A Review of the Fundamental Structure of Area or a Contribution to the Theory of Development of Area with a Paticular Reference to the Distributions of Lilium and its Related Groups. (1)

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古池 博：分布域の発展についての一考察 (一)

There are two status to treat the multiformities between the areas. The first[1] mainly put the interpretations by climatic and geological diversities of present and past. Is this view-point right ?

If this view is correct, area is merely a side of histry of earth, and the diversities of area are to be attributed to the contingents for the evolution of the taxon.

In the second status, it is assumed that the low of area is the fundamental cause of the multiformities, therefore, though the accidents in the history of the earth are the main cause of each case, the main cause is essentially subordinated to the low.

"On the History of Plant Dispersal "offered by Dr. Masamune[2] and[3] are the representative of the latter. The low such that an area developes from initial or progressive endemic stage, through pandemic stage, prodiscontinuity and meta-discontinuity stages, to relic endemic stage, is confirmed by many cases. Then, from what organization of area and how is the low brought about ? The purpose of this essay is to offer a small contribution to the problem.

In the first place, a general analysis of area is to be taken. An area is an area inhabited by a natural group of plant. Therefore, the foundation of area is the natural group. For a natural group, the following propositions are admissible in systematic botany. 1) A taxon is an approximation of a natural group. 2) A natural group including biological species or being biological species itself is a stage of the evolution of plant.

Biological species is the smallest stage of evolution or the smallest natural group and is a mass of ordered developmental stages of a great many plants, which are bound through phylogenetical, orthogenetical and consanguineous relationships. For example, the group including *Cardiocrinum cordatum* var. *Glheni* Hara, *C. cordatum* Makino, and *C. cathayanum* Stearn is a biological

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species including 9 developmental stages characteristic to the lifecycle. ie : Seed-stage, germinating-stage, rosett-stage, stem-growing-stage, spore-forming-stage, gametophyte-forming-stage, flowering-stage, fruiting-stage, and seed-forming-stage.[4] About spermatophyta more than 2 stages of physiologicaly characteristic in their development as temperature-stage and light-stage were confirmed.

The mass has populational composition of developmental stages. These developmental stages are inverted relatively.The invertion is called development. The smallest constructive unit of development is the invertion from one developmental stage to the next. The invertion is subject to heredity and variability* of the developmental stages concerned. A developmental stage requires of its own characteristic material conditions and responses in a definite way to the various conditions to be assimilated. The sexual process is an important but merely a peculiar form of development. The variability of heredity brings about variations to the diversities of the assimilated conditions. Therefore, each stage of development, for the conditions to be assimilated, is to be bound with the suitable parts of the environment. The binding is formed through the whole of or a part of the plant body. For example, to light, the leaf is bound through the functions of photosynthesis, and composes a part of the vitality of the plant body. In general, the vitality is determined as the measure of the binding with environment. The phytosociological concept of vitality has anything in common with such idealisms as Vitalism. The heredity of vitality of each stage composes the viability of the life of plant body.

A series of invertion from one developmental stage to the next, forms a lifecycle. As nothing but the abolishig of a developmental stage makes the next stage create itself, the abolishing of one lifecycle itself through the circulation, creates the next lifecycles. The reproduction of a lifecycle produces the new heredities or the varieties at the same time.

The interrelations produced by the developmental stages, which are bound through lifecycles, construct the relations of subsistence. Relations of subsistence unify the developmental stages or the several parts of vitality, lock out unrulable parts of the components of the vitality from the relations, formulate the correlations of the characters and organize the heredity and variability. Variations appear initially on the characters or the components of the vitality. Vitality lets the relations of subsistence change and makes it correspond to the vitality. As far as the vitality developes or changes, the new vitality forms the new

* The conception of heredity and variability of Lysenko[5] is applicable.

relations of subsistence which is separated from anterior relations of subsistence, and, in which the vitality begins to develope. In other words, the correspondence between the new vitality and relations of subsistence, or the new mode of living have grown in the old mode of living and are independant now. The new mode of living means a new biological species.

It is conclusive that the evolution of plants is the evolution of the mode of living, and that the formation of any natural group can not but begin in the form of the formation of biological species.* The intraspecific interrelations of the biological species or the relations among the modes of living organize the communities in general, and the main form is association. The association consists of two moments. Those are the ceaseless antagonism between the interrelations of subsistence and the ceaseless assimilation of materials and conditions given by another through the vitalities of each one. Association, the fundamental unit of plant community, is assimilation of the mode of living in relative. Assimilation of the biological species of a community bring to succession, the abolishing of the old community itself with the organization of new community, or inverts itself to the next stage through the exclusion of the unfit and antiquated species.

The series of succession of association is the process of reltaive invertion through the assimilation of conditions, mainly biological species. Associations are to be classified through their behavior, motion, and some characteristic, though the natural system of vegitation did not yet performe. Neverthless, relative invertions and circulations through the series of succession is unified to the mass of species at last. Mass of species is a mass of developmental stages of which areas are in common intersection. Of course, phytososiological circle is in the pile or in the intersection of areas.

Then, we conclude that the area of species (taxon including species in general) is constructed through the community as the intermediation between the species (taxa).

The troublesome analysis demonstrates that the fundamental structure of area is communities to which the species (or taxon) is related. Then, what are the motions of area on the fundamental structure ?

First of all, the newly organized mode of living is the contradiction to the

* Then, it is logically inevitable that the new genus as a stage of evolution can not but developes from the corresponding older genus, not differentiating from the new species.

mode directly anterior to itself. The new mode excludes its direct ancester through the organization of communities in which have been the niche of the direct ancester. Therefore, the origin of the area can not but reflect the motion undergone in the foundation.

The initial endemic or progressive endemic stages appear as islands (Polygenesis is apodictic under the premise such that the natural group including biological species is the stage of the evolution.) in the sea of ancesters which are in the old modes of living. The new species or the new group of species aquire their niches through the relative assimilations, extend their areas. The areas are fused partly, and come to the initial or progressive discontinuous stage.

On the contrary, the direct ancester is excluded from the communities, so that the area is cut and narrow.

Then, the new area grows to the pandemic stage. For the extention of the area, the species (or natural group in general) have of such a mode of living to be widely adaptive, or it organizes such vitality as is bound to more variable communities, such heredity and its variability as rules the vitality and such relations of subsistence as organizes the mode of living. Therefore, subspecies, cline, etc. are the side of the mode of existance of species. The development of vitality finally contradict to the relation of subsistence and make the relation of subsistence of itself independent. Then, at the end of the pandemic stage, there are organized initial endemic islands of each new modes of living which are directly next stages of the one of the pandemic stage. The pandemic stage is inverted to the metadiscontinuity stage (Dr. Masamune quantitativily noted the difference between the pro- and metadiscontinuity stage.). At the boundary area, at which two masses of species meet with their frontiers, it is probable that the diversities of intraspecific interrelations and communities promote the process that the invertions of the species constructing each mass come out. Neverthless, the species is to the new species now what the direct ancester is to the species before. The islands extend while the sea is cut and becomes narrow. Accordingly, there come metadiscontinuity stage, the advent of twilight. The situation reversed itself. Island turned to sea and the sea to island. Lastly, it is in the relic endemic stage, the area is to be islands or an island in the sea of new area, and, at some future time, the islands vanish into the sea.

Thus, in general, the developmental stage of area of a certain natural group is defined such that the area related in opposition to the developmental stage of the area of direct ancester and to the ones of a direct descendant. (to be continued.)