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CMFRI newsletter

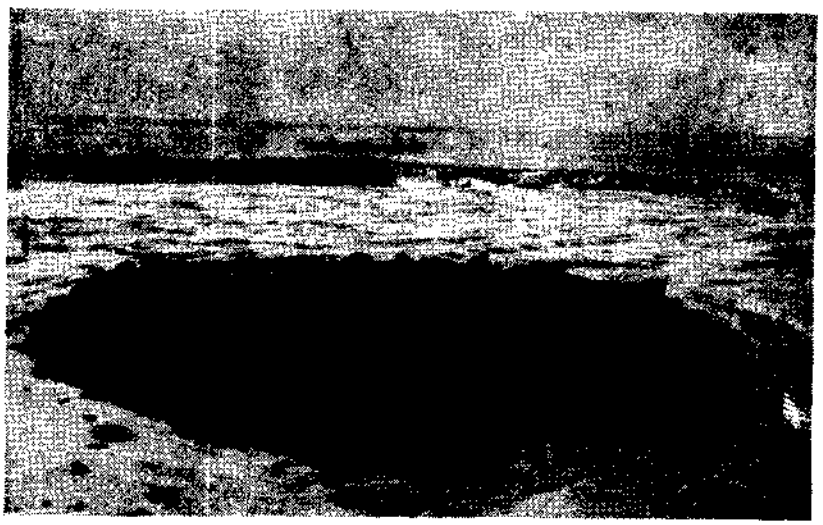
Number 4 June - October 1976

MUD BANKS AND FISHERY

The formation of mud banks is a unique phenomenon occurring only at defenite localities between Calicut and Quilon on the southwest coast of India and is reported from nowhere else in the world. The first authoritative account of it is a report by Mr. R. C. Bristow in 1938, of the occurrence of four mud banks, one off Alleppey, one off Cochin and two at or near Calicut.

Mud banks are those inshore areas having the special property of giving complete quiescence to the waters above even in the roughest weather during the South West Monsoon. These areas may extend miles along the shore and perhaps miles out to sea. They may be submerged or may cover up to surface. They are usually the immediate result of a heavy weather. The water in the area is generally discoloured in the initial stage with churned-up mud. But after this stage is passed this seems to settle down and the area becomes clear like the rest of the neighbouring sea. The mud bank provides a calm area for safe navigation and quiet anchorage even in the roughest weather. The mud banks may shift their positions and may move (always southward) miles.

The scientists differ in their opinion of the causes of the formation, maintainence and dissolution of the mud banks. The earlier investigators have attributed their formation to depositing of material brought down the rivers through the river mouths or to the probable lifting of the bottom mud by vertical acceleration. But the recent investigations undertaken by the Central Marine Fisheries Research Institute are now tapering down to the conclusion that the mud banks are the result of the subterranean mud brought up in the form of "volcanoes" or huge mud cones.



Mud cones are formed, though rarely, even on the intertidal zone.

The mud banks are of increasing economic importance. Besides being an area for quiet anchorage and safe channel

for navigation, a mud bank at times provides an intensive fishing ground. During the heavy southwest monsoon, the sea is generally inaccessible to the fisherman with his indigenous craft and, but for an occasional fishing expedition by some daring fishermen as and when occurs a few hours lull in the fury of the sea, there is no fishing activity along these coasts and the entire length of coast has a deserted appearance. During this period of difficulty a sudden outburst of a fishery, as it might sometimes happen in association with the formation of mud banks, has naturally a great economic bearing on the coastal people. The fishery is locally known as "CHAKARA". The term, a derivative of "CHATHA KARA" meaning dead or quiet bank, an expression still prevalent in the northern parts of Kerala, might have been originally used to denote a mud bank. But, of late, the word has become a synonym for a good or heavy harvest from the sea during SW monsoon. The occurrence of a chakara, by virtue of its economic importance, creates headline news in local papers and gains wide publicity. As a result, hundreds of indigenous boats even from far-off villages are rushed to the spot. Boats are brought even on hand-carts by roads and along wet sandy beaches. The place soon turns out to be a beehive of activity. There are reports of such heavy landings of prawns and fishes during the short span of a chakara, which generally lasts for a week or at the most ten days, that would fetch tens of thousands of rupees per day. In the interest of fishermen who depend upon crafts which are not equipped to go out in the rough sea, the State Government have imposed restrictions on the entry of mechanised boats in the area.

The buzzing excitement at the landing place

In spite of all the local popularity, the scientific information available on the chakara was meagre. This was because no serious attempt was made to investigate the real nature of it nor any effort was made to correlate the fishery with the formation of the mud bank. The Institute has since undertaken the task and assigned the job to a team of scientists under the leadership of Dr A. V. S. Murthy. The scientists who assist him in the project are Shri D. S. Rao, Shri K. J. Mathew, Shri C. P. Gopinathan and Shri A. Regunathan.

