

DESIGN WITH NEW METHODOLOGY : THE 'MEMORY' OF LAND, LAND ART, BIOMIMICRY

新手法による農村の景づくり

～土地の記憶、ランドアート、バイオミミクリーの概念～

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The purpose of this study is to develop a new concept of landscape design methodology using as a case study the design of a 'symbiotic' park in Kashiwazaki, Niigata Prefecture. This concept addresses the problem of deteriorated landscapes.

Presently, one critical issue in Japan is the deterioration of the rural landscape which began one hundred and forty years ago. At the end of the Edo period, a visiting English diplomat appreciated the beauty of Japan's landscape so much that he called it 'the garden island.' The word 'garden' suggests that the landscapes have well-tended rather than natural beauty. It is unfortunate that in the Meiji period the concurrent introduction of technology and modernism to Japan has led to the neglect of context in designing environments. Furthermore, the fundamental concept of creating space has been lost during the postwar period of hyper-expansionism. As a result, not only the rural landscape but also most of the city-scapes and town-scapes have lost their 'sense of place.'



WORKSHOP PARTICIPANTS DISCUSSING THE ISSUES AND CONSTRAINTS AND THEIR DREAMS FOR THE PARK.

These chaotic vistas should be reconstructed and refurbished during this millennium. Only a new design methodology can rectify this problem. The definition of landscape architecture by Michael Laurie is 'Landscape is a reflection of dynamic, natural, and social systems. Landscape architecture is concerned with the planning and design of land and water for use by society on the basis of an



IN THE THIRD SESSION PARTICIPANTS APPROVED THE MASTER PLAN.

understanding of these systems.'¹⁾ At this period of time when a paradigm shift is going on, a new concept for this field is demanded. In this study from the viewpoint of a landscape architect, among concepts derived from the site itself, three key concepts are chosen and discussed.

The first key concept is 'Memory of Land'. As one of the assets of a site, the history of the land itself is such an important issue that the first concept should be derived from it. The second key concept is 'Land Art' which means to take the site as a canvas to manifest the will to the other world. The third key concept is 'Biomimicry' which is basically a methodology to cooperate with the nature, which is essential for recreating a site.

These three key concepts of landscape architecture, 'Memory of Land', 'Land Art', and 'Biomimicry', which are needed for recreating rural landscapes, are examined through designing a 'symbiotic' park in Kashiwazaki. These are interwoven in the design of this park. In this report the process oriented design methodology is shown in several diagrams which actually made citizen participation easy in the workshops. Through studying these three concepts and design processes, a clue for the new methodology for the rural landscape is to be clarified.

keywords : 1)Memory of Land, 2)Land Art, 3)Biomimicry

1)土地の記憶、2)ランドアート、3)バイオミミクリー
- (生命に学ぶ)

I. THREE KEY CONCEPTS

I-1. MEMORY OF LAND

Every piece of land has its own multiple layers of the historical past. This basic fact is named by the author 'Memory of Land'²⁾ In this site in Kashiwazaki, the 'Memory of Land' stems from thousands years ago. The site is considered to have been a center of high technology during the Iron Age. Perhaps this historical concept could be transformed into the new design. As a result, design would be extracted from the layers of 'Memory of Land.' Most of the time the information is given by documents, yet sometimes the necessary information regarding 'Memory of Land' is passed on by elders to younger generations. Therefore, the proposed workshop^{Note 1)} is a means of finding such precious memories. In such a workshop each

participant is an asset for finding clue for design.

In this way 'Memory of Land' can be metaphorically manifested into the new space as a representative layer of the present.

The scientific layer system of a site created by I. McHarg has been an orthodox and inevitable system to start with. Upon this basic layer system, completely new aspect, 'Memory of Land' is introduced as a first key concept in this site. Layers vary, including the ecological history of the site, and the site's position in relation to the universe, etc. The higher the number of layers piled on the site, the higher the dimension of the landscape design will become. (See Fig. 1.) It means that the more elements are considered, the richer the meaning of the space become.

The land has an intricate history hidden from people or from its surface. To penetrate that history and discover those secrets we need to search the land's layers.

I-2. LAND ART

Land Art is a form which enables artists to depict concepts on the land. In the 1970's in the United States, many artists expanded their activities to the land. The land is used as a canvas that projects the artist's message to the universe. A landscape architect also uses the land as a canvas to manifest his/her message to 'the other world'. There is, however, a significant difference between Land Art and Landscape Architecture : the former is a means for the artist to project his or her concepts, whereas the latter involves not only the artist's idea but also an awareness of the needs of both land and community.

