



CMFRI newsletter



**SPACE TECHNOLOGY
IN
MARINE RESOURCES
MANAGEMENT**

Space Technology is being increasingly used in the management of marine living resources. The Indian Remote Sensing Satellite expected to be launched in 1986 will be a major step in the overall programme for space applications in India. CMFRI has done some pioneering work in this line in the country in collaboration with the Space Application Centre, Ahmedabad and the National Remote Sensing Agency, Hyderabad and availed the opportunity offered by the Joint Space Programme in which the first Indian Cosmonaut Sqn Ldr Rakesh Sharma participated.

The TERRA Experiment

Synchronizing with the overpass of the space craft Salyut-7, observations were carried out, from 7 to 9 April, off Cochin and Quilon. The programme was organized to collect sea-truth data and aerial observations.

For the collection of sea-truth data, CMFRI's Research Vessel *R. V. Skipjack* and the smaller vessels *Cadalmin I* and *IX* were employed along with the vessel *Matsya Varshini* belonging to the Fishery Survey of India. The vessels stationed off Cochin and Quilon at different depths, upto 100 metres. The parameters measured were chlorophyll, particulate organic matter, upwelling and down welling, irradiance, temperature and related features.

For the aerial observations, an aircraft of the National Remote Sensing Agency was used. The ocean colour radiometer (OCR) mounted on the aircraft was operated and photographs were also taken. Observations on fish schools were made from the aircraft.

Multi-spectral photographs, when received from Indian Space Research Organization, will be used to study the distribution data of productivity parameters and the pelagic resources through interpretation of satellite imageries on the basis of the sea-truth data collected and the aerial obser-

ventions made during the overpass of the spacecraft. CMFRI also carried out similar work on a smaller scale off Madras and Visakhapatnam using the *Cadalmin* vessels.

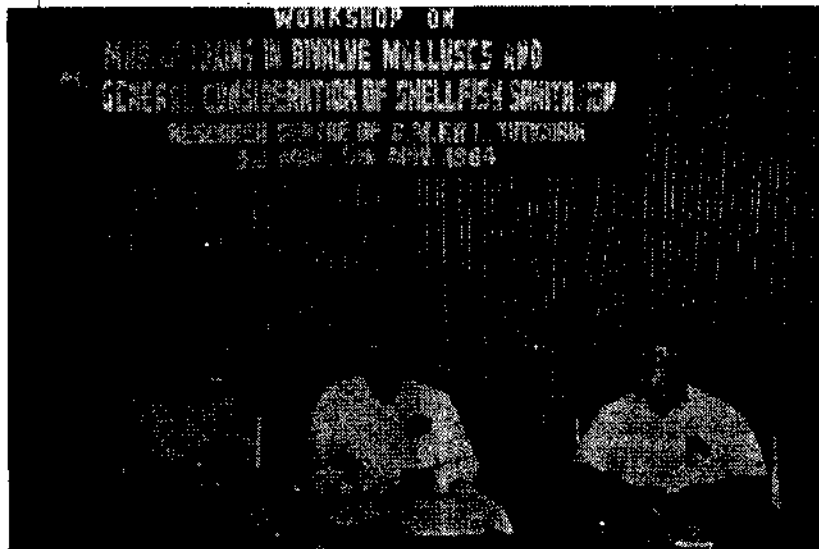
During October-November, a team of scientists from CMFRI will conduct a survey in the Gulf of Mannar using the ocean colour radiometer of NRSA. The research vessels and the Mobile Laboratory of CMFRI will provide ground support for the survey.



Collection of Sea-truth Data

Through remote sensing and interpretation of satellite imageries, space science and technology have provided new tools to study the ocean dynamics such as waves, currents and circulation patterns which would enable a more realistic forecast of the ocean environment and thereby, fisheries. The remote sensing is done either from satellites orbiting the earth at fixed intervals or from special type of sensors mounted on aircraft which can scan the ocean surface. The satellites that are concerned with remote sensing of the oceans are Seasat, Landsat, Nimbus, Tiros and NOAA in addition to Mercury, Apollo, Soyuz and other multi-purpose satellites. The sensors are cameras, infra-red and microwave radiometers, colour sensors, synthetic aperture image radar, scatterometer, visible IR scanners and meteorological sensors. The oceanic parameters that are determined are temperature, ice cover, radiation budget, wind speed, wave height and surface currents. Landsat imageries in different spectral bands enable detection of phytoplankton distribution in the water as well as in the thermal fronts.

The launching of the Indian Remote Sensing Satellite (IRS) (scheduled for 1986) would enable a more intensive study of the seas around India especially the Exclusive Economic Zone from resource point of view as well as coastal environment. The CMFRI is being geared up for intensive investigations on fishery resources through application of space technology and a Remote Sensing Cell is being developed for this purpose.