"KADALPONNU": *basketsful of prawns. This foreign-exchange earner determines the success of a Chakara.*

In the course of their investigation, they brought to light,

(See Page 8)

Strive Towards Excellence In Scientific Research: P M

Referring to the data furnished by the Planning Commission on the annual compound growth rate for selected crops and the gross value of output per hectare, Shrimati Indira Gandhi, the Prime Minister, in her inaugural address at the meeting of the National Development Council held on September 24 and 25, 1976 at New Delhi made the following remarks:

"The provision of fuller employment is one of the surest means of promoting greater social justice. The Planning Commission's document has devoted some thought to this problem. Its study shows that a dent can be made on rural unemployment by augmenting agricultural productivity and vigorously implementing land reforms as envisaged in the 20-Point Programme. A disturbing finding in the Planning Commission's document is that only in 15% of the gross cropped area is the output per hectare about Rs. 1500 per annum. Only 12% of our districts have achieved a growth rate of more than 5% in agricultural production. Thus employment opportunities can be increased by improving agricultural productivity through irrigation, the adoption of improved technology and more equitable distribution of the gains of growth through land reforms. Employment programmes are not isolated but are organically linked with those of agricultural production. When the employment situation in rural areas improves, the drift into towns and cities will slow down. To that extent the problem of urban unemployment will also become more manageable and the strain on civic services will be relieved. We should also devote closer attention to household industries like handlooms and handicrafts, carpet-weaving, sericulture, etc. Employment in these industries has suffered in the last two years. This process has to be arrested. Programmes connected with those industries should receive high priority. Our country has immense opportunities for self-employment. Villagers need many services and in many areas are capable of paying for them. These needs should be identified and, through imaginative local planning, educated young people should be organised and given financial and other help from public financial institutions and other agencies."

Stressing the importance of science in finding solutions to these problems, Prime Minister commented:

"Thanks to planned development, our science itself has come a long way, compared to its state when we became free. Visiting many national laboratories and central research laboratories, which one by one have been celebrating their silver jubilees, I have been impressed by their progress and also by their direct contribution to development. The world has begun to take note of our science and its strides in the search for self-reliance. But I do notice some signs of complacency. Self-reliance does not mean self-satisfaction. As we enter newer and more sophisticated areas of work, there is greater compulsion for our scientists to be equal to the best. In the new list of citizen's duties, a clause points to the importance of striving for excellence. In no branch of life is this search for excellence as crucial or has such direct social consequence as in science."

OIL SARDINE:

A possible fishery for Bombay

Our Bombay Centre reported the occurrence of shoals of oil sardine, *Sardinella longiceps*, in Bombay waters. It was stated that the fishermen had already started exploiting them on a small scale. As the fishery for this pelagic fish is traditionally confined to the southwest coast of India between Quilon and Ratnagiri, the presence of these shoals in commercial quantities attracted the scientists. Dr K.V. Sekharan who heads the Fishery Biology Division said that immediate steps have been taken to assess the fishery potential in these waters as there seems to be a good possibility of developing it into a regular fishery there. Further, it will be of interest to know whether the fish which now appears at Bombay is a part of the stock conventionally fished from our southwest coast or a part of that which contributes to the fishery along the Pakisthan coast in recent years.

OUR STEP FORWARD

Madras Centre Makes Great Strides In Mariculture

Mussel: Large-scale experiments on the domestication of edible mussels yielded excellent results. Culture of these molluscs on rafts in the open sea was started on a trial basis in February last at Kovalam, a place 35 km south of Madras. A temporary field laboratory was also set up for on-the-spot studies. A set of mussels collected from Ennore were hung from the raft in nylon bags to form the parent stock, and tiles were suspended at various places on the raft to serve as spat collectors. By mid-March large number of spats were seen settled on the tiles and then onwards spat fall in enormous numbers was a regular occurrence. These spats were seeded on ropes hanging from the rafts. They have grown ideally during the subsequent months in spite of strong currents and wave action.

The temporary aquaculture laboratory at Kovalam

Shri Tholasilingam (extreme right) with his colleagues examining the experimental raft moored in the open sea.

Spiny lobster: Pueruli and post-Pueruli of certain species of the commercially very important Indian spiny lobster, in the size range 25 to 30 mm in total length, collected in the last week of April are being successfully reared in the field laboratory in plastic pools in which are strewn concave earthen tiles to afford cover for the growing lobsters. The larvae are readily growing on the food provided and are proved to be sufficiently hardy to withstand the controlled conditions. Encouraged by the success of these experiments the scientist at the Centre under the enthusiastic leadership of Shri T. Tholasilingam,

Post-Puerulus of spiny lobster (2 cm)

Fishery Scientist, is now turning their attention to explore the possibility of economically culturing these lobsters in suitable marine enclosures by large-scale stocking of these early larvae which could rather easily be collected with the aid of specially devised 'Puerulus Collectors' from their natural habitats.

Large-Scale Culture of Brine Shrimps At Narakkal

The brine shrimp, *Artemia salina,* is being mass-cultured at the Prawn Culture Laboratory at Narakkal. The culture is maintained continuously of many generations. Under the existing laboratory conditions a life cycle takes 18 to 20 days to complete. These cultures are maintained because brineshrimp nauplii are found to be preferred as food by the penaeid larvae in the hatcheries at the Culture Laboratory. As the selection of a cheap and appropriate food for the larval stages is more or less a major problem in the prawn-culture programme, the success in maintaining a brineshrimp culture, with very little input, may step up the possibility of a venture in the near future on an industrialised hatchery for supplying seeds at low cost to the prawn farmers.