The rural landscape is a natural form of land art without man's artistic intention . This type of landscape is often called vernacular landscape 'non-design.'^{Note 2)} For example, the landscape formed by production of rice crops has been continuing from generation to generation.

Japan is a topographically small-scale country.

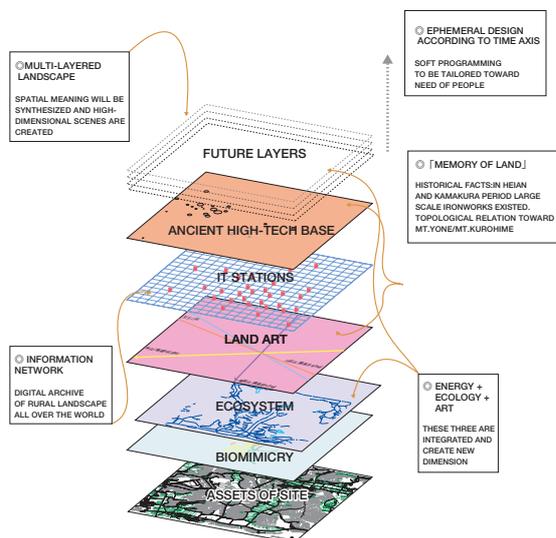


FIG. 1 HIERARCHICAL DIAGRAM : MULTI-LAYERED STRUCTURE : THE BASIC LAYER EXPRESSES THE ASSETS OF THE SITE. DIFFERENT ASPECTS ARE LAYERED ON. MORE LAYERS WILL BE ADDED IN THE FUTURE.

Therefore, our ancestors devised a method of farming which maximized crop production. As farmers worked to gain the most from the fields and the steep mountain areas, a special natural design emerged called 'tanada' (step-like paddy field).

This is the quintessence of beauty in rural landscapes categorized in 'non-design.'

In this case the farmers have cultivated their land with a sense of beauty. Until recently this tradition has been inherited. The technique has been diminished because the young successors have not been brought up in agriculture fields. An awareness of Land Art is an essential element in rural landscape design.

I-3. BIOMIMICRY

To learn from nature is the fundamental concept when designing any piece of land. Landscape architects listen to the spirit of the land, and at the same time analyze sites scientifically. The ecological conditions are carefully considered and design criteria are decided according to the results of the analysis.

As a result of these processes a completely new idea of technology is being conceived - 'Biomimicry'. 'Bio' means life and 'mimicry' means imitation in Greek. This theory is described by J. M. Benyus, who is a Canadian journalist and wrote a book, 'Biomimicry'.

Benyus's major concepts in 'Biomimicry' are:

1. *Nature as model.* Biomimicry is a new science that studies nature's models and then imitates or takes inspiration from these designs and processes to solve human problems, e.g., a solar cell inspired by a leaf.
2. *Nature as measure.* Biomimicry uses an ecological standard to judge the "rightness" of our innovations. After 3.8 billion years of evolution, nature has learned: What works. What is appropriate. What lasts.
3. *Nature as mentor.* Biomimicry is a new way of viewing and valuing nature. It introduces an era based not on what we can *extract* from the natural world, but on what we can *learn* from it. ³⁾

According to her theory, the technology which was created by the Industrial Revolution in Europe stems from just 250 years ago. She postulates that in the 21st century, a completely new technology could be invented by learning from 'Biomimicry'.

One such example she cites is the abalone : the shining, beautifully colored abalone's shell is produced deep in the sea, which is a time consuming process; yet once the abalone dies, it vanishes from the surface of the earth. On the other hand, the creation of an equally complex and beautiful textures by human technology requires a lot of energy, and the material ends up as scrap after it has been used.

Just as the light battery was innovated from photosynthesis, a completely new technology will emerge from 'Biomimicry'. The theory could be applied to landscape

methodology.

In Japan, learning from nature has been inherited from generation to generation, so it is easily accepted, yet in modern times we seem to have forgotten it; therefore, we have to realize this fact and we have to consider this concept very carefully, when we create a new place.

These three fundamental concepts always lead us when we design a place.

