

## INSTITUTIONAL SCIENTIFIC INTERESTS IN THE SOUTHERN CALIFORNIA ISLANDS

John B. Loefer

*Office of Naval Research, Pasadena*

or even large bays as a part of the land area (Golomb, personal communication). From the point of view of delineating between terrestrial and marine biological provinces, it seems more appropriate to use the shoreline as the boundary of the land area. This has been done for the preceding figures; however, no correction was made for the different tide levels employed in the various charts used.

The original calculations for these area figures were in square nautical miles, and they are presented here to the nearest square statute mile and to the nearest square kilometer. Because of rounding-off, the two sets of figures are not directly interconvertible.

In most surprising contrast with frequently quoted area figures are those calculated for San Miguel and San Nicolas. Both of these islands, which are owned by the U. S. Navy and have been subject to extensive geological and archeological study, are actually considerably smaller than generally assumed.

Distance from the nearest point on the mainland is the second geographical fact that shows a particular relationship to the biota of certain California Islands. Variation in measurement of this distance depends primarily on projection distortion and map error. The figures presented here (table 2) are calculated from the charts cited and are rounded-off to the nearest statute mile and to the nearest kilometer. Certain of these distances have previously been documented with very accurate figures; however, the completeness of the present list should make it of value for comparative purposes. Figures are also given in table 2 for the distance to nearby intervening islands.

For convenient reference, the island abbreviations and the basic area and distance figures are presented again in a table on the inside back cover.

Ralph N. Philbrick  
Santa Barbara Botanic Garden  
January, 1967

It is appropriate to mention, at the outset of this symposium, something about the widespread interests of scientists in the Southern California Islands. These interests cover a number of fields, including archaeology, geology, oceanology, as well as botany and zoology.

Although the ocean has interposed a formidable geographic barrier preventing easy access to these islands, there are many published records about them by explorers and scientists. According to one compilation of references up to November 1942, approximately 500 publications had appeared. That was almost a quarter century ago. More recently there appeared an excellent annotated bibliography containing approximately 1,000 references on the oceanographic literature of the Santa Barbara Channel area<sup>1</sup>. These were selected from approximately 4,000 references, and the list does not include the vast literature on terrestrial biology that has also accumulated.

Another approximation of current scientific interest in the Southern California Islands may be obtained by noting a list of institutions at which staff scientists are pursuing research relating to these islands.

Superimposed on the map of the southern California coastal area, shown in fig. 1, are the names of many, but not all, of the southern California educational and research institutions, both public and private, which have interests directly or indirectly related to scientific problems of the Southern California Islands. These institutions may be grouped in several categories, as follows. (1) Botanic Gardens and Museums. Among these are the Santa Barbara Botanic Garden, the Santa Barbara Museum of Natural History, the Los Angeles County Museum, the San Diego

---

1. Aron, W., W. D. Clarke, R. G. Paquette, T. C. Tutschulte, and D. E. Well. 1962. A survey of the oceanographic literature of the Santa Barbara Channel area. Santa Barbara. 230 pp.

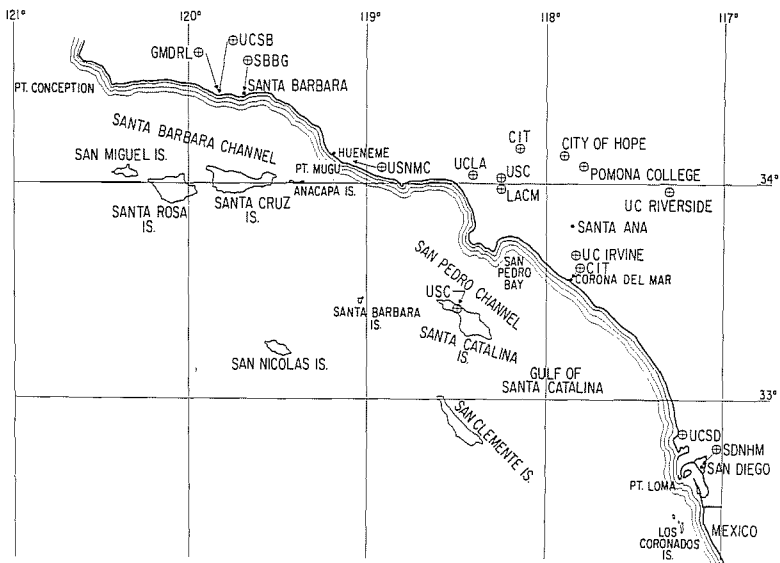


Fig. 1. The location of institutions concerned with the California Islands. California Institute of Technology (CIT); General Motors Defense Research Laboratories (GMDRL); Los Angeles County Museum (LACM); Santa Barbara Botanic Garden (SBBG); San Diego Natural History Museum (SDNHM); University of California, Los Angeles (UCLA); University of California, Santa Barbara (UCSB); University of California, San Diego (UCSD); University of Southern California (USC); U. S. Naval Missile Center (USNMC).

Natural History Museum, and the Rancho Santa Ana Botanic Garden. (2) Colleges and Universities. These include the California Institute of Technology, The Claremont Colleges, Los Angeles City College, Occidental College, the University of Southern California, and five branches of the University of California, as well as a number of the state colleges and some of the junior colleges. (3) Industrial Laboratories. This group has included such corporations as Lockheed Aircraft Co. and North American Aviation, Inc. Currently one of the most active of such laboratories is the General Motors Defense Research Laboratory. (4) Miscellaneous Institutions. This category includes such southern California organizations as the City of Hope, St. Johns Hospital, Marineland of the Pacific, Sea World, and World Life Research Institute. The list of participants at this symposium also indicates the interest of a number of more distant organizations such as the California Academy of Sciences and Stanford University.