Transport of Elvers

Experiments have shown that polythene bags inflated with air and packed in wooden boxes could be successfully used for transporting live elvers for seeding. About 26 ideal places have also been located from where live elvers could be collected for industrial purpose.

New Clam Bed

A highly potential bed for the clam, *Meretrix,* extending over 2 hectares has been identified off Bhimunipatnam near Waltair.

Dr. R.V. Nair Retired

Dr R. V. Nair, Deputy Director, has retired voluntarily from service with effect from the afternoon of February 29, 1976. Dr Nair who was serving the Institute in various capacities, since April 2, 1947, has officiated as Director from 27 March 1964 to 21 June 1964, from 27 February 1970 to 6 December 1970 and from 4 January 1974 to 24 June 1975. Dr Nair who worked in different fields, under Fishery Biology and Fishery Survey & Statistics, has many scientific publications to his credit. He is at present working as Emeritus Scientist at the Aquarium, Trivandrum.

Dr JAG JIVAN RAM VISITING CMFRI EXHIBITION. The Institute put up a stall to explain its current activities and achievements at the exhibition conducted at Central Institute of Fisheries Technology in connection with the inauguration of its new building at Cochin on June 2, 1976. Dr Silas is seen explaining the latest technique of prawn culture to the Hon'ble Union Minister. Hon'ble Home Minister of Kerala Shri Karunakaran (extreme right) accompanied Dr Ram.

TRAINING OFFERED

Pearl Culture Technicians Training Course At Tuticorin

The Institute is conducting a 6-month Pearl Culture Technicians Training Course under its Scheme on Pearl Culture. The training course was inaugurated on 24th September at Tuticorin by Shri R. Nagarajan, IAS, Director of Fisheries, Tamil Nadu, at a function presided over by the Director, Dr E. G. Silas. The following seven candidates are at present undergoing training:

1. M. S. Nazir Ahmed, Dept. of Fisheries, Govt. of Kerala.
2. M. A. Varghese, Dept. of Fisheries, Govt. of Gujarat.
3. M. M. Patel, Dept. of Fisheries, Govt. of Gujarat.
4. S. M. Irulandy, Dept. of Fisheries, Govt. of Tamil Nadu.
5. S. Velapandian, Dept. of Fisheries, Govt. of Tamil Nadu.
6. A. Deivendra Gandhi, CMFR Institute.
7. A. Srinivasan, CMFR Institute.

Dr. Silas delivering the presidential address

Truinees practicing graft-tissue preparation

Besides, two private candidates chosen from the fishermen community will also be sponsored by the Govt. of Tamil Nadu shortly. The training programme made good progress according to curriculum approved by the Council. The aim of the course is to train sufficient number of technicians, in the light of the specialised expertise gained by the Institute, to handle the skilled jobs involved in the development of pearl culture industries in our country.

In conducting the training programme, Dr K. Algarswami, Officer-in-charge of the pearl culture scheme is helped by Shri K. Nagappan Nayar, Shri S. Mahadevan, Shri A.C.C. Victor, Shri K. Ramadoss, Shri A. Chellam and Shri S. Dharmaraj of CMFRI Research Centre, Tuticorin.

Training in the Preparation of Agar Agar from Seaweeds At Mandapam

Shri Bidyadhar Nayak of the Sterling Chemicals, Cuttack, was given training in the preparation of agar agar by different processes using different types of agarophytes, at CMFRI Regional Centre, Mandapam Camp. Shri Nayak was trained in theextraction of agar agar from *Gracilaria verrucosa,* a species growing abundantly in Chilka lake in Orissa, mixed with *G. acerosa* and *G. edulis,* species occurring in commercial quantities in Mandapam. During the training, emphasis was given on obtaining maximum bleaching to the final product. Bleaching was demonstrated by initial sun drying as well as by using chemicals like sodium hypochloride and activated carbon. He was also trained in the technique of extracting alginic acid from brown seaweeds.

AGRICULTURAL RESEARCH SERVICE

The following staff members of the Institute have been selected for the award of the 'Agricultural Research Service' in the discipline of Fishery Biology, as a result of the examinations held in March 1976.

1. Alexander Kurian, Research Assistant at Bombay.
2. P. V. Sreenivasan, Research Assistant at Porto Novo.
3. A. Chellam, Junior Scientific Assistant at Tuticorin.
4. Vajipeyayajula S. Murty, Research Assistant at Kakinada.
5. V. Thankaraj Subramanian, Senior Research Assistant at Bombay.
6. Gaddipaty Sudhakara Rao Senior Research Assistant at Kakinada.
7. C. Muthaiah, Research Assistant at Bombay.
8. R. Padmini, Research Scholar at Cochin.

A New Prawn named after Shri Krishnatri

A new species of prawn collected from Corbyn's Cove near Port Blair (a brief report on which has already appeared in these columns) has been described in a recent scientific paper by Dr E. G. Silas and Shri M. S. Muthu. The species is named after Shri Krishnatri, Chief Commissioner, Andamans & Nicobar, in appreciation of his keen interest in the development of fisheries in Andamans & Nicobar Islands.