In the following chapter the case study of a symbiotic park in Kashiwazaki will be described. This park is an experimental park with new ideas, from which a new information for revitalizing all 'Satoyama' -- village forests and fallows in Japan will be conveyed.

II. CASE STUDY : A SYMBIOTIC PARK IN KASHIWAZAKI

II-1. SITE ANALYSIS : ISSUES AND CONSTRAINTS

The site is located four kilometers from the center of Kashiwazaki city, which is in the western region of Niigata Prefecture. The site is planned as a core area of the 'Kashiwazaki Eco-city Plan' and is called the Kashiwazaki

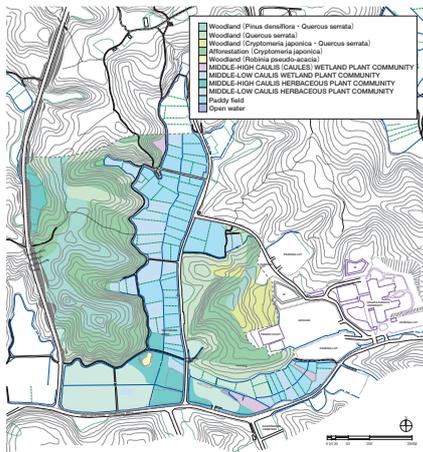


FIG. 2 VEGETATION CLASSIFICATION DIAGRAM : THE FIELD SURVEY CLASSIFIED THE FOLLOWING ; CEDAR PLANTATION GROVE, RED PINE-OAK GROVE AND OAK GROVE. THE MARSH COMMUNITY IS IN THE LOWLAND AREA.

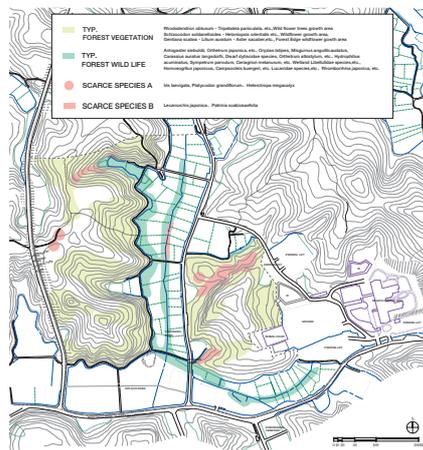


FIG. 3 VEGETATION PRESERVATION DIAGRAM : THE SITE HAS GOVERNMENT-PROTECTED PLANT AND ANIMAL SPECIES. ALSO ECOLOGICAL SUCCESSION IS BEING CAREFULLY CONSIDERED.

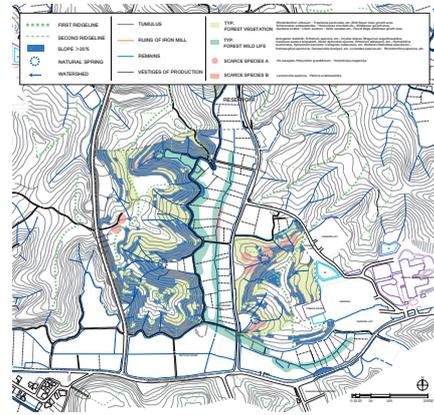


FIG. 4 VISUAL INVENTORY OF THE SITE : PHYSICAL CONDITIONS SUCH AS WATERSHED, MOUNTAIN RIDGES, AND EXISTING VEGETATION WERE EVALUATED IN RELATION TO THE SURROUNDING AREAS.

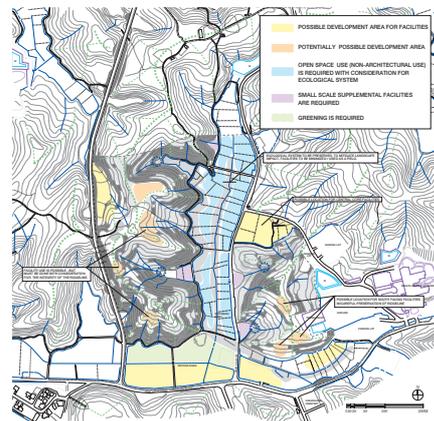


FIG. 5 EVALUATION CRITERIA : GENERAL FRAMEWORK FOR DEVELOPMENT BASED ON THE VISUAL INVENTORY

School Zone because it includes two colleges, the research parks, and the educational and cultural zones of 180 ha. The central planned park area is about 30 ha.

