

# Eniwetok Marine Biological Laboratory

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The Eniwetok Marine Biological Laboratory, located in the northwestern portion of the Marshall Islands, 11°25'N. Lat., is situated in the most tropical location of any American marine laboratory. Because it is located on an atoll it exemplifies environmental conditions in a rather simple form, and enables the researcher to study a microcosm without the usual complications present in the sea adjacent to a large land mass. Important also is the fact that the fauna, and to a certain extent the flora, is exceedingly rich in numbers of species which present an unexcelled opportunity to study biotic interrelationships and subtle differences so important from an evolutionary standpoint.

More, specifically, the opportunities for both field and laboratory study of the more spectacular forms of tropical marine life are exceedingly good. Animals such as large specimens of *Tridacna gigas* can be held under experimental conditions, as can entire coral heads. Conditions simulating the classical "over the beach" route of colonization of land by marine forms can be recreated under laboratory conditions simultaneous with parallel studies *in situ*. The fundamental lessons in biology which just these few situations can reveal have more than justified the continued support of the laboratory by the U.S. Atomic Energy Commission.

EMBL has been in operation since 1952 during which period several hundred marine biologists have used its facilities. It is managed by the University of Hawaii through contractual arrangements with the Division of Biology and Medicine of the U.S. A.E.C. Scientists apply to the writer for accommodation at EMBL. A concise account of the research intended, the period of time anticipated, together with the types of supplies and equipment needed, are required for review by the Director of EMBL and the A.E.C. Approved programs receive the following support from EMBL:

1. Travel to Eniwetok and return from point of origin in the U.S.
2. Full board, room and laundry services at Eniwetok.
3. Use of EMBL supplies and equipment (with some opportunity for special supplies and equipment purchase from EMBL funds for certain projects).

The usual period of operation is during the summer months, but visiting scientists may be accommodated at other periods providing at least two persons are in residence to assure safety on field trips off the main island. Senior scientists are encouraged to bring student research assistants, for the experience in an atoll environment is valuable to both the young and the more experienced biologist. Because of the nature of living accommodations at Eniwetok, males only may go there. Each person must have a security clearance which requires up to two months' time for completion. Prospective visitors must initiate procedures at

least three months in advance of the desired date of departure for Eniwetok.

The following general fields of study are especially important ones for the Eniwetok area, but they are by no means the only ones. Any type of research which is fundamentally sound science and for which EMBL has special advantages will be considered suitable for support.

### **Energy Relationships**

Mass relationships of energy production and utilization in the various trophic levels can be easily undertaken at Eniwetok. Pioneer work of Sargent and Austin and of the Odums indicates that we can learn much from more detailed studies in such a tropical reef area where many of the usual variables are constant or nearly so.

### **Symbiotic Relationships**

Animal-animal and animal-plant associations are ubiquitous on the Eniwetok reefs. The early work of Yonge and his associates on the Great Barrier Reef can be extended at this location to reveal more precisely the interrelationships of corals and contained zooxanthellae, corals and the filamentous algal growth in the skeleton, and mollusks and their contained zooxanthellae, particularly *Tridacna* which is alleged to subsist entirely on its algal "farms."

Sensory mechanisms involved in selection of hosts by commensals and other types of organisms having mutualistic habits are readily accessible for investigating a great variety of species.

### **Colonization of Land**

Eniwetok has a crustacean population ranging from those always submerged, those occupying the intertidal zone, those occupying the beaches and supratidal zones, those which remain on terrestrial areas except for daily dips to moisten themselves, to those which burrow on land and go to the sea's edge only to deposit larvae. No better range of species is available anywhere for studying the morphological, physiological, and biochemical changes coincident with the colonization of land by marine species. One island has been set aside as an EMBL preserve to protect this "terrestrial" marine fauna so that it may be available to study in an undisturbed environment.

### **Metabolic Adaptions of Marine Organisms**

Virtually no information is available on metabolic rates, growth rates, longevity, etc., of a tropical fauna for comparison with temperate and arctic faunas. The entire problem of acclimatization needs this type of basic information which can be secured only under conditions such as are available in tropical regions.

### **Taxonomy**

Considerable effort has been put into the development of a named reference

collection of both marine and terrestrial biota of Eniwetok Atoll, and this constitutes one of the unique features of EMBL. Coincident with this development taxonomists have published extensively on the Eniwetok and central Pacific fauna and flora. Thus, identification of many species is facilitated, and biologists unfamiliar with the Indo-Pacific biota can work at EMBL with greater ease than otherwise would be the case. A small but highly selected library of systematic reports is maintained at the Laboratory to supplement the named specimen collection.