CONSULTANCY

The following Government Departments, Institutions, Agencies and persons were benefited by our services by way of consultation:

1. Director of Fisheries, Govt. of Goa, Daman & Diu, Dayanand Bandodkar Marg, Panaji.
2. Shri K. G. Paul, Kadaviparambil, Mundavely P. O., Cochin.
3. Shri K. C. Mathew, Kadavil House, Pallipuram, Sherthalai.
4. Shri M. N. Vijayan, Chilavanur, Cochin.
5. Shri V. V. Vernekar, Congress Road, H. No. 477, Tilakwadi, Belgaum.
6. Shri R.S. Stardekar, C|O Allied Process Premises, 528, Dr Ballar Road, Malvan.
7. Shri C. Devadoss, M|S David & Son, Madras-10.
8. Shri Issac Rajendran, Deputy Director of Fisheries (Mariculture), Madras-28.
9. Shri C. D. Sebastian, Pookote Fisheries, Pookote Lake, Vayitri, Kozhikode.
10. Dr K. Venkatasubba Rao, Professor of Fishery Biology, Central Institute of Fisheries Education, Govt. of India, Bombay.
11. Deputy Commissioner, Office of the Commissioner of Fisheries, Govt. of Gujarat, Ahmedabad.
12. Dr M.N. Moorjani, Project Coordinator, Meat, Fish and Poultry Technology, Central Food Technological Research Institute, Mysore.
13. Deputy Commissioner (FP), Ministry of Agriculture & Irrigation, Department of Agriculture, Krishi Bhavan, New Delhi.
14. Director, Bureau of Economics & Statistics, Govt. of Andhra Pradesh, Hyderabad.
15. Dr Daroga Singh, Director, Institute of Agricultural Research Statistics, Library Avenue, New Delhi.
16. Director of Statistics, Department of Statistics, Madras.
17. Shri Ravindranathan, Accounts Officer, Accountant General's Office, Trivandrum.
18. Director of Fisheries, Govt. of Tamil Nadu, Madras.
19. Deputy Director of Fisheries (Stat), 60-A. Colootala St. Calcutta 1.

Deputation for training

Shri S. K. Dharmaraja, Assistant Fishery Scientist, is deputed to undergo a 6-month training in Population Dynamics at CSIRO. Cornulla, Sydney, under the Colombo Plan Training Programme. Shri Dharmaraja left for Australia on 10-10-76.

Mud banks-

(From Page 2)

among many other interesting facts about the formation and dissolution of the mud banks, a clear picture of the mudbank fishery. It is evident that the formation of the mud bank is dependent on the southwest monsoon. If the monsoon starts with its usual intensity, in time, say, May-June, the mud banks are formed in May-June, too. These early mud banks are usually associated with a good fishery. This is accounted by the fact that the formation of the mud banks coincides with the period when the prawns and fish of our coastal waters are on a shoreward migration and are available in abundance in the nearshore regions. But, owing to inclement weather, the fishermen are not able to get them. The mud banks being tranquilised areas help them to fish either from within the area or from areas adjacent to them, more so from the latter. For, it is often found that fishermen bring in their catches from those areas lying outside the limits of the banks using the latter merely as a safe channel for navigation.

The delayed monsoon in Kerala this year, although it had its own undesirable effects, was indeed a godsend to the mudbank scientists. The dependence of the mudbank formation on the southwest monsoon was not more clearly evident before. Consequent on the very delayed monsoon locally, the formation of the mud banks was also equally delayed. Again, when the monsoon arrived in Kerala it was very weak compared to the previous years, so also the formation of the mud banks. Yet, very interestingly, there was the usual good fishery during May-June, which the local papers reported as chakara. This was in spite of the fact that there was no trace of a mud bank during this period. It is thus evident that if the monsoon is delayed or erratic the mud banks are delayed or erratic, too, and are not then banks are delayed or erratic, associated with a fishery.

S. Rajagopalan Appointed as Senior Administrative Officer

Shri S. Rajagopalan, Administrative Officer of the Institute, has been appointed on promotion as the Senior Administrative Officer. Shri Rajagopalan has assumed charge of the new post on Saturday, October 9, 1976.

Seminar on Bioenergetics

The Institute participated in the seminar on Bioenergetics held at the National Institute of Oceanography, Goa, between 12 and 14 July 1976. The following papers were read:

1. Analysis of the marine catches of clupeoids of different feeding habits in India with reference to the concept of ecological efficiency. — by K. V. Sekharan.
2. Primary production and ecological-efficiency factor in the Indian seas. — by P.V. Ramachandran Nair, C. P. Gopinathan, K. J. Joseph and V. K. Balachandran.

Dr K. V. Sekharan chaired the session on Energy Budget at the seminar.

VISITORS

The Institute received the following distinguished visitors:

Prof. S. Rajagopal, Professor of Geography, Grambling State University, Grambling, visited the Institute on 13.7.76

Mr K. H. Alikunhi, Project Manager, Brackishwater Project, UNDP, Indonesia, visited on 2-8-76.

Mr T. Nischimura, Mr S. I. Keda and Mr Y. Konno, representing Japanese Marine Products Exporters' Association and Government of Japan visited on 20-8-76.