The surrounding environment has elements of a typical rural landscape such as 'Satoyama' and rice fields. It is an ordinary landscape with beautiful green hills, yet it has been neglected for a long time. In fact it is a typical example of a deteriorated contemporary rural landscape.

The critical issue of the site is that the upper adjacent area is planned as a main road crossing the whole area, which gives a severe environmental impact to the park site. The water shed would be cut off by the road.

Our study started with the visual scale analysis of the site. The ecological studies have been done by an assistant professor of Wakayama University, Mr. S. Yabu, and his group. The issues and constraints from the ecological research show that valuable species of vegetation are in critical condition. (See Fig. 2 and 3.)

The main stream of water in the central area of the site is important assets for the site as well as the bottoms of the hills which fringe on to the wetlands. These critical areas should be preserved in an appropriate manner.

II-2. PROGRAMMING

The workshops conducted by the chairman, Dr. I.Shinji,

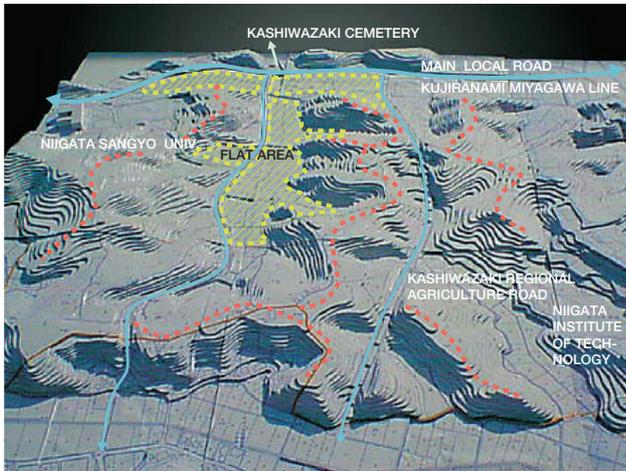


FIG. 6 VISUAL ANALYSIS BY STUDY MODEL :
LOOKING FROM THE NORTH SIDE TOWARD THE ENTIRE SITE. TO MINIMIZE THE VISUAL IMPACT, THE REDLINED RIDGE OF HILLS SHOULD BE PRESERVED TO THE UTMOST EXTENT.

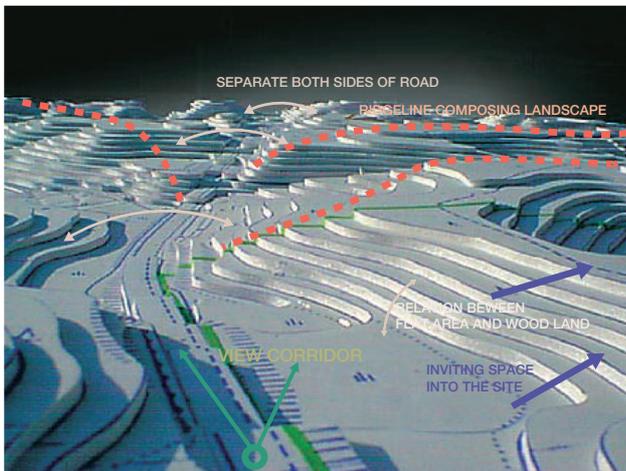


FIG. 7 VISUAL ANALYSIS BY MODEL :
LOOKING FROM THE WEST SIDE. TO MINIMIZE ENVIRONMENTAL IMPACT, THE FRONT AREA IS MOST APPROPRIATE FOR BUILDING.

were held three times in 1998. Thirty-six members including residents, local government officers, clients and the present owners of the site together with fellow professionals discussed what this symbiotic park should be. All the opinions discussed were categorized and projected spatially into a plan. The more the discussion proceeded, the fewer the number of items of programming became. A consensus has been reached on the symbiotic park to 'minimize facilities and preserve the vernacular rural landscape'.

In order to realize this consensus, the programming should have priority.

