Of the several physical processes occurring in the sea, vertical motions have special significance because of their marked effects on the oceanic environment. Upwelling is the process in the sea whereby subsurface layers move up towards the surface. The reverse process of surface water sinking to subsurface depths is called sinking. Upwelling is a very conspicuous feature along the west coasts of continents and equatorial regions, though upwelling also occurs along certain east coasts of continents and other regions.

Upwelling influences the physical, chemical, biological and geological environment of the region. Since upwelled water is rich in nutrients high fishery resources are common and variations in the intensity of upwelling, both in space and time are known to cause variations in the production of biomass at various trophic levels. The high productivity is reflected in the deposition of sediments rich in organic matter, which may lead to formation of valuable quantities of petroleum or phosphorite. The effects of upwelling are reflected in the meteorological conditions as well; the
cool and uneventful weather on the coasts of Peru and southern California is the result of upwelling. It has been known that variations in the Somali Coast upwelling affect the low level jet and hence the monsoon over India (Wooster, 1978). The 'El Nino' of 1972 not only affected the environmental conditions off Peru, but it had also a possible relationship with drought in Brazil (Caviedes, 1973).

Upwelling in the Indian Ocean is unique in many respects due to the periodic monsoon winds. Though upwelling in the Indian Ocean is not exclusively a phenomenon of the coast, regions of coastal upwelling are highly productive and heavily fished. For the better exploitation of various resources in the coastal regions a thorough knowledge of upwelling and sinking in these regions are necessary. In this Thesis it is attempted to find out the period and duration of upwelling and sinking off the Indian coasts, its causative factors and its major effects, and thereby it is aimed to get a detailed account of the physical process of upwelling and sinking. Particular importance is given to upwelling off the west coast of India.

The Thesis has been divided into six chapters, with further subdivisions and sectionalisations.
Chapter one has two sections. Section one deals with a general introduction, and in the other section the material and methods for the present investigation are presented.

The second chapter deals with the seasonal variation of temperature and density fields off the west and east coasts of India.

The surface vergence, windstress and sea level off the east and west coasts of India are dealt in chapter three.

Chapter four is concerned with the inferences on upwelling and sinking drawn from the study of temperature and density structure, vergence field, windstress and sea level variation off the west coast of India. Various other associated features are also discussed.

The fifth chapter has two sections. Section one deals with upwelling off the east coast of India, while section two is a comparison of upwelling off the east and west coasts of India.

The sixth chapter summarises the results of the present investigation and conclusion arrived at.