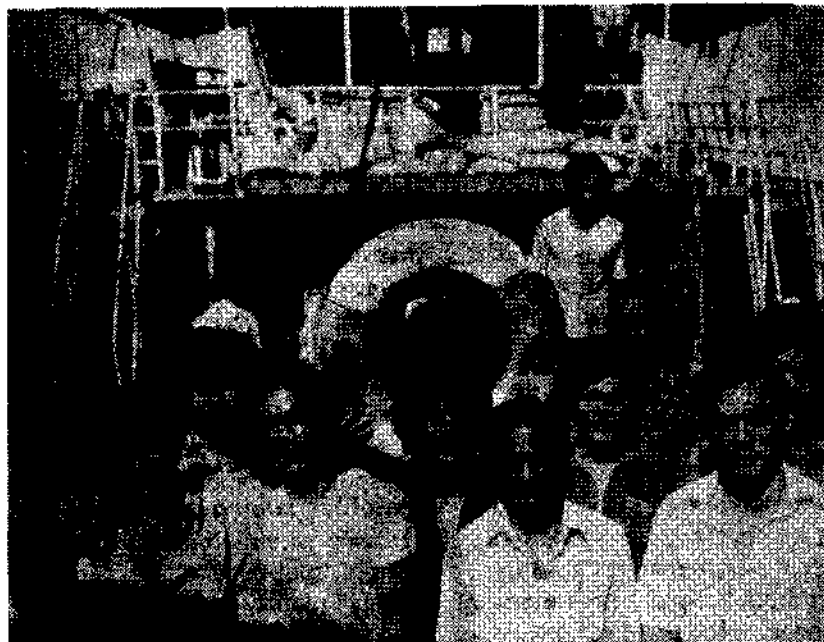
Shri V. Chidambaram, Managing Director, Tamil Nadu Pearls Ltd, Tuticorin with Dr Sammy M Ray and Shri K. Nagappan Nayar at the valedictory of the Workshop

CMFRI Scientist Participates in Chartered Fishing Cruise

Shri Pon Siraimetan, Scientist S-1 at Tuticorin participated in fishing cruise on board the chartered Taiwanese fishing vessel Hwa Kuo No. 2 during 20 December 1983-7 April 1984 in the north-west coast of India. The Hwa Kuo No. 1 & 2, commercial trawlers conducted pair trawling for 110 days continuously. The crew consisted of 19 members each, the Hwa Kuo No. 2 had 14 Taiwanese and four Indians. The 37.11 metre long vessels with fish hold capacity of 150 tonnes could cruise for 90-120 days.

The areawise and depth-wise catch data revealed good fishing grounds off Okha and Sir Mouth where trawling could be done profitably. Shri Siraimetan has collected several samples of commercially important species of fish and squids for biological investigations. He deserves our full appreciation for successful

completion of the long and arduous cruise which requires good stamina and will power to withstand the vagaries of nature.



Shri Siraimetan with Hwa Kuo No. 2 crew

Workshop on Bivalve Molluscs Toxins

A Workshop on Marine Toxins in Bivalve Molluscs and General Consideration of Shellfish Sanitation was conducted by CMFRI at its Tuticorin Research Centre from 3-5 May under the leadership of Dr Sammy M. Ray. Seventeen participants including nine from agricultural and other universities, Central Institute of Fisheries Technology and the Department of Fisheries, Tamil Nadu and eight from CMFRI attended the Workshop. The Workshop dealt with sources and nature of marine toxins in bivalve molluscs, geographical distribution, prevention and control of shellfish poisoning and procedures for monitoring the quality of molluscan shellfish and shellfish growing waters.

Dr Sammy Ray on Shellfish Poisoning

Dr Sammy M Ray Coordinator of Graduate Programme and Acting Dean, Moody College of Marine Technology, A & M University, Galveston Texas, U S A who was on a 12-week consultancy programme at the Centre of Advanced Studies in Mariculture returned to USA on 24 April. Dr Ray gave consultancy in oyster biology and culture. Following are the excerpts of his interview with the Newsletter.

Question: *What are your current research activities in molluscan shellfish poisoning?*

Answer: Currently I am involved in culturing of some of the toxic dinoflagellates with the aim of obtaining crude toxins for use by the coworkers in the University of Texas Medical School and others to determine the pharmacological and toxicological properties and also producing materials for individuals who are interested in studying the chemical structure of these toxins.

