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Continuing Diversifying——the only Megatrend of Evolution

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ABSTRACT

For the whole living world, the only trend in evolution is continuing to diversify-genetically, morphologically, trophically, functionally ecologically as well socially, and to radiate into any corner of the biosphere.

Key words biodiversity increase, evolutionary trend

Many scientists considered that long-term, directional natural selection is the basic explanatory device of evolutionary theory (Eldredge, 1989). "rectilinear", "orthogenesis", "irreversibility" (Dollo's Law, 1893), "parallelism", "convergence", "continuity" and "replacement" etc. are some rules that evolution obeys, but on a grand scale, the only orientation in evolution of the whole living world is continuing to diversify, and to radiate into any corner of the biosphere.

Creating as many species as possible

Diversification and specialization in the rank of cell are the first step in the radiation for early organisms. The different degrees of cellular evolution can create organisms at different levels. The higher the rank of an organism, the more complicated of its body structure. As evolution goes on, more and more advanced organisms are appearing, but the primitive organisms do not change even a little. So the evolution is just a process of increasing new ranks at the frontier, which has nothing to do with the lower rank organisms. In the history of the earth, many species had been washed away through natural selection, but the most mysterious thing is why most of the lowest organism species maintained. The great chain of being is keeping on elongating with evolution. The numbers of rank of the living world are continuing growing, the more complicated the biological elements (cells, tissues and organs), the more species will appear. The diversification in functional morphology prepared the prosperity of more new species.

Occupying as many ecological niches as possible

At the beginning, organisms only lived in the oceans, afterward (Devonia), some organisms flurished in terrestrial environments, e. g. lacustrine and fluvial environ-

ments. Some times later, the animals developed into space, such as insects and birds as well as flying reptiles (Mesozoic). Also some periods later, some animals (tetrapods) appeared, which means the land (or terrestrial) environment became the most important habitat for organisms. Among the 1.5 million scientifically described species living on the earth today only about 250 thousand species live in marine environments. Explorations have revealed that every inch on the surface of the earth is inhabited by living organisms, no matter how severe of its environment is—dry or wet, hot or cold. The Arctic duck can stand at temperature as low as 110 degrees centigrade below zero; on the mountains of more than 8000 meters high, there still exist some animals (Bufo vulgis, and some birds) and plants (moss) and fungi; in the hot springs on Himalays, some protists can tolerate temperature as high as 60 degrees centigrade (Qian Wenyan et al., 1974); sciensists have found some bacteria in space of 40 thousand meters high. On the other hand, one kind of fish (Bassogigas profundissimus) lives in the deep sea of 8300 meters; in the northwest Pacific Ocean, one kind of mollusc has been found in a depth of 10 700m under the sea; one kind of earthworm can dig into the earth as deep as 8m. In the desert also exist some plants and animals. Besides the natural ecological niches, the bodies of organisms are also very important niches for some parasites. Conclusionally, filling all the ecological voids is the second step for the development of organisms.

Using the natural resources as efficient as possible

Trophic diversification (different food habits) not only can lighten the stress of competition for food and enable more organisms to survive and develop, but also can make the natural system cycle restlessly, too. Theoretically it is possible to have ecosystems which contain only producers and decomposers, but in fact it is far from enough for the complicated living world. The occurrence of consumers not only destroyed the simple linear form of food chain, it really makes the trophic structure complicated, too. Among the group of comsumers, there is a wide variety of food habit. One species can occupy more than one trophic livel. Most herbivores eat many types of plant, while most carnivores eat several types of herbivore and other carnivores. Consequently the linear food chains interconnect to form food webs (Emberlin, 1983). The diversification in feeding habit not only makes the full use of nutrients and suports more animals, but also can maintain the nutrients longer in current, the more steps in a food chain, the more completely the nutrients will be used, the more biomass will be produced. The diversification in trophic levels also can reserve more energy for organisms.

Intraspecific diversification——sexual and social

The diversification in functional morphology, ecological niche and feeding habit created the variety of the living world, but the diversification among different members (or individuals) of the same population has made a good living order. The author regards the diversification inside the population as intraspecific diversification, which is very apparent in two aspects: sexual and social.

Sex difference is the most important phenomenon of diversification inside the population, the higher of the rank of a species, the more remarkable the sex difference. In

many species there are pronounced sex differences in the following aspects: morphology, physiology, behaviour, body size, fat depostition, haemoglobin level as well as in metabolic rate etc. Research shows that in some species there are pronounced sex differences in feeding ecology (Gautier-Hion, 1980) as well as in the effects of starvation on survival (Widdowson, 1976).

Social differentiation is another important phenomenon among different individuals of the same population. Social diversification is the highest form of biodiversity. Social divergence means cooperation and advancement.

The higher of the rank of a population, the more complicated of its intraspecific diversification. Intraspecific diversification inside *Homo sapiens* is the most complicated one.

To conclude, in the past, the pressure of natural selection was overestimated, the struggle for existance was also severized, because species that were eliminated through natural selection and competition are rare. On the other hand, organisms fill almost all the ecological niches. The living world is adjusting itself continually, the increase in diversity is the mechanism of selforganisition and selfbalancing, this evolutionary process enables organisms to avoid severe struggle. Finding new territory and new resources is always the major aspects of evolution.

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