Dr Leigh H Hammond, Asst. Vice Chancellor, North Carolina State University, Raleigh, N Carolina, USA, visited on 13-7-76.

Dr S. N. Roy, Director of Fisheries, W. Bengal, visited on 14-9-76.

Mr G. B. Debling, Grimsby College of Technology, U.K. visited on 23-9-76.

Doctorate Degree Awarded

Shri T. R. Chandrasekhara Gupta, a former Research Scholar at the Institute, is declared eligible for the degree of Doctor of Philosophy by the University of Bombay. Shri Gupta's thesis, "Studies on Primary and Secondary Production in the Arabian Sea off Cochin", was based on his work done at this Institute during the tenure of his scholarship. Shri Gupta is at present Assistant Professor (Limnology) at the College of Fisheries, Mangalore.

GENERAL

The Director, Dr E.G. Silas, is nominated as Member of the following Committee|Panel|Board:

The Board of Management of Konkan Krishi Vidyapeeth, Kapoli, Maharashtra.

Technical Committee of the Marine Products Export Development Authority, Cochin.

Scientific Panel for Fisheries of the ICAR, for a period of three years from 1-3-76.

Board of Studies in Zoology (Post-Graduate) and Zoology (General and Pass) of the University of Madras for a period of three years from 20-3-76.

Expert Committee of the Madurai University, Madurai, constituted for framing the rules, regulations and syllabus for B.Sc., Marine Science.

The Board of Management, Tamil Nadu Agricultural University has appointed a Committee consisting of Dr E. G. Silas, Director, as a Member, to select a suitable location for establishing a Fisheries College under the University. The Board of Management at its twenty-third meeting held on 13 September approved starting of the College commencing from the academic year 77-78.

Engagements

Dr E. G. Silas, Director and Dr K. V. Sekharan, SFS, attended the Kerala State Fisheries Research Committee meeting held at Ernakulam on 10-9-76.

Director attended the meeting of the Board of Studies in Zoology, University of Madras, at Madras on 14-8-76.

'NARAN' SEEDS FOR ANDAMANS: Shri Krishnatri, Chief Commissioner of Andamans & Nicobar receiving larvae of *Penaeus indicus* at Port Blair, for propagation in selected areas in the island from Dr Silas. The larvae were reared at the culture laboratory at Narakkal.

Dr S. Ramamurty, Officer-in-charge of Mangalore Centre attended the first annual convention of the Forum of Fisheries Proffessionals held at the College of Fisheries, Mangalore, on June 27, 1976. During the convention, which was inaugurated by Smt. Manorama Madhvaraj, Hon'ble Minister for Women and Child Welfare, Karnataka, there was also a technical session at which various papers were presented and discussed.

Change in Nomenclature

The names of the substations, units and survey centres of the Institute are revised with the approval of the Indian Council of Agricultural Research. The revised names are:

Regional Centre

1. Maudapam Regional Centre of C.M.F.R. Institute.

Research Centres

1. Bombay Research Centre of C.M.F.R. Institute.
2. Calicut Research Centre of C.M.F.R. Institute.
3. Kakinada Research Centre of C.M.F.R. Institute.
4. Karwar Research Centre of C.M.F.R. Institute.
5. Madras Research Centre of C.M.F.R. Institute.
6. Mangalore Research Centre of C.M.F.R. Institute.
7. Minicoy Research Centre of C.M.F.R. Institute.
8. Port Blair Research Centre of C.M.F.R. Institute.
9. Tuticorin Research Centre of C.M.F.R. Institute.
10. Veraval Research Centre of C.M.F.R. Institute.

11. Vizhinjam Research Centre of C.M.F.R. Institute.
12. Waltair Research Centre of C.M.F.R. Institute.

Field Centres

1. Alleppey Field Centre of C.M.F.R. Institute.
2. Bhatkal Field Centre of C.M.F.R. Institute.
3. Cannanore Field Centre of C.M.F.R. Institute.
4. Cape Comorin Field Centre of C.M.F.R. Institute.
5. Chavakad Field Centre of C.M.F.R. Institute.
6. Colachel Field Centre of C.M.F.R. Institute.
7. Cuddalore Field Centre of C.M.F.R. Institute.
8. Dahanu Field Centre of C.M.F.R. Institute.
9. Dumas Field Centre of C.M.F.R. Institute.
10. Goa Field Centre of C.M.F.R. Institute.
11. Gopalpur Field Centre of C.M.F.R. Institute.
12. Jamnagar Field Centre of C.M.F.R. Institute.
13. Janjira-Murud Field Centre of C.M.F.R. Institute.
14. Juntut Field Centre of C.M.F.R. Institute.
15. Kovalam Field Centre of C.M.F.R. Institute.
16. Machilipatnam Field Centre of C.M.F.R. Institute.
17. Mahabalipuram Field Centre of C.M.F.R Institute.
18. Malvan Field Centre of C.M.F.R. Institute.
19. Nagapattinam Field Centre of C.M.F.R. Institute.
20. Narasapur Field Centre of C.M.F.R. Institute.
21. Nellore Field Centre of C.M.F.R. Institute.
22. Ongole Field Centre of C.M.F.R. Institute.
23. Palasa Field Centre of C.M.F.R. Institute.
24. Pattukottai Field Centre of C.M.F.R. Institute.
25. Porto novo Field Centre of C.M.F.R. Institute.
26. Pondicherry Field Centre of C.M.F.R. Institute.
27. Puri Field Centre of C.M.F.R. Institute.
28. Quilon Field Centre of C.M.F.R. Institute.
29. Ratnagiri Field Centre of C.M.F.R. Institute.
30. Srikakulam Field Centre of C.M.F.R. Institute.