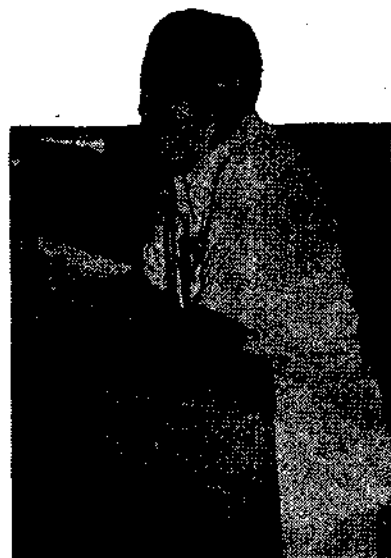
Question: *There have been two incidents of shellfish poisoning in India resulting in some casualties. What are your comments and what measures do you suggest to prevent such outbreaks?*

Answer: The Central Marine Fisheries Research Institute or some public health agency should immediately begin monitoring of shellfish for shellfish poisoning in the Mangalore area in the west coast and the Buckingham Canal in the east coast to determine whether or not toxic levels occur in the shellfish. Since this is a warm area of the world, paralytic shellfish poisoning may not have seasonal occurrences as in temperate regions. I would suggest that oysters and other shellfish be sampled for toxicity using more bioassay on a monthly basis. In case toxic levels occur, the public should be informed immediately of the

areas involved and the public media such as newspapers, radio and television should be involved in warning the general public. I understand that in India most of the shellfish are eaten by villagers who may not have access to these media. Personnel of the CMFRI or the public health department should make sure that the villagers are warned and given a message of the damage. Another thing that should be done is to initiate a survey to determine the incidence, distribution and seasonal occurrence of toxic dinoflagellates.

Question: *What are the procedures adopted in U S A to prevent and control shellfish poisoning?*

Answer: In U S A shellfish poisoning normally occurs during warm season of the year. During the warm period all shellfish that are marketed through commercial sources that are known or suspected for paralytic shellfish poisonings are analysed. If the levels exceeds 400 mouse units/100g of meat, the harvest of shellfish in those areas is prevented. In case shellfish are harvested by sports fishermen, the information regarding the location of toxic shellfish is presented through public media. Signs are also placed in the suspected area. This type of warning continues until the mouse bioassay indicates non-toxic levels.



Dr Ray

We also have marine extension specialists who are associated with the country agents and these agents, during outbreaks of poisonings or diseases, through the public media and personal contact, warn the producers of shellfish that a public health hazard exists.

Question: *You have seen the oyster culture work that is being carried out at Tuticorin. What are your suggestions for strengthening the work on diseases in oysters?*

Answer: Well! I think in Tuticorin, in the area of the oyster farm and in the area of natural beds, you should begin systematic survey of oysters for various parasites. Some parasites are known to occur in Tuticorin area. We have noticed a parasite in the oyster in Tuticorin that is similar to *Perkinsus marinus* which causes extensive mortality in the Gulf of Mexico and the South Atlantic coasts of U S A. Oysters from the farm and from natural beds should be fixed, histological preparations made and examined for parasites.

Turtle Specialist From USA Visits CMFRI



Dr Marie Therese Dimond, Professor Emerita, Trinity College, Washington, DC, visited CMFRI during 28-29 April. Dr Dimond had come to India as a Visiting Professor in the Department of Zoology, Utkal University where she was a Research Associate during February-April 1983. She was also the Guest Professor in the Research Institute, Maharashtra Association for Cultivation of Science, Pune. She was a Visiting Professor in the School of Biological Sciences, Bhopal University for three terms during 1979-82. Currently, Dr Dimond is working on the developmental endocrinology of reptiles, endocrine aspects of calcium metabolism and bone formation in embryonic and juvenile turtles and chicks and effect of incubation temperature on gonadal development of turtles. Dr Dimond gave two seminars on the Effect of Temperature on Turtle Egg Incubation.

Born in 1916 in Alaska, Dr Dimond took her MSc and PhD in animal biology from the Catholic University of America. She was a recipient of the Fellowships of Public Health Research Service under the American Physiological Society, University of Pennsylvania and National Science Foundation Faculty for Marine Biology under the Duke University Ma-

Publication

Mudbanks of Kerala Coast

The mudbank (*Chakara*), an unique phenomenon occurring in the south - west coast of India has evoked considerable interest in scientists ever since it was noticed and the researchers have been striving hard to explain its formation. The fishermen consider it as a bounty from the Mother Sea during the monsoon which precludes venturing into the sea for fishing. Since 1973 mud banks have not developed as anticipated. This combined with extensive erosion has created serious socio-economic problems in the coastal zone.

Being the agency engaged in marine fisheries research CMFRI initiated the study of mudbanks from the point of view of coastal zone management. A team of scientists from different disciplines were engaged to study the mudbanks in detail with particular emphasis on the mudbanks of Alleppey.