A number of marine laboratories or stations have served the California Island area for many years, and these represent important centers of research activity. In many cases the stations have maintained research vessels. For example, scientists using research vessels of Scripps Institution of Oceanography, have conducted scientific expeditions in this area for years. The Allan Hancock Foundation played an early role in exploration of the waters around the islands, and its research ship, *Veleo III*, was used by the Los Angeles County Museum in the 1939 expeditions to the islands. Although there was a small field station and aquarium at Avalon in use about 1915, the first major station with modern laboratory facilities on the islands will be the one now under construction by the University of Southern California at the isthmus on Santa Catalina. Plans have been made for extensive inter-university cooperative educational and research programs.

The Kerckhoff Marine Laboratory at Corona Del Mar has been in operation since 1930 and has accommodated not only Caltech scientists and their students but others, especially from Pomona College. An extensive rehabilitation and modernization of the facility is underway.

The University of California, Santa Barbara, is one of a select few institutions to have an excellent marine biological laboratory on its campus. The cooperative working arrangement established several years ago with the General Motors Defense Research Laboratory for use of the R/V *Swan* has already proven to be mutually beneficial to both institutions. This campus of the University of California is ideally situated for ready access to the northern islands. It is encouraging to note that a good working arrangement with the owners of Santa Cruz and Santa Rosa islands has been in effect for a number of years and that a permanent field station is being constructed on Santa Cruz.

A number of government agencies have also been interested in the scientific potential of this area and in one way or another have indicated their interest. Two of the islands, Anacapa and Santa Barbara, constitute a national monument. Scientific research is encouraged on these islands; the Chief Scientist of the National Park Service reiterated this policy in a recent statement<sup>2</sup>.

Other federal agencies such as the National Science Foundation and the National Institutes of Health, through their facilities grants, have also contributed materially to the furtherance of scientific interests in this geographic area.

2. Sprugel, G., H. Stagner, and R. M. Linn. 1964. National parks as natural science research areas. *Trends in parks and recreation*, 1 (1).

The U. S. Navy has recently constructed a new marine biological facility at Point Mugu, where scientists of the Naval Missile Center and the Naval Ordnance Test Station are collaborating on marine mammal studies. There are also other research programs encompassing invertebrate marine biology, and many of them are being conducted in collaboration with university scientists.

The Office of Naval Research, through its contract research program, has supported financially the research of many scientists concerned with problems in this geographic area. This is only one way in which the Office of Naval Research has tried to encourage and coordinate governmental and civilian scientific efforts in exploring the scientific potential of the Southern California Islands.

Another effort to do this, something of an innovation, was carried out by the Office of Naval Research within the last two years. We called it project ILEX for Island Expeditions. Project ILEX consisted, in part, of a series of helicopter expeditions in which marine corps or naval pilots carried scientists on flying platforms to and from and around the Southern California Islands at seasonal intervals. We took along botanists, zoologists, archaeologists, geologists, photographers, and others who were interested in specific research objectives. While botanists and geologists collected specimens, others observed and photographed the sea lions and elephant seals. We also photographed aquatic habitat groups along the shores of Santa Catalina Island and the sites where the new University of Southern California station is being built. Through the use of these flying platforms, we overcame the sea barrier to these islands and the participating scientists of project ILEX accomplished in hours and days what otherwise would have taken weeks, perhaps months. Several scientific communications have already been prepared for publication, and other findings will be discussed during this symposium. We extended the ILEX flights to Los Coronados when the California grey whales were migrating, and anticipate extending this type of expedition southward and northward. The enthusiastic response received from scientists participating in this cooperative effort is indicative of the widespread scientific interest in the California Islands.

## WESTERN ANACAPIA - A SUMMARY OF THE CENOZOIC HISTORY OF THE NORTHERN CHANNEL ISLANDS

D. W. Weaver and D. P. Doerner

*University of California, Santa Barbara*

Anacapia is a geologic province which forms the southern boundary of the Santa Barbara Embayment and the northern limits of an old, often emergent, land mass - Catalina. It embraces San Miguel, Santa Rosa, Santa Cruz, and Anacapa islands as well as the western part of the Santa Monica Mountains (Reed and Hollister, 1936).

A study of the geology and evolution of the Northern Channel Islands, lying as they do on the southern edge of the Transverse Ranges (fig. 1) of California, has long held the interest of natural historians, both geologic and biologic. The Transverse Ranges as a whole form an anomalous feature to the general north-south trending structures of western North America. The Murray Escarpment, trending westward 1,900 miles out to sea, is believed to be a structural extension of this continental anomaly. This east-west trend terminates to the east against the great San Andreas fault system and the San Bernardino Range. Not only is it of interest for its obvious structural significance as it is related to one of the great features of the earth's crust, but this transverse feature also has strong biogeographical implications, having roots perhaps as far back as early Mesozoic time. With the progressive provincialization of marine faunas during the Cenozoic (Smith, 1919), these east-west trending mountain ranges, at times partly submerged, partly emerged, served as the limits on more than one occasion for new biogeographic provinces (Kleinpell and Weaver, 1963), some of which became distinctive and conspicuous life areas in the middle and late Cenozoic. Thus the Transverse Ranges serve as a focal point of considerable significance not only for structural but for biogeographic studies as well. In fact, these two fields, tectonics and chorology, are rather intricately interrelated, though perhaps more directly through intermediate climatological phenomena.