Symposium On Warm Water Zooplankton

Under the auspices of UNESCO|CSIR(NIO) a Symposium was held at the National Institute of Oceanography, Goa, on 14-19 October 1976, at which the Institute presented the following papers:

1. Hatchery production of penaeid larvae for large-scale coastal aquaculture — by E. G. Silas and M. S. Muthu.
2. Studies on diurnal variations in the distribution of zooplankton in relation to currents and other ecological parameters of the mud bank of Alleppey, Kerala, — by K. J. Mathew, C. P. Gopinathan, D. S. Rao, A. Regunathan and A.V.S. Murty.
3. Dynamics of cyclopoid copepod population in a tropical estuary — by P. K. Martin Thompson and D.C.V. Easterson.
4. A critique to the study of larval development in Euphausiacea — by E. G. Silas and K. J. Mathew.
5. Larval transport and setting of the pearl oysters (Genus *Pinctada*) in new areas in Gulf of Mannar — by K. Algarswami.
6. The variability of production and distribution of calanoid copepods in the upwelling area of the southwest coast of India and the Lakshadweep sea with remarks on the copepod indicator species — by P. Parameswaran Pillai.

Dr E. G. Silas, Dr P. V. Ramachandran Nair, Dr P. A. Thomas, Dr A.V.S. Murty, Shri Regunathan, Shri Martin Thompson and Dr K. Alagarswami of the Institute attended the symposium. Dr. E. G. Silas and Dr. K. Alagar Swami each chaired a plenary session at the symposium.

Narayana Kurup Completes the Training at I.A.R.S.

Shri K. Narayana Kurup, Research Assistant at Cochin, has rejoined after completing his one-year training in 'Professional Statistician's Certificate Course', at the Institute of Agricultural Research Statistics, New Delhi, on 6-10-76.

Mechanisation of Data Centre

As the first phase of mechanisation of the Fishery Data Centre of the Institute, three sets of I.C.L. Punches and Verifiers have been installed in the Fishery Survey and Statistics Division. The Centre envisages the installation of fully automatic data processing system in due course for processing the survey data.

Shri Varughese Philipose, Research Assistant and Shri Balan, Research Assistant have returned after obtaining the necessary training in the operation of the system at International Computers (India) Pvt Ltd., Bangalore.

STAFF NEWS

Appointments

Shri P. Ramamurthi, permanent Senior Store Keeper & Officiating Superintendent, is appointed as Assistant Administrative Officer on ad hoc basis at Mandapam Camp with effect from 3-6-76, on reversion from his foreign service at Pre-Investment Survey of Fishing Harbour, Bangalore.

The other appointments are:

Shri M. P. Khadtale as L.F.A. at Bombay w.e.f. 31-5-76.

Kum. G. Abitha as Jr Clerk at Cochin w.e.f. 11-6-76.

Shri V. Chandran, permanent Jr Clerk as Sr Clerk at Cochin on ad hoc basis w.e.f. 14-6-76.

Shri S. Abdulla, permanent Jr Clerk as Sr Clerk at Cochin on ad hoc basis w.e.f. 14-6-76.

Shri K.L.K. Kesavan, permanent Artist, as Sr Artist at Cochin on ad hoc basis w.e.f. 1-6-76.

Shri P. Ferozkhan as Bosun at Mandapam Camp w.e.f. 19-7-76.

Shri E. Sivanandam as Cook at Mandapam Camp w.e.f. 22-7-76.

Shri K. Ramachandra as L. F. A. at Karwar w. e. f. 10-5-76.

Shri M. Manickaraja, permanent L.F.A., as Jr Stenographer at Tuticorin w.e.f. 7-5-76.

Shri R. Narayanan, permanent Sr Clerk, as Assistant on ad hoc basis w.e.f. 17-5-76.

Shri N. Sundaram, permanent L.F.A., as J.S.A. at Tuticorin w.e.f. 30-8-76.

Kum. A. Kanagam, permanent L.F.A., as J.S.A. at Cochin w.e.f. 1-9-76.

Shri D. Vincent, permanent L.F.A., as J.S.A. at Kozhikode w.e.f. 28-8-76.

Shri K. Muniandi, permanent L.F.A., as J.S.A. at Porto Novo w.e.f. 28-8-76.

Shri K. Ramadoss Gandhi, permanent L.F.A., as J.S.A. at Ratnagiri w.e.f. 30-8-76.

Shri J. R. Ramalingam, permanent L.F.A., as J.S.A. at Mandapam Camp w.e.f. 1-9-76.

Shri T. Chandrasekhara Rao, permanent L.F.A., as J.S.A. at Junput w.e.f. 30-8-76.

Shri D. Sundararajan, permanent L.F.A., as J.S.A. at Malwan w.e.f. 30-8-76.