A completely new system of managing the park will be devised. Since this site is an experimental field for 'Biomimicry', the entire park is to be used as an educational field to 'learn from Nature'. Maintaining the rural landscape is an appropriate educational experience for the younger generation. It is important for urban children to have contact with this environment. It is advisable to have an exchange-program between children brought up in urban settings and those in rural settings. For this programming, the following facilities are required: ECO-HOUSE, ECOMUSEUM FOR SATOYAMA, LAND ART MUSEUM, ARCHEOLOGICAL

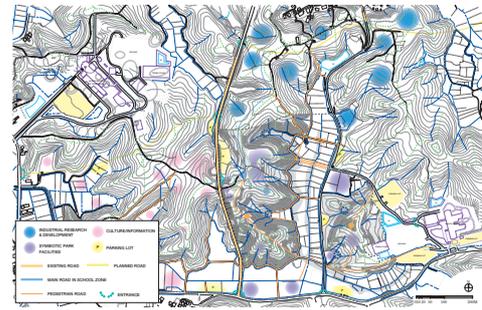


FIG. 8 SITE INTENT DIAGRAM INCLUDING ADJACENT SITE :
TOTAL SIZE OF THE SCHOOL ZONE IS 180 HA. THE COLORED CIRCLE AREAS ARE THE ONLY ECOLOGI-CALLY SOUND SITES.

PLAY MUSEUM, ENVIRONMENTAL FARM, MARSH ARBORETUM, MARSH ECOMUSEUM, WATER SPRING AND CASCADE, WORKSHOP FIELD AND ITS CENTER STUDIO, OPEN FIELD, WATER PURIFICATION GARDEN, POND, REST HOUSE, WELCOME PLAZA, AMPHITHEATER, FOREST PARKING, FLOWER TREE CORRIDOR, NATURAL PLAY AREA IN FOREST.

This entire site should function as an environmental-education classroom not only for local residents but also visitors from all over Japan. The main target should be the children living in the cities and the teachers could be older residents who have kept this environment since their childhood. These programs started in 2000 with the workshop members.

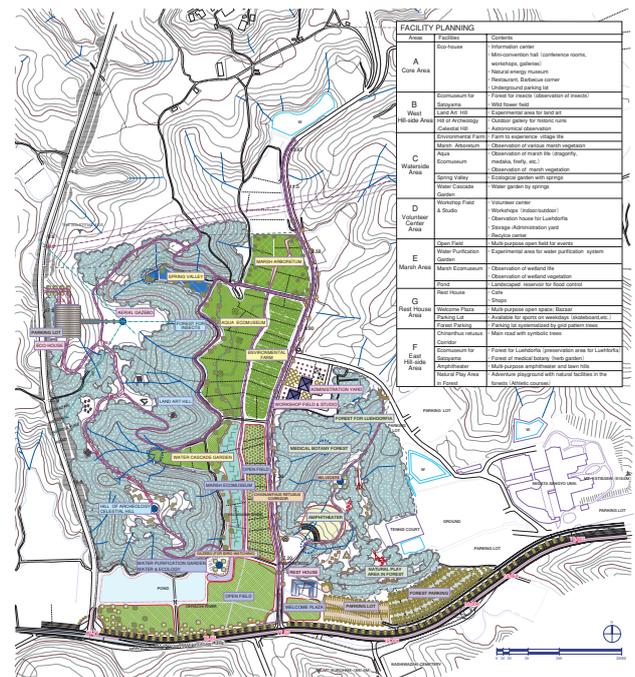


FIG. 9 MASTER PLAN

II-3. SPACE COMPOSITION

For ecological stability, the main target is to minimize the impact to the site. The contours of the site are supposed to remain unchanged. In order to utilize the relatively flat areas to the utmost extent, the buildings are sited to these areas. Utilizing the difference in grade at the northwest corner of the site makes half of the Eco-house appear to be

buried. Adequate space for each facility is sited carefully according to the grade and 'Memory of Land' . (See Fig. 9.) As a result the space composition is logical.

According to the site analysis (See Fig. 4.), the most vulnerable areas must be kept as they are and maintained. The watershed areas, some parts of rice fields, precious plants and animal communities, and mountain ridge areas will be maintained. The rest of the area is to be utilized for human activities.

Besides the logical approach, the concept of 'Land Art' is interwoven into the entire site, so that it seems to be an open air landscape museum.

For example, there is an archeological hill for future excavation. (A specialist has argued convincingly that the site is likely to contain evidence of highly-developed cultures). This area is used for children where they can experience to imagine the past, the time axis. This is a direct use of 'Memory of Land.'

This typical rural landscape is composed of rice fields, surrounded by low rolling hills (*Satoyama*). It seems just a typical landscape at a glance, yet the different layers of meaning piled on to it by our design works enhance the landscape to a higher dimension.

