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THE PRINCIPLES AND PROBLEMS
OF SURFING

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The main purpose of this thesis was to analyze the sport of surfing from the point of view of the surf which is necessary for good surfing. Since surf occurs at the shores of beach areas, the first step was to examine the shore area of those locations which have beaches known to be surfing areas. A survey was made of the geographical, climatic, and meteorological features of these locations in which surfing originated and first developed as a sport in order to find out if any of these locations had any such features in common which might be responsible for the development of the sport in these particular places.

It was determined that the islands of Bora Bora and Tahiti in Oceania did have many favorable geographical, climatic, and meteorological features. Thus a hypothesis was formulated that certain geographical, climatic, and meteorological features might be a factor in the production of good surf for surfing at any location.

To test this hypothesis a survey of many of the other locations throughout the world was made. The results of this survey showed the following: (1) all beaches surveyed faced the open ocean, (2) all beaches were located between the latitudes of 44 degrees N and 35 degrees S, (3) most of them had a narrow continental shelf, (4) fifty per cent of the surfing

areas had a warm current flowing past their shores, and (5) most of the beaches, except Hawaii which lies in the belt of the Northwest Trade Winds, lie in the belt of the Prevailing Westerlies. This is good when the winds blow in the same direction the waves are traveling. The evidence obtained from this survey supported this hypothesis. Geographical, climatic, and meteorological characteristics are therefore suggested as factors in the production of good surf.

Despite the fact that the evidence obtained seemed to indicate the above hypothesis valid, it also became evident that some other factors must be involved. It was necessary to investigate such questions as: How are the waves which ultimately become surf produced? Are there any specific characteristics of the beach area not detectable by mere observation of the above water features which might affect the formation of the surf?

To attempt to answer such questions as these required an investigation of certain specific aspects of well-known surfing beaches. It was necessary to investigate the physics of the sea and the geology of above water and underwater features at these beaches. Since waves are produced by the winds blowing over the surface of the ocean, the greater the expanse of ocean the more energy the waves will have when they reach the beach. Further study of waves and particularly their behavior revealed that as waves approach the shore their behavior changes. Not only do they break in specific

ways to produce surf but also their speed and direction change.

One finding of the analysis of the geographical features of beaches which seems to have been overlooked by other investigations is the significant effect of the nature of the underwater continental shelf at surfing beaches. Another factor upon which the nature of the surf at a particular location depended was the presence or absence of offshore sand bars or reefs.

To complete the investigation of the factors which need to be considered by surfers in order to gain the most "sport" from their activities, an attempt was made to correlate the characteristics of surfboards with the characteristics of surf and also to correlate the characteristics of surfing techniques or skills with the characteristics of the surf. They were namely: (1) the shape and length of the surfboard are dependent upon the nature of the surf in which the board is used, and (2) that the most difficult skills and techniques of surfing are required in surf producing waves which are large and have complex and unusual behavior.

The recent growth of interest and participation in all water sports and the consequent developments of new and improved motors for boats has resulted in experiments in what is called "fresh water" surfing. Another recent development related to increased knowledge of phenomena occurring in the water areas of our environment is "tidal bore" surfing.

The field of oceanography which is regarded as a new frontier of science is expected to yield much new knowledge of the sea and its waves. The inventions of new devices with which to make more careful and accurate observations and measurements of oceanographic phenomena will probably result in modifications in current ideas and theories. Gains in the science of oceanography might aid the surfing enthusiast in predicting the arrival times of peak surf at particular locations and in the possibility of accurate surf forecasts which would be similar to weather forecasts presently being made.