The occurrence of creeks on the beaches suggesting the sinking of the coastline and ejection of mud in the form of cones and continuous

oozing of mud through it show beyond doubt that the source of Alleppey mudbank is of subterranean origin, the mechanism of bringing it out being the same as formation of mud cones. Problems pertaining to physical, chemical and biological aspects were investigated in detail by the team. The CMFRI Bulletin 31, Mudbanks of Kerala coast is a comprehensive report of the investigations carried out by the 'mudbanks team.' In the light of these studies, it has been possible to give explanation to the origin, maintenance and dissolution of the mudbanks. The Bulletin also puts forward hypotheses on the physico-chemical aspects of mudbank formation with a critical review and appraisal of earlier theories and a detailed account of the various types of mudbanks.

The Bulletin consists of 12 chapters written by Dr E. G. Silas, Dr A. V. S. Murty, Shri D. S. Rao, Dr C. P. Gopinathan, Shri A. Regunathan and Dr K. J. Mathew. The Bulletin is dedicated to Sir Robert C. Bristow, former Administrator-cum-Chief Engineer, Cochin Harbour who made fairly extensive study on the mudbanks in the context of port management which was published as the History of Mudbanks in 1938.

rine Laboratory, Plymouth, England. Dr Dimond has participated in and directed several training programmes and has number of publications on varied aspects of physiology to her credit. She has also, been the consultant for the Population Food Fund, USA.

Dr Dimond is a member of the Sisters of Notre Dame de Namur since 1939.

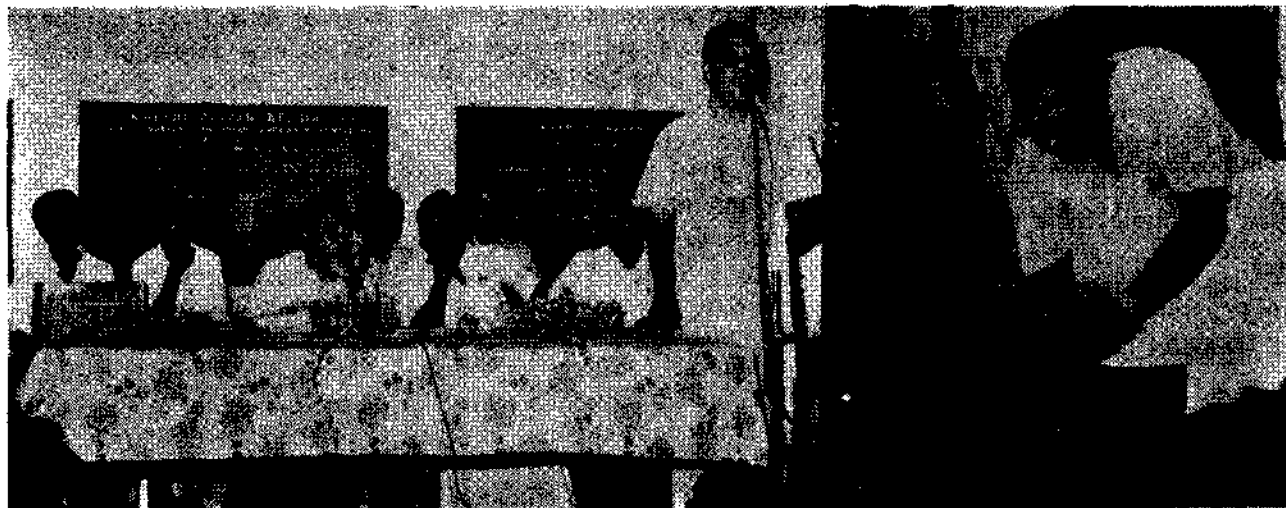


Vanamahotsava Inaugurated at KVK Campus

The *Vanamahotsava* of Vypeen Block was inaugurated at the KVK campus by Shri P. K. Velayudhan, Hon'ble Minister for Community Deve-

lopment, Kerala State by planting trees at the KVK campus and distributing seedlings to the public. A meeting was held in this connection with the District Collector, Ernakulam, as

the President. Joint Director CMFRI, District Forest Officer, Block Development Officer, Vypeen Block and many distinguished persons of the locality participated in the programme.



Tagging Team Released 5000 Tagged Prawns

Encouraged by last year's results which indicated southward migration of prawn the tagging team of CMFRI released about 5,000 tagged prawns, off Calicut in April. Once again there were recoveries of tagged prawns from southern regions thus confirming the fact of southward migration of prawns along the west coast.

Drift bottle releases also have shown that the coastal currents help such southward migration.

