Introduction

Dennis M. Power
Santa Barbara Museum of Natural History, Santa Barbara, California 93105

The California Islands offer a fascinating set of natural laboratories that have caught the interest of researchers for many decades. To one degree or another, almost all of the museums and universities on the California coast, as well as governmental agencies concerned with natural resources, have been involved with research on the islands or in the Southern California Bight (see Loefer 1967 for a partial list). Among these, the Los Angeles County Museum of Natural History conducted a biological survey of the Channel Islands from 1938 to 1941 (Comstock 1939). They published the results of their studies in the period 1939 to 1964. In 1965, the Santa Barbara Botanic Garden, an institution with its own research interests on the islands, held a symposium on the biology of the California Islands, the published proceedings (Philbrick 1967) from which stimulated even more research in the years that followed. In addition, the fact that the continental borderland is important from economic and recreational perspectives has stimulated the gathering and analysis of new data. For example, the Outer Continental Shelf Office of the Bureau of Land Management (Department of the Interior) has recently conducted extensive investigations in the Southern California Bight, the National Park Service is involved in baseline and management studies on islands under its jurisdiction, and the Catalina Island Conservancy and Nature Conservancy (Santa Cruz Island) have gained research interests in the islands in the last few years.

This scientifically productive atmosphere gave rise to the Multidisciplinary Symposium on the California Islands held early in 1978 at the Santa Barbara Museum of Natural History. The purpose of the meeting was to bring together researchers from several disciplines and to provide a forum to summarize and advance our knowledge of the California Islands and the adjacent waters. The papers in this book stem from this symposium.

The Setting

The California Islands are situated along the west coast of North America, roughly between 38 and 27.5 degrees north latitude (Fig. 1). Because they are distributed along the edge of a continent, they are best classified as "fringing islands" (Carlquist 1974), rather than an "archipelago," which, in the strict sense, is defined as a sea containing many islands. All of the islands, except one, are on a topographically complex region called the continental borderland, a region made up of a diversity of submarine canyons and ridges (Shepard and Emery 1941). Guadalupe Island, the exception, is volcanic rock that rises some 15,000 ft (4, 570 m) from the ocean floor (Hubbs 1967).

The islands vary considerably in size, topography, and distance from the mainland (Table 1). The largest is Cedros, with a land area of 134 mi^2 (348 km^2). The smallest is Año Nuevo, with an area of slightly less than 12 acres, or 0.02 mi^2 (0.05 km^2). There are a number of small islets associated with some of the islands (see Philbrick 1967, table 1). Guadalupe, the second-largest of the islands, reaches the greatest maximum elevation and is farthest from the mainland, facts which make its biota among the most interesting for study.

Climatologists classify this region as one with a "Mediterranean Dry-Summer Subtropical" climate (Kimura 1974). Temperature, precipitation, cloud cover, and wind are strongly influenced by proximity to the sea, wherein seasonal patterns in currents, temperature gradients, and other physical and biological properties are also variable. If one general theme can be derived

