"Barriers are of many different kinds. For a lowland animal, a mountain range is a formidable barrier. For a steppe animal, a dense forest is a barrier. For a species adapted to warm water, a cold current is an effective barrier. For land mammals, my special topic here, the most important barriers are wide bodies of water. The broad outlines of the historical geography of mammals are concerned mainly with the development of the faunas of the various continents. and the barriers most important for this study are the stretches of sea that have at different times separated one continent from another

"The probability of spread of a group of animals from one region to another may have, any level from nearly impossible to nearly certain, depending on the geographic and other environmental conditions between the two regions. Although any degree of probability may occur and no sharp distinctions are possible, it is convenient to consider three main sorts of paths of faunal interchange: corridors, filters and sweepstakes routes.

"A corridor is a route along which the spread of many or most of the animals of one region to another is probable.

"A filter is a route across which spread of some animals is fairly probable but spread of others is definitely improbable. Hence some elements of a regional fauna expand readily across the filter and into another region, but other elements do not. The route is a Semi-barrier that permits parts of faunas to pass but filters out others. (Of course this is still a matter of degree; a corridor usually filters out some animals, and a strong barrier does not necessarily hold back all animals.) A filter may be a desert, such as the Sahara and adjacent deserts, or a mountain range, such as the Himalayan system. Between different continents, a filter is generally a land bridge, an isthmian connection narrower and more specific in environmental conditions than a corridor and hence a stronger impediment to faunal interchange. That intercontinental land bridges do have strong filtering action, that they are filter bridges, is one of the most important conclusions from the study of faunal interchanges. The connection between North and South America is a filter bridge now in existence

"At the other end of the scale from a corridor, a sweepstakes route is one across which spread is highly improbable for most or all animals but does occur for some. In other words, a sweepstakes route is a formidable barrier that is nevertheless occasionally crossed. The implication of the term is that as in a lottery or sweepstakes the odds against winning are enormous but nevertheless someone does win. Another point is the element, apparent at least, of chance in following a sweepstakes route. Where a corridor or a filter exists, most or all of the groups adaptively capable of following the route will do so rather promptly. With a sweepstakes route, probabilities are so much against all groups that crossing may be long delayed. What groups do, in fact, cross, which do so first, and when they do so seem to be largely matters of chance, determined almost at random.

"For land animals the most obvious and important sweepstakes routes involve spread across channels, straits, or still wider sea barriers . . ."

-- George Gaylord Simpson, *Evolution and Geography* (Eugene, Oregon: University of Oregon, 1962), pp.18-24.