CMFRI to Serve as Repository for Tuna Data

The Second Meeting of the STC's Ad hoc Advisory Committee for the Development of India's Fisheries Projects was conducted on 18 May at CIFNET, Cochin. Shri M. S. Muthu, Dr P. Parameswaran Pillai and

Dr V. S. K. Chennubhotla participated in the meeting representing CMFRI. It has been accepted that catch statistics of tunas landed by purse-seiners will be deposited with the NMLRDC of CMFRI.

From the Skipjack

Cruise conducted on board R. V. Skipjack in April assessed the demersal fish resources off Mangalore-Bombay region in 50-400m depth zone. Hydrographic sections off Mangalore and Ratnagiri were worked out and bottom trawl operations were conducted mainly beyond conventional fishing areas to study the distribution of demersal fish. A depthwise analysis of the catch data indicated that the catch rates tended to be higher in 50 - 60 m depth. Deepwater prawns were obtained beyond 100 m. A noteworthy finding was the presence of redshrimp (*Solenocera* spp)

in the upper continental slope off North Canara coast.

Visitors

Cochin

Dr S. Bandhopadhyay and Shri A. Mitra, Assistant Professors in Aquaculture Section at the Indian Institute of Technology, Kharagur.

Dr Amal Datta, Member of Parliament.

Shri B. R. Kaira, Deputy Commissioner (FE), Department of Agriculture, Government of India, in connection with collection of data for EEZ Mission to India.

Karwar

Shri Sanjay S. Gupta, IAS, Special Deputy Commissioner, Karwar, 17 May.

Mangalore

Shri Rasheed A. Bolar,
Bolar Fish Farms, Kankanady,
Mangalore.

Bombay

Mr Boan Soung and his
group, Livestock Department,
Laos.

Mr R. N. Morris, Hay St.
East Perth, Western Australia

Shri H. C. Hingarani, Prin-
cipal, Central Institute of Fish-
eries Education, Bombay.

Dr (Mrs) B. I. Maharajan,
Indian Institute of Technology,
Bombay.

Mandapam

His Excellency the High
Commissioner for Malaysia in
India Mr Razate bin Ismail.

Tuticorin

Professor Dr S. C. Bargava,
Indian Agricultural Research
Institute, New Delhi.

Dr C. P. Wood, Tropical
Development and Research
Institute, London.

Professor S. Krishna Swamy,
School of Biological Sciences,
Madurai Kamaraj University,
Madurai.

Shri R. Ananthapadmana-
bhan and Shri P. P. Siva
Sankaran, Indian Oil Corpo-
ration, Madurai.

Shri K. Nair, Keltron, Tri-
vandrum.

Shri Jacob Cherian with
30 students from Christian
College, Chengannur, Kerala.



Phillipus Martin, and Shnyengeh Mathews from FWOP, Namibia who were sponsored by FAO for training in Fish processing at CIFT, during their visit to CMFRI

Staff News

Engagements

Dr E. G. Silas, Director
attended the following:

Meeting of the Secretary,
Department of Ocean Develop-
ment with the Director General,
ICAR on FORV Sagar Sampada
Programme, 11 April.

First Meeting of the Natio-
nal Mangrove Committee at the
Department of Environment,
Government of India, New
Delhi, 17 May.

Dr E. G. Silas, Director
has been nominated as a
member of the National Man-
grove Committee constituted
by the Department of Environ-
ment, Government of India.

Smt V. Chandrika, Scientist
S-1 attended the Seminar on
Pollution Problems organized
by the Kerala State Pollution
Control Board and Department
of Forests, Kerala at FACT,
Ambalamedu and presented a
paper on Distribution and Sig-
nificance of Faecal Indicator

Organisms in Bacterial Pollution
in and around Cochin, 5 April.

Dr K. Radhakrishna, Sci-
entist S-3 and Shri G. Sudha-
kara Rao, Scientist S-2 parti-
cipated in the training pro-
gramme organized by the Export
Inspection Agency at Waltair
and gave lectures on Oceano-
graphy and Fisheries of Andhra
Pradesh, 27 June.

Shri G. Sudhakara Rao,
Scientist S-2 participated in the
V Meeting of the Consultative
Group for Calcutta Base, Fishery
Survey of India, 14 May.

Shri G. Nandakumar, Sci-
entist S-2 and Shri Chennappa
Gowda, Field Assistant (T-1)
participated in the fishing cru-
ses of M. V. Saraswathi of
CIFE.

Shri T. M. Yohannan, Sci-
entist S-2 gave a talk on 'Flood'
over All India Radio, Calicut.



