Evolution Ecology Informatics 2003/11/19 Sakura（sakura@iii.u-tokyo.ac.jp）

From Biological Evolution to Evolutionary Theory of Knowledge and Culture (2)

●Two Methods to Apply Theories of Biological Evolution to Human Knowledge and Culture:

1．Follow the trail of evolutionary history→previous lecture(11/5)

2．Treat knowledge and culture as evolutionary systems

● Non-life Evolutionary Theory

- Biological evolution=self-reproduction system of information ;adaptive system; systems that create complexity
- Universal selection theory (Dawkins, 1986; Cziko, 1995)
- Cultural evolution (Cavalli-Sforza & Felman, 1981; Boyd & Richerson, 1985)
- Memetics (meme; Dawkins; 1976; Blackmore, 1999; Aunger, 2001)
- Genetic algorithm (Holland, 1975)
- Evolutionary Epistemology (Popper,1968,1972; Lorenz,1941,1952; Campell, 1974; Toulmin, 1972)

● Points of Caution

- Up until today there have been numerous 'XX evolutionary theories.' (e.g. evolutionary theories of society, architecture, tools etc) →failure in every case → Don't follow in the footsteps of these failures.
- Why have past 'XX evolutionary theories' failed?

Reason 1. One cause is an inadequate concept of evolution: There is confusion between evolution and progress, There is preconceived notion that evolution brings about optimal results, Whiggism (e.g., extinction of dinosaurs) only placed focus on the survivors.

Reason 2. The other cause is inadequate concept of life: life is taken as a hierarchical structure. There is this myth of intentionality and an obsession with 'life=harmony' (cf. Gaia hypothesis)

- Life is much more "easy going."

- Evolution is “tinkering” (F. Jacob), *The Panda’s Thumb* (S.J. Gould)
- Evolution of life required colossal amount of time (four billion years) and massive amount of extinction (>99%)

●Bibliography

Blackmore, S. *The Meme Machine*, Oxford University Press (Book that bravely debates the evolution of mankind and civilization with memetics)

※ For further readings refer to http://park.itc.u-tokyo.ac.jp/sakuralab/index.htm.