Shri Y. D. Sivaria as J.S.A. at Bombay w.e.f. 10-9-76.

Shri G. Subramanya Bhat as J.S.A. at Bombay w.e.f. 10-9-76.

Shri N. Salunke Madhukar appointed as J.S.A. at Karwar w.e.f. 15-9-76.

Shri S. Palanichamy as L.F.A. at Narakkal w.e.f. 7-9-76.

Shri M. Gopala Prabhu as L.F.A. at Cochin w.e.f. 9.9.76.

Shri M. Sethuraman as L.F.A. at Bombay w.e.f. 4-9-76.

Kum. K. Uma Kumari as L.F.A. at Mangalore w.e.f. 6-9-76.

Shri N. S. Viswanath as L.F.A. at Mangalore w.e.f. 2-9-76.

Sri Sapan Kumar Ghosh as L.F.A. at Bombay w.e.f. 4-9-76.

Shri Hameed Batcha as L.F.A. at Bombay w.e.f. 3-9-76.

Shri N. Surendranath as L.F.A. at Madras w.e.f. 31-8-76.

Shri S. Subramani as L.F.A. at Madras w.e.f. 31-8-76.

Shri G. Krishnamurthy as L.F.A. at Madras w.e.f. 1-9-76.

Transfers

Shri A. Hanumantha Rao, J.S.A., from Nellore to Machilipatnam.

Shri P. Ananda Rao, J.S.A., from Machilipatnam to Nellore.

Shri S. R. Conrad Samuel, J.S.A., from Bombay to Cape Comorin.

Shri V. Selvaraj, J.S.A., from Veraval to Mahabalipuram.

Shri P. Karuppaswamy, R.A., from Minicoy to Kozhikode.

Shri V. Chemutty, Assistant, from Cochin to Kozhikode.

Reliefs

Shri A. R. Pawaskar Kadir, L.F.A. at Bombay on resignation w.e.f. 3-7-76.

Shri V. Ratilal Kanji, L.A. at Veraval, on resignation w.e.f. 13-8-76.

Shri M.P. Khadtale, L.F.A. at Bombay, on termination of his services w.e.f. 8-8-76.

Shri R. S. Ugale, Watchman at Bombay, on resignation w.e.f. 11-6-76.

Smt. P. R. Krishnakumari Amma, permanent Computor, on her appointment at Kerala Agricultural University, Mannuthy, on foreign service terms, w.e.f. 8-7-76.

Retirements

Shri K. Vellayan, L.A. at Mandapam Camp, retired after completing 26 years of service in the Institute.

Shri P. Nagan, Fieldman at Mandapam Camp retired from service on the afternoon of 30th September. Shri Nagan joined the Institute on 27-4-1954.

Wedding

Shri B. Bavanandan, Junior Clerk at Cochin married Selvi: Vazhasundari, daughter of late V. Arunachalam Servai of Aruppukottai, on July 8, 1976 at Goripalayam, Madurai.

Change of Address of Field Centre

The new address of the Field Centre at Nellore is: Nellore Field Centre of CMFR Institute, W-16|9-A, Wayyala Kalava Street, Nellore-524001.

OBITUARY

With profound sorrow, the Institute records the demise of the following staff members:

Shri C. G. Kurian, Laboratory Attendant at Calicut, passed away on 23-7-76, after a brief illness. Shri Kurian was in the Institute's service since 1-8-1947.

Shri A. Ramaswamy, Laboratory Attendant at Mandapam Camp, expired after a brief illness, on 14-9-76. He was in service since 1955.

Shri S. Chelliah, Peon at Mandapam Camp, expired on 17-9-76. Shri Chelliah joined service in 1963.

Institute Benevolent Fund Grants interestfree Loan

From the benevolent Fund of the Institute a sum of Rs. 1750|- was distributed as Interestfree loan in September 1976, among 9 staff members.

Deputed for Training at C. I. F. E.

Shri G. M. Kulkarni, Research Assistant, has been sponsored to undergo training in Fisheries Science at Central Institute of Fisheries Education, Bombay, where he joined on 9-7-76.

Fish Mortality in Baithkol Cove

One of the hydrochloric acid storage tanks belonging to M|S Ballarpur Industries Ltd., Binage, Karwar, collapsed on 8 April 1976 and about 300 tons of acid drained to the adjacent cove. Fortunately at that time occurred strong seaward winds which carried the clouds of fumes off to the sea and there was no injury to any one. However, it is reported that about 2 tonnes of fish died in the cove due to the sudden fall of pH. As a precaution, the Port Officer, Karwar, asked the fishermen not to do fishing in Baithkol Cove and Karwar Bay for some days. At the instance of the Deputy Commissioner, N. Kanara, the Research Centre at Karwar has examined the hydrological conditions of the cove and submitted a report according to which there was no hazard to fishing in the area from 9 April as the conditions returned to normal. The fishermen were informed accordingly and fishing was resumed forthwith.