Appointments

The following scientist in grade S-3 have been granted the scale of pay of Rs 1800-2250 as personal to them.

Shri P. R. S. Tampi, 1 July, 1982

Shri K. H. Mohamed 1 January, 1983

The following Scientists have been promoted on the basis of Five Yearly Assessment.

S-2 to S-3

(With effect from 1 July, 1982)

Dr G. Luther

Dr K. Radhakrishna

Shri S. Mahadevan

Shri M. S. Muthu

Dr M. D. K. Kuthalingam

Shri A. Noble

Shri M. S. Rajagopalan

Dr K. C. George

Shri K. Rengarajan

Dr K. Sathyanarayana Rao

(With effect from 1 January, 1983)

Shri M. H. Dhulkhed

Dr M. Vasudev Pai

S-1 to S-2

(With effect from 1 July, 1982)

Shri R. Sarvesan

Dr V. Sriramachandra Murty

Dr K. Devarajan

Dr K. J. Mathew

Dr C. P. Gopinathan

Shri G. Sudhakara Rao

Dr P. A. Thomas

Shri C. Suseelan

Shri V. Kunjukrishna Pillai

Shri C. Muthiah

Dr N. Kaliaperumal

Shri T. M. Yohannan

Shri A. C. C. Victor

Dr P. Nammalwar

Shri K. Rengarajan

Shri E. V. Radhakrishnan

Shri A. Chellam

(With effect from 1 January, 1983)

Shri Kuber Vidya Sagar

Dr D. B. James

Smt Mary K. Manisseri

Dr G. Syda Rao

Dr A. Laxminarayana

Shri K. K. Appukuttan

Shri S. Lazarus

Shri A. A. Jayaprakash

(With effect from 1 July, 1983)

Shri M. Vijayakumaran

Smt Rani Mary Jacob

Dr L. Krishnan

Shri A. R. Thirunavukkarasu

Dr E. Vivekanandan

Shri N. Neelakanta Pillai

Dr S. Kulasekhara Pandian

Dr P. Devadoss

Shri G. Nandakumar

S-to S-1

Shri P. Karuppaswamy,
1 July 1980

The following Scientists have been granted advance increments

Dr. A. V. S. Murty,
One, 1 July, 1982

Shri V. M. Deshmukh,
One, 1 July, 1982

Shri P. Bensam,
One, 1 July, 1982

Shri V. Balan,
One, 1 July, 1982

Shri M. Kumaran,
Three, 1 July, 1982

Shri G. Subbaraju,
Two, 1 July, 1982

Three, 1 July, 1983

Shri K. A. Narasimham,
Three, 1 July, 1982

Shri M. Mydeen Kunju,
Two, 1 July, 1982

Dr (Mrs) P. V. Kagwade,
Two, 1 July, 1982

Dr. V. S. K. Chennubhotla,
Two, 1 July 1982

Two, 1 January, 1983

Dr. P. T. Meenakshisundaram,
One, 1 July 1982

Two, 1 January, 1983

Shri D. Sadananda Rao,
One, 1 July, 1982 Two, 1
January, 1983

Shri V. N. Bande,
Two, 1 January, 1983

Shri N. Surendranatha Kurup,
One, 1 July, 1982
Two, January, 1983

Dr. H. Mohamed Kasim
Two, 1 July, 1983

Shri P. N. Radhakrishnan Nair,
One, July, 1983.
Two, 1 January, 1983

Shri G. S. Daniel Selvaraj,
One, 1 July 1982
Two, 1 January, 1983

Shri K. V. Somasekharan Nair,
Two, 1 July 1982

Shri Alexander Kurian,
Two, 1 July, 1982

Shri P. Livingston,
One 1 July, 1982
Two, 1 January, 1983,

Shri P. V. Sreenivasan,
Two, 1 July, 1982

Shri K. Ramadoss,
Two, 1 July, 1982

Shri Y. Appanna Sastry,
Two 1 July 1982

Dr N. Gopinatha Menon,
Two, 1 July 1982

Smt. Geeta Bharathan,
One, 1 July 1982
Two, 1 July 1983

Shri G. Gopakumar,
Two, 1 July, 1982

Shri Madan Mohan,
Two, 1 January, 1983

Shri K. K. Sukumaran,
One 1 July 1982
Two, 1 January, 1983

Shri K. G. Girijavallabhan,
Two, 1 July 1982
Three, 1 January, 1983

Shri Pon Siraimetan,
Two, 1 July 1982
Three, 1 January, 1983

Dr (Mrs) S. Lalitha Devi,
Three, 1 July 1983

Shri K. Prabhakaran Nair
Two, 1 July 1982
Three, 1 January, 1983

Shri M. Kathirvel,
Two, 1 July, 1982
Three, 1 January, 1983

Shri R. Soundararajan,
Two, 1 July 1982
Three, 1 January, 1983

Shri A. Regunathan,
Two, 1 July 1982
Three, 1 January, 1983

Shri K. S. Sundaram,
One, 1 January, 1983

Dr M. K. George,
One 1 July, 1982

Dr V. S. Kakati,
One, 1 January, 1983

Dr (Mrs) R. Padmini,
One, 1 July, 1982

Shri Rajamani,
One, 1 July, 1983

Shri John K. Antony as
Superintendent on deputation
from Accountant General Office,
Trivandrum, 26 May.

