the available fish seed is limited. Researches at the Central Inland Fisheries Station have helped to reduce the mortality of fish seed while they are collected and transported. A promising line of work has been successfully opened up whereby the carps have been induced to spawn in the ponds by the administration of pituitary hormone.

The estuarine fisheries mainly consist of capture fisheries in the coastal tracts like Chilka and Pulicat Lakes, large numbers of backwaters on the coasts and estuaries of the large rivers. Important estuarine fishes are Bhekti (*Lates calcarifer*), mullets (*Mugil* spp.), milk fish (*Chanos chanos*) and prawns.

A large part of our sea fish catches is seasonal and based on shoaling species like Sardines and Mackerel. This fact combined with the inadequacy of transportational facilities to send fish in fresh condition to the interior, has led to the development of a fish curing industry. The surplus catches are either sun-dried or salt cured and later sun-dried. Prawns are often boiled and sun-dried. Pit-curing and wet-curing by different methods are also practised throughout India, but the curing industry is best developed on the Kanara, Konkan and Malabar coasts. Recently, cold storage and ice plants have been established in various places and private industry has come into the field of freezing good quality prawns and fish. The bulk of cured fish produced in India is exported to Ceylon and other eastern countries and there is a growing market for frozen shrimp in the United States. In addition, small quantities of fish meal, fish guano, fish manure and fish oil have been exported to other countries for many years.

Fisheries have been looked upon for many years only as a source of revenue. It took many years to have that orientated to development and better utilisation of an important natural resource. In recent years administrative organisations to deal with fisheries have come into being in most States but much more remains to be accomplished if fishery industry is to contribute its full share to national economy.

SOME ASPECTS OF ESTUARINE HYDROLOGY AND BIOLOGY*

ESTUARIES are characterised by complexity of physical structure and pattern of circulation and ever-unsettled hydrological features. Studies of the vellar estuary (Lat. 11·29° N and Long. 79° 49° E) which is a bar-built estuary and always open to the sea show that it can be demarcated into (1) *a marine zone* with homogeneous salinity, (2) *a tidal zone* with higher salinity at the bottom and lower salinity at the surface, and with the difference between the bottom and surface salinities progressively increasing up the estuary and (3) *a gradient zone* with the difference in salinity progressively diminishing up the estuary, and which merges into (4) *the freshwater zone*. The existence of a stratification into an upper less saline and a lower more saline layer in this bar-built estuary makes it difficult to fit it into the generally accepted schemes of classification of estuaries. There is need for critical studies of the hydrography of Indian estuaries.

The salinity of estuarine waters is continually changing. Hourly and two-hourly studies of the hydrobiology of the vellar estuary have been continuously made for twenty-four hours on full-moon and new-moon days. The rate of change of salinity is not uniform but varies frequently in a marked manner during the flow as well as ebb tides. This is much more marked at the surface than at the bottom. The differential rate of the continual change of salinity is very significant for organisms in relation to their physiological adaptations and distribution in the different zones of the estuary.

The dynamic state of estuarine waters is also reflected in the fluctuations in the volume and composition of plankton from hour to hour. The volume of plankton collected has its maximum during night time at low tide.

Estuarine organisms are very suitable for comparative biochemical studies. Biochemical features of the gonadial cycles of estuarine fish have been under investigation in comparison with those in other environments. The pituitary and ovary during different stages show interesting variations in their biochemical constituents like free and protein bound amino acids, amino-nitrogen, alkaline phosphatase, etc.

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* Summary of paper presented to the 24th Annual Session of the Indian Academy of Sciences, Baroda.