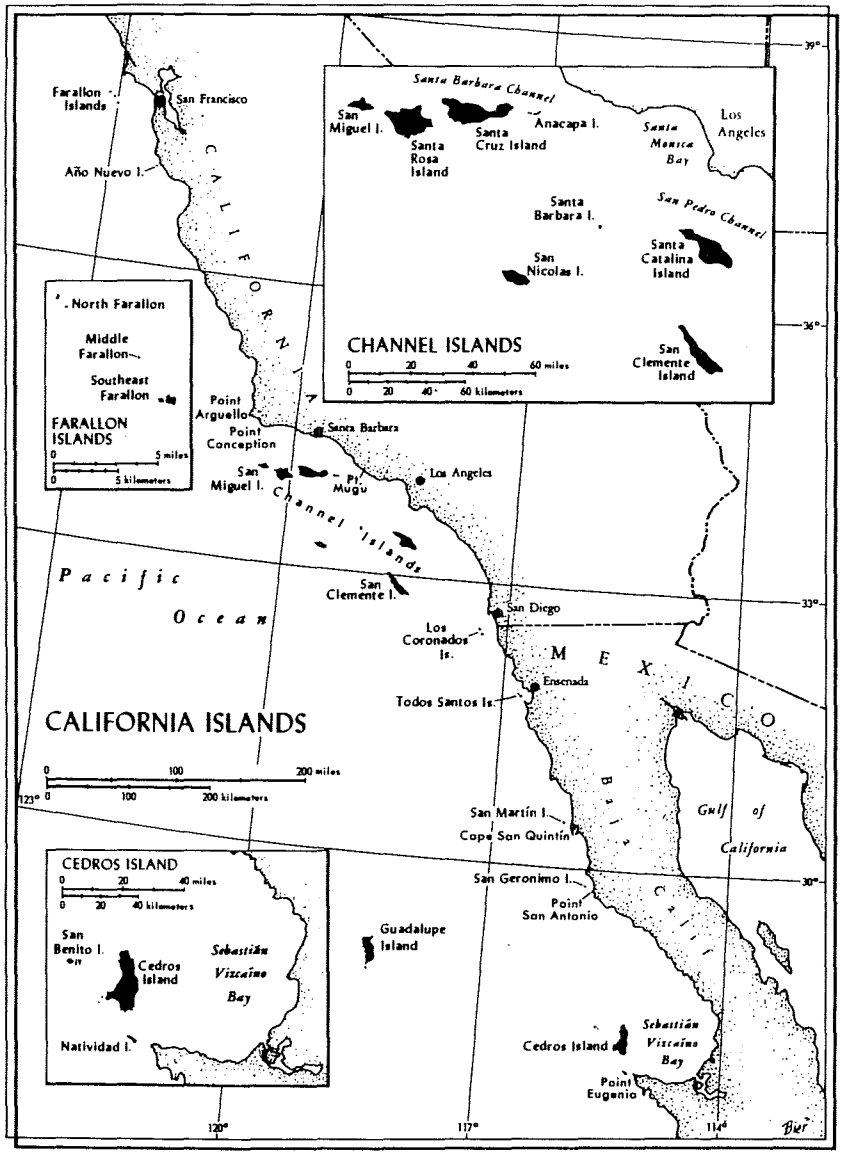

FIGURE 1. *Map of the California Islands.*

TABLE 1. Some physical attributes of the California Islands.*

Island	Area km²	Area mi²	Greatest elevation m	Greatest elevation ft	Distance to nearest mainland point km	Distance to nearest mainland point mi
Northern California Islands						
Farallon group†	0.9	0.3	109	358	33	20
SE Farallon†	0.5	0.2	109	358	33	20
Año Nuevo	0.05	0.02	18	60	0.5	0.3
Northern Channel Islands						
San Miguel	37	14	253	830	42	26
Santa Rosa	217	84	475	1560	44	27
Santa Cruz	249	96	753	2470	30	19
Anacapa†	2.9	1.1	283	930	20	13
Southern Channel Islands						
Santa Barbara	2.6	1.0	194	635	61	38
San Nicolas	58	22	277	910	98	61
Santa Catalina	194	75	648	2125	32	20
San Clemente	145	56	599	1965	79	49
Baja California Islands						
Los Coronados†	2.5	1.0	204	670	13	8
Todos Santos	1.2	0.5	96	315	6	4
San Martín	2.3	0.9	143	470	5	3
San Geronimo	0.4	0.2	40	130	9	6
Guadalupe	255	98	1402	4600	252	157
San Benito†	6.4	2.5	201	660	66	41
Cedros	348	134	1204	3950	23	14
Natividad	7.2	2.8	149	490	7	5

* Data on area and distance to the mainland are from Philbrick (1967, tables 1 and 2 of the Introduction). Data on elevation are from Johnson *et al.* (1968). Data on the total Farallon group are from National Wildlife Refuge information provided by Point Reyes Bird Observatory (pers. comm.).

† Area for these islands represents the total for various numbers of smaller islands, as follows: Farallon group, 7; Southeast Farallon, 2; Anacapa, 3; Los Coronados, 4; Todos Santos, 2; and San Benito, 3.

from the collection of research papers in this book, it is that the physical and biological components of both land and sea are interwoven in often complex, cause-and-effect relationships. For the California Islands, variation in size, shape, and degree of isolation, coupled with variance in oceanographic and climatic setting, prepare the stage for evolutionary changes and ecological interactions within the biota.

Organization of This Book

Forty-three papers are presented here, not including this introduction and a summary. The papers are organized by topic, not by formal, academic discipline. The judgment as to which

papers belong to what topic is mine, not the authors'. (I apologize for disturbing any reader's expectations about organization.)

The first section treats general geological history and two specific topics in geology and paleontology. Next are two papers concerned with prehispanic Indians in California. These are followed by papers with a geographical flavor that deal with changes in the landscape and in the vegetation, including the impact of extinct mammoths, Indians, and feral goats and sheep. The next section concerns botany in the usual sense and deals with the evolution and ecology of land plants. Then, there are two large sections dealing with biogeography, evolution, and ecology—first, of marine organisms and, second, of land animals. The marine section begins with an oceanographic topic that sets the stage for several analyses of marine plants and invertebrates. The marine section also includes the results of research on kelp fish, sea birds, and pinnipeds. The section on land animals begins with a paper about vertebrate distribution in the absence of land bridges. This is followed by more specific works on amphibians, reptiles, birds, and mammals. In the summary, I have attempted to pull together some of the threads common to various works, even though the collection of topics may be too diverse to do this in a totally satisfying way.

REFERENCES

CARLQUIST, S. 1974. Island biology, Columbia University Press, New York, N.Y.

COMSTOCK, J. A. 1939. Contributions from the Los Angeles Museum—Channel Island biological survey. Bull. So. California Acad. Sci. 38:133-134.

HUBBS, C. L. 1967. A discussion of the geochronology and archaeology of the California Islands. Pp. 337-341 *in* R. N. Philbrick, ed., Proceedings of the symposium on the biology of the California Islands. Santa Barbara Botanic Garden, Santa Barbara, Calif.

JOHNSON, M. P., L. G. MASON, and P. H. RAVEN. 1968. Ecological parameters and plant species diversity. Amer. Natur. 102:297-306.

KIMURA, J. C. 1974. Climate, Pp. 2-1 to 2-70 *in* M.D. Dailey, B. Hill, and N. Lansing, eds., A summary of knowledge of the southern California coastal zone and offshore areas. So. California Ocean Studies Consort. (BLM Contract no. 08550-CT4-1).

LOEFER, J. 1967. Institutional scientific interests in the Southern California Islands. Pp. 9-12 in R. N. Philbrick, ed., Proceedings of the symposium on the biology of the California Islands. Santa Barbara Botanic Garden, Santa Barbara, Calif.

PHILBRICK, R. N., ed. 1967. Proceedings of the symposium on the biology of the California Islands. Santa Barbara Botanic Garden, Santa Barbara, Calif.

SHEPARD, F. P., and K. O. EMERY. 1941. Submarine topography off the California coast: canyons and tectonic interpretations. Geol. Soc. Amer. Spec. Paper 31.

GEOLOGIC HISTORY AND PALEONTOLOGY