Shri P. C. Jacob as Administ-
rative Officer on transfer from
CPCRI, Kasargod, 11 June.

Shri K. L. K. Padmanabhan,
Assistant on regular basis, 22
June.

Transfers

Shri S. S. Sugawekar, Field
Assistant (T-1) from Cochin to
Ratnagiri,

Shri K. Ramadoss Gandhi,
Junior Technical Assistant
(T-2) from Ratnagiri to
Bombay.

Shri S. D. Kamble, Field
Assistant (T-1) from Bombay
to Dahanu.

Shri K. Srinivasagam, Field
Assistant (T-1) from Madras to
Tuticorin.

Shri R. Thangavelu, Tech-
nical Assistant (T-1-3) from
Tuticorin to Madras.

Reliefs

Shri C. P. Thomas, Senior
Administrative Officer on trans-
fer to CPCRI, Kasargod, 16 June.

Shri N. Varatharajan, Field
Assistant (T-1) on resignation,
31 May.

Shri C. Gangadharan, Bosun
(T-II-3) on resignation, 25 May.

Shri Johnson K. Kuriakose,
Engine Driver (T-II-3) on resi-
gnation, 8 June.

Shri L. Jobai Fernando,
Oilman - cum - Duckhand (T-2)
on resignation, 13 June.

Shri N. S. Jadhav, S. S.
Grade I (Watchman) on resi-
gnation, 6 June.

Shri S. K. Guruswamy,
S. S. Grade I (Watchman) to
take up the appointment as
Motor Driver at CIAE, Bhopal
on deputation basis, 30 June.

Weddings

Shri N. K. Mohanan, Junior
Clerk at Calicut married Kumari
Ushakumari at Parur, 7 April.

Shri V. S. Gopal, Field
Assistant (T-1) at Alleppy
married Selvi M. Karpagam at

Singaperumal Koi street, Chen-
galpathi 15 April.

Shri George Augustine,
Bosun at (T-II-3) at Cochin
married Kumari Alphonsa at St.
Thomas Cathedral, Irinjalakuda,
29 April.

Shri S. B. Chavan, Field
Assistant (T-1) at Bombay,
married Kumari Ratnaprabha R.
Parab, 12 May.

Shri V. Chandrasekharan
and Kumari R. Radha, Junior
Clerks at Cochin married at
Siva Temple, Cochin, 6 May

Kumari M. R. Beena, Punch
Card Operator at Cochin married
Shri K. Parthan at Palluruthy,
Cochin, 20 May.

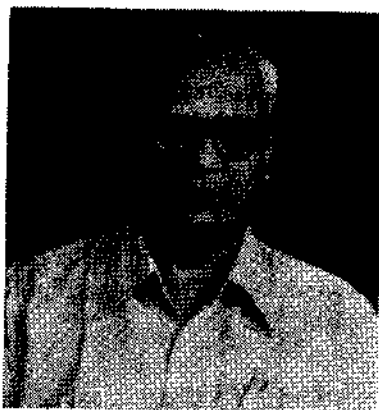
Shri L. K. Suvarna, S. S.
Grade I (Watchman) at Karwar
married Kumari Sumathi at
Bombay, 13 May.

Shri M. E. Durgekar, S. S.
Grade I (Laskar) at Karwar
married Kumari Dhakshpani at
Karwar, 23 June.

Recreation

The Club Day of the Senior
Staff Recreation Club at the
Mandapam Regional Centre
was celebrated on 24 June.
Sports and games and variety
entertainments were conducted
for the members of the staff
and their families. The cham-
pionship award instituted by
Dr R. S. Lalmoohan was given
to Shri G. K. Rajan and Shri
P. Hillary among men and
Smt Kamala Gajendran and
Smt Innocent Edwin Joseph
among women. Shri S. Maha-
devan, Officer-in-Charge of the
Centre distributed the prizes.