FISHERY DATA CENTRE, CENTRAL MARINE FISHERIES RESEARCH INSTITUTE, COCHIN—682018

STATEWISE MARINE FISH LANDINGS IN INDIA DURING 1975 (IN TONNES)

Sl. No.	Name of Fish	West Bengal & Orissa	Andhra	Tamil Nadu	Pondicherry	Kerala	Karnataka	Goa	Maharashtra	Gujarat **	Andamans	Laksha-dweep	Total
1.	Elasmobranchs	1,450	9,977	20,614	129	10,292	1,726	572	8,167	11,930	48	325	65,230
2.	Eels	4	1,837	110	4	12	81	64	1,101	2,497	—	—	5,710
3.	Cat fishes	3,383	9,824	7,469	55	32,603	3,222	1,367	8,236	2,514	15	1	68,689
4.	*Chirocentrus*	687	2,920	1,811	50	605	412	32	2,936	2,325	35	—	11,813
5. (a)	Oil Sardines	—	131	—	—	97,183	52,701	7,526	1,699	—	—	—	159,240
(b)	Other sardines	957	32,994	35,610	1,046	33,652	775	3,914	3,103	—	66	—	112,117
(c)	*Hilsa ilisha*	5,254	70	121	31	10	1	—	16	3,394	—	—	8,897
(d)	Other *Hilsa*	181	930	1,158	277	—	10	—	1,152	3,846	13	—	7,567
(e)	*Anchoviella*	207	7,037	10,873	412	11,432	10	31	533	130	79	—	30,744
(f)	*Thrissocles*	1,608	1,776	3,127	337	1,638	344	123	927	117	—	—	9,997
(g)	Other clupeids	3,436	7,536	5,406	50	998	568	419	21,172	13,192	9	—	52,786
6. (a)	*Harpodon nehereus*	3,043	359	1	—	—	2	10	51,645	44,554	—	—	99,614
(b)	*Saurida & Saurus*	6	242	1,026	44	11,294	75	151	218	1,267	—	—	14,323
7.	*Hemirhamphus & Belone*	5	24	1,482	55	278	36	—	52	3	16	29	1,980
8.	Flying fish	—	1	1,657	142	—	—	—	2	—	—	30	1,832
9.	Perches	201	4,888	8,153	389	14,741	727	45	2,484	3,261	157	186	35,232
10.	Red mullets	14	721	1,566	100	23	3	77	103	—	—	34	2,641
11.	Polynemids	224	1,836	1,339	14	105	3	63	1,628	8,832	—	—	14,044
12.	Sciaenids	4,474	11,682	10,096	212	16,811	1,853	3,048	20,576	45,781	—	2	114,535
13.	Ribbon fish	1,252	11,701	17,782	314	15,175	219	355	9,435	1,097	—	—	57,330
14. (a)	*Caranx*	237	3,498	6,225	610	7,190	746	1,078	2,240	1,012	108	61	23,005
(b)	*Chorinemus*	165	1,790	1,090	—	135	55	—	145	—	—	—	3,380
(c)	*Trachynotus*	—	6	—	—	6	49	—	3	—	—	—	64
(d)	Other carangids	2	6	8	—	85	92	—	—	14	—	—	207
(e)	*Coryphaena*	—	251	65	—	61	23	—	11	—	—	—	411
(f)	*Elacate*	1	25	87	—	62	31	—	15	—	—	—	221
15. (a)	*Leiognathus*	552	11,268	20,142	511	5,211	1,240	604	200	—	80	5	39,813
(b)	*Gazza*	—	101	29	—	—	—	—	293	1	—	—	424
16.	*Lactarius*	6	2,513	1,822	30	983	495	189	431	5,379	—	—	11,848
17.	Pomfrets	2,501	5,697	1,303	13	1,181	213	102	8,351	5,612	14	—	24,987
18.	Mackerel	116	1,593	5,826	2,259	14,930	12,469	6,779	1,860	—	115	—	45,947
19.	Seer fish	554	5,277	4,100	23	4,065	776	222	1,850	1,879	85	66	18,897
20.	Tunnies	16	664	1,785	—	5,845	212	2	274	546	9	1,932	11,285
21.	*Sphyraena*	3	119	1,506	27	396	14	—	17	26	25	17	2,150
22.	*Mugil*	44	954	1,566	31	74	8	124	30	600	84	—	3,515
23.	*Bregmaceros*	—	—	—	—	—	—	—	1,043	—	—	—	1,043
24.	Soles	30	305	785	125	6,932	373	16	487	2,991	—	—	12,044
25. (a)	Penaeid prawns	2,920	7,152	11,460	62	77,207	3,074	1,762	24,653	13,395	28	—	141,713
(b)	Non Penaeid Prawns	2,787	3,523	573	2	755	—	—	69,012	2,386	—	—	79,038
(c)	Lobsters	—	102	465	25	31	12	6	245	2,105	—	—	2,991
(d)	Crabs & other Crustaceans	8	605	13,896	260	1,797	2,540	227	550	10	—	—	19,893
26.	Cephalopods	2	151	2,953	58	3,342	175	96	482	611	—	19	7,889
27.	Miscellaneous	9,431	3,552	16,128	453	43,696	2,129	166	9,242	12,468	118	224	97,607
	TOTAL	45,761	155,638	221,215	8,150	420,836	87,494	29,170	256,619	193,775	1,104	2,931	1,422,693

** Exclusive of the catches by the Gujarat boats landed at Satpati (Maharashtra) which are included in the estimates of Maharashtra State.

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