteemed readers. Contributors can elaborate on any of the following:

- Outstanding past and present achievements of Indian S&T.
- Scientific Institutions that are engaged in R&D in frontline areas and work being done in such places.

- Work being done in institutions that are adopting scientific techniques to improve the living conditions of our people
- Inventions/discoveries by our scientists.
- Contributions of Indian scientists worldwide.
- Significant efforts at science popularisation (organisational and individual).

Guidelines for contributions:

- Contributions can be either in the electronic format (preferred) or typed in double space.
- The length of the write-up can be about 500 words. Illustrations to accompany the write-up would be welcome
- The decision of the Editorial board would be final.

All contributions will be acknowledged

Development and Valuation of Urban Properties

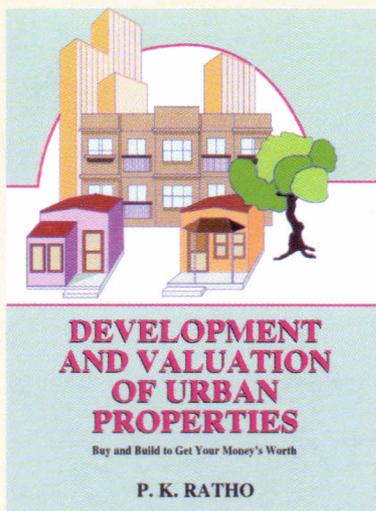
Buy and Build to get your Money's Worth

P.K. Ratho

Rs.250

Pages 419 + xxii (Hardcover)

Any person making a decision to buy, sell or develop an urban property stands to gain or lose at least a few thousands of rupees. Evaluation is based on cost-benefit analysis. Benefits accrue when a building performs the intended services. Such benefit can be valued. The book explains how to evolve an appropriate building and value an urban property. Starting from what is a property, its development and its market, it explains how to apply the development control regulations to maximise the value of the development. It is a user's guide for architects, engineers and valuers and outlines, step by step, how to apply the principles in practice. It explains how to determine the market value of an urban land; how to evolve an integrated set of building specifications based on value engineering and how to estimate the market value of a building and a flat. It outlines an appropriate method to classify neighbourhoods and value urban lands, buildings and apartments.



Actual case studies are cited.

Real estate development is a business. When developed with appropriate technology, the process yields an appropriate value of land to the owner and a handsome profit to the developer. At the same time, it gives satisfaction to the purchaser that at an affordable cost he is able to stay in a place of his choice and in an apartment with specifications in accordance with his requirements. The book explains the real estate business process and is followed by valuation of land by development method. State-of-the-art technologies for developing an urban property have been explained.

Divided into three parts, where the first explains the principles of urban property development

and valuation; the second provides a step by step approach to determine the fair market value of an urban land and finally the third part explains the economic aspects of real estate development as a business. Together with a compilation of relevant laws and Acts, tables and figures which summarise issues of import, as for instance: permissible ground coverage indicating the floor area ratio, height and number of dwellings in a residential zone; relationship between soil characteristics and shear failure; minimum and maximum scopes of sewerage lines; effect of length and width of a plot and width of road; chronological variation in market rates of HIG and MIG flats in city 'A'; etc. The book is self contained and of great utility to all.

In the words of M.K. Koundinya, Addl. Director General Works (PWD, Retd.): "It may not be difficult to find a book on architecture, the National Building Code, Bye-laws or even a book on valuation. However, it is difficult to find a book that integrates all the information necessary to develop on urban property and value it. It is heartening to see that the author has adequately and completely covered all these aspects in the book." □

ABOUT THE AUTHOR

For over 35 years, Profullo Kumar Ratho has worked as an engineer and has risen to the post of Additional Director General of Works in the Central Public Works Department. He graduated in Civil Engineering in 1962, from the Utkal University. In Japan, he acquired expertise on Bridge and Structural Engineering. For more than

a decade, he planned, designed and supervised the construction of buildings in many parts of India. Shri Ratho also has vast experience as a valuer. He has to his credit several papers, many of which were published by the Institution of Engineers and the Institution of Valuers. □

India's S&T achievements

It is often remarked that the Indian civilization has progressed with an unbroken continuity of some 5000 years and continues to be as vibrant as ever. Besides being home to very many original schools of thought, its achievements in the bygone era have attracted worldwide attention. It is not unusual for people to opine that there is hardly any truth that was unknown to our ancient sages. Their grasp of astronomy, mathematics and medicine was surpassed by few.

But what is the present scenario vis-a-vis science & technology? What are the premier scientific institutions of our country? What have been the contributions of India's large scientific manpower? Do people know about our S&T institutions and the work going on there? Perhaps not! Through this column, we hope to present, month after month, some of the achievements of premier S&T institutions of India.

C-MMACS

The CSIR Centre for Mathematical Modelling and Computer Simulation (C-MMACS), situated at Bangalore is a part of the Council of Scientific and Industrial Research (CSIR) family and has a mandate for taking up major mathematical modelling and simulation tasks of interest to CSIR and to provide value addition to CSIR products and services by innovative applications of mathematical modelling. Working in close association with various CSIR laboratories and other organisations, the major scientific achievements of C-MMACS are in the areas of Ocean Modelling ; Atmospheric Modelling ; Lithosphere Modelling; Dynamical Systems Modelling and Industrial Computational Mechanics

Climate modelling has been receiving much attention. A good understanding of the atmosphere-oceanic-lithosphere system can lead to reliable models of atmospheric circulation which is essential for forecasting and rainfall pattern prediction. This is especially needed in a country like ours which is dependent, to a large extent, on agriculture. Besides, tropical dynamics play a major role in world-climate. The heating and associated dynamics in the tropics exhibit a wide range of temporal and spatial variabilities and understanding these variabilities is the basis for developing better simulation and prediction models.