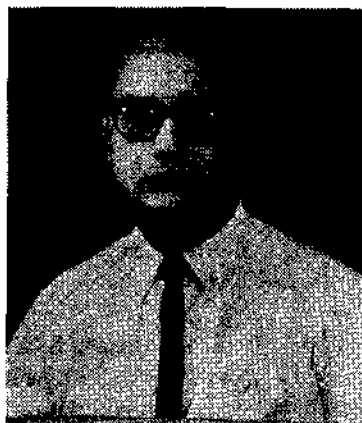
Retirements



Dr S. V. Bapat

Dr S. V. Bapat, Joint Director at Cochin retired from the services of CMFRI on 30 April on attaining the age of superannuation. Dr Bapat joined CMFRI in 1947 as Research Assistant at Mandapam. He became Assistant Research Officer in 1964. His work for Ph D on fish eggs and larvae of Bombay waters was the earliest comprehensive work on the subject from the Country.

Dr Bapat served the Deepsea Fishing Section of the then Exploratory Fishery Project as Assistant Director during 1961-67. Back at CMFRI he served two terms as the Officer-in-charge of the Karwar and Bombay Research Centres. While at Bombay he devoted much attention to the fishery and biology of Bombay duck (*Harpodon nehereus*) and the management problems connected with its resources. He was on Government of India deputation under Colombo Plan for 2½ years at the Fishery Research Institute, Canada for training in fish biology and migration. As the Joint Director at CMFRI Dr Bapat has made great contributions to the research management and infrastructure development.



Shri G. Venkataraman

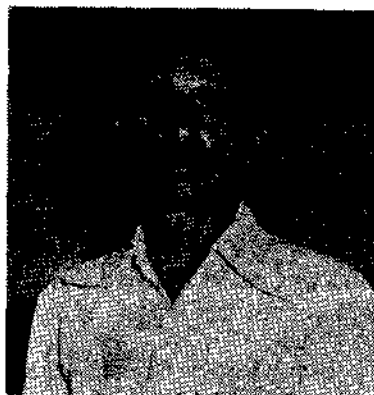
Shri G Venkataraman, Scientist S-3 retired on 31 May after 37 years of distinguished service in CMFRI. Joining CMFRI in 1947 after postgraduation, he served CMFRI in various capacities, as Research Assistant, Assistant Research Officer, Research Officer, Scientist S-2 and Scientist S-3 and worked at Calicut, Mandapam and Cochin. He was the Officer-in-Charge of the Mandapam Regional Centre from 1974-78. He became the Head of the Fishery Resources Assessment Division in 1982. Shri Venkataraman has published number of research papers on the biology and fishery of commercially important fishes, offshore fishery resources and socio-economic aspects of fishermen.

Shri S. R. Shanmughavelu Senior Technical Officer retired on superannuation on 30 June. Shri Shanmughavelu joined CMFRI in 1947 as Assistant. He served CMFRI as Assistant Fishery Scientist, Field Officer T-6 and T-7. Shri Shanmughavelu was associated with the Fishery Resources Assessment Division of CMFRI.

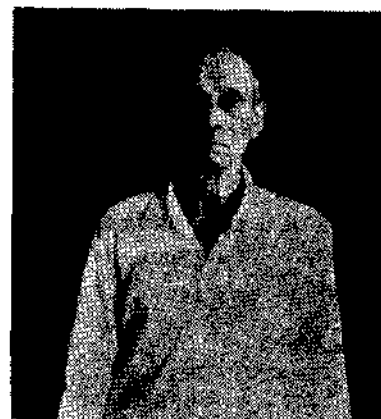
Shri V. Kalimuthu, S. S. Grade III (Laboratory Attendant) on superannuation, 30 June.

Shri S. Subramanian, Superintendent on superannuation, 30 June.

Shri N. M. Naik, S. S. Grade III (Fieldman) on superannuation, 30 April.



Shri S. R. Shanmughavelu



Shri N. M. Naik

PhD Awarded

The following have been awarded Ph D by the University of Cochin



Shri P. N. Radhakrishnan Nair, Scientist S-1 at Vizhinjam for his Studies on the Systematics, Biology and Fishery of Rainbow Sardines, *Dussumieria* spp., from Indian Waters.



Smt V. Chandrika, Scientist S-1 at Cochin for her studies on the Ecophysiology of Heterotrophic and Indicator Bacteria in the Marine Environments of Kerala.



Kumari Ammini Joseph, Senior Research Fellow at the Centre of Advanced Studies in Mariculture for her studies on Culture and Growth Kinetics of Selected Nanoplankton. Kumari Ammini Joseph is the first full-time Research Fellow to qualify for the degree from the Centre of Advanced Studies in Mariculture, CMFRI.

All the three researchers worked under supervision of Dr P. V. Ramachandran Nair, Scientist S-3, CMFRI

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