In the area of ocean modelling, the Modular Ocean Model (MOM) for simulation studies of circulation in the Indian Ocean has been optimised. The marine ecosystem model has been tested with the Arabian Sea Joint Global Ocean Flux Studies (JGOFS) observations of marine productivity and thermal studies. The results have been embedded in the MOM code system and numerical simulation of the coupled physical biological processes in the Indian Ocean are being carried out. Mention may be made of the waters off the Somali Coast

Round-up

Software to see tumours in three dimensions

Scientists have developed an indigenous software that helps doctors see a tumour in three dimensions and judge how far and deep radiation given for treatment has reached the affected organ. The system was developed under a project of the Department of Electronics (DOE) in collaboration with the Centre for Development of Advanced Computing (C-DAC) in Pune and a Delhi based firm Messrs. TSG Integrations.

DNA vaccine for hepatitis B

Indian scientists are testing an indigenous anti-hepatitis vaccine based on DNA, the genetic material in cells. DNA vaccines, in which the genetic material of the microorganism is introduced directly to generate antibodies and an immune response, have stirred intense interest among immunologists the world over in recent times. Researchers at the Sanjay Gandhi Post Graduate Institute of Medical Sciences, Lucknow have developed a DNA vaccine against hepatitis B, which has been tested on mice. India initiated research in this frontier area of science only some years ago, and DNA vaccines against Kala Azar, Japanese encephalitis, malaria and hepatitis B are under study. Laboratories engaged in this research include the Indian Institute of Science (IISc) in Bangalore and the National Institute of Immunology (NII) in New Delhi.

CBRI develops new technique to extinguish fires in oil tanks

A new technique to extinguish fires in oil storage tanks has been developed by scientists at the Central Building Research Institute in Roorkee. The technique, called direct foam injection (DFI), injects commercially available low-cost foam directly into the zone of fire inside stationary tanks thus extinguishing the fire.

New treatment of heel ulcers in leprosy patients

The Central Jalma Institute for Leprosy in Agra, under the Indian Council of Medical Research (ICMR), has used a technique first developed in the U.S., called "sure-closure skin stretching system" to treat foot ulcers in leprosy patients. These ulcers are usually resistant to healing, leading to loss of sensation in the area, loss of heel pad fat, and skin defects. The device basically works on the principle of tissue expansion and has been used for the first time on patients with leprosy. □

in the Arabian Sea which is perhaps the most active region of biological productivity in the world. The plentiful availability of nitrates which are upwelled during the South West Monsoon is one of the primary reasons for the high primary productivity. A detailed dynamical study of this ecosystem has been carried out.

The South Indian Strain Measurement Experiment (SISME) is another activity of importance which aims at measuring extremely slow earth movements and modelling the accumulation rate of crustal strain in South India as a basic approach to inferring earthquake risk in the region. The SISME has many collaborators and is remarkable in many ways. It has provided valuable information on the average crustal strain rate in a very short interval of time and the first directly measured velocity of the Indian plate towards Tibet. More importantly, it uses technology based on Global Positioning System (GPS); a satellite based sophisticated method of accurate measurements. In all 24 GPS points were established in South Indian Peninsula for the experiment. The experiment has shown evidence of folding of the Southern Indian shield.

The rate of collision between the Indian sub-continent and Southern Tibet determines the recurrence interval of great earthquakes beneath the Himalayas. Initiating GPS measurements at 10 stations in the Himalayan region, the kinematics of deformation of the Garhwal-Kumaon Himalaya has been quantified.

These are just a few of the activities of the Centre. Other investigations include numerical simulations for motion of a sphere in an inhomogeneous viscous fluid; modelling and computer simulation of multi-layered road systems; behaviour of Masonry infilled RCC frames; strength contours of leather surfaces; and more. The computing environment for such activities is rather demanding and the Centre is equipped with high performance computing and networking resources that include the Convex C3820 supercomputer and workstations such as DEC Alpha, Ultra Sparc and SGI Indy, etc. A Local Area Network (LAN), a robust Internet link, and other usual computer accessories complete the computing environment. □

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Strange are the ways ...

In the open scrubs of Southern Australia one finds the mallee fowls, birds that have discovered a perfect technique for incubating their eggs. The master technician is the male bird who maintains the incubator for months together. His work begins in winter when he digs a huge pit in the sand measuring about four feet deep and fifteen feet wide and fills it up with vegetation. In the centre a pit about a foot deep is made which is to hold the eggs. He waits for the showers in spring to completely moisten the pile before covering it with sand. The vegetation now begins to rot and the mould gets warm. When the female is ready the sand is cleared to expose the rotting vegetation. After the egg is laid, the mould is again covered. The male now carefully monitors the temperature by sticking its beak into the pit. If the mould overheats



Mallee fowl; Courtesy: David Attenborough - *The Trials of Life*

due to some very active fermenting, some sand is kicked off for the heat to dissipate. As the fermentation process slows down, the heat produced is reduced, but by now the summer would be intense requiring more sand to be heaped on to prevent overheating. Soon the summer gives way to chiller days. To capitalise on the remaining sunlight, the sand cover is removed during the day and put back in the night. During the entire season, the temperature is maintained at about 34°C. Management is solely done by the male who even reserves the right to drive away the female if she chooses to lay the egg when exposing the mould would be hazardous to the temperature maintenance. If the female is healthy and has enough food, in one season as many as 35 chicks can be produced. The frequency of egg laying can range from every other day to once in a fortnight. However, by the time she lays the last egg, the first egg would have long hatched. Fascinating! □