In this kind of environment where people are forced to think of space carefully, 'Biomimicry' would be pursued by the workshop participants.

In order to let new generations learn from Nature, those almost forgotten typical rural areas will become experimental 'Biomimicry' laboratories. As a result these areas will be vitalized and maintained. For instance, according to given curricula participants will experience aspects of rural life.

II-4. CIRCULATION

One of the factors causing the deterioration of the rural landscape in this century is the rezoning of farmlands in order to maximize productivity with minimum labor. Human labor has been exchanged for tractors, for which hard surface roads have been constructed by government grant. Small-scale rice fields were consolidated to form larger-scale fields in a rectangular shape in order to improve efficiency in farming. As a result, the roads which used to have a human scale and have a balanced beauty with rice fields and rolling hills have been altered. Nowadays these roads cut the contextual relationship of the landscape and communities. Thus, the cohesiveness of landscape scenery has been destroyed.

This site is an example of this issue. The existing agricultural road is running in the center of the site from north to south. In addition, the City Planning Bureau has authorized the construction of a twenty-meter-wide road. As mentioned in the previous chapter (See Fig. 10.), this road will destroy the ecological system of the central area by cutting the watershed. Under these conditions the main issue is to provide a main road to circulate the entire park without environmental impact. In order to pursue this task we are starting to use the existing roads as much as possible

and provide a road connecting two universities which are located in the south east and the north west ends of the site.

By providing an inviting path between these two universities, we hope students will participate in the activities in the park. The sense of amenity is required for this path.

To maintain the concept of circulation, the separation of the main transportation road and pedestrian path is necessary. The circulation structure is planned as shown in the diagram. (See Fig. 10.) The existing mountain paths are to be widened to two meters. The width of new main road for automobiles will be 4 meters, and the main pedestrian road will be 2.4 meters wide.

Most of the visitors will park their cars at the fringe areas and then rent mountain bikes, or electric vehicles, which are available at each information center.

From the viewpoint of landscape design, it is more favorable to provide a forest-like setting for automobiles rather than a concrete parking lot. We plan to define individual parking areas by planting trees six meters apart.

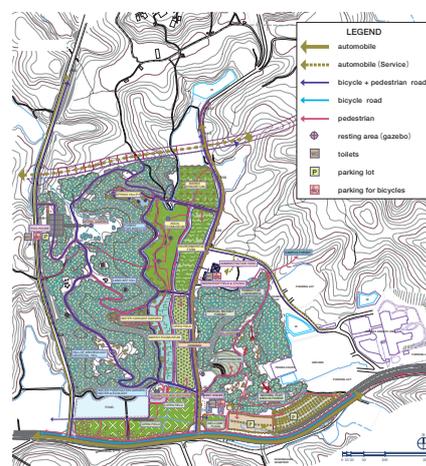


FIG. 10 CIRCULATION DIAGRAM

II-5. SPACE, DRAMATURGY, MANAGEMENT

Space, Dramaturgy and Management form a trinity. In other words, the space structure of the park is vitalized by aspects of its programming such as the direction of the park and its management system.

The space itself provides the concepts of 'Sequence', 'Open-closed', 'Rhythmic', 'Theater-like', 'Museum-like', 'Articulation', and 'Sense of Place'. The dramaturgy intensifies the meaning of each place. The park provides various kinds of stages for visitors. Many choices of scenario are possible in each space.

'Dramaturgy' includes 'Ephemerality' which is produced by showing the phenomena of 24 changing seasons, with flowering trees and plants and deciduous trees, which are chosen from the potential natural vegetation. Since one thousand years ago, in Japan, there have been more than 24 names to express each season. In this park, we plan to let visitors be aware of not only 24 seasons but also 48 seasons by providing variety of vegetation and activities to manage it.

The major goal of park management is to preserve the quality of the park. Time-axis management is a key to accomplishing this goal. The management of public parks has depended on the local governments which own the parks. Because of decreasing availability of public money, it will be almost impossible in the future to manage parks with government support alone. So it is very important to provide a new, creative management system for new parks.

The participation of citizens of all ages, encouraged by inviting and creative programs, is one solution.

Land Art Installation such as Triennial 2000 in the Tsumaari area (Niigata Pref.) is one of the challenging creative programs produced by F.Kitagawa and participated in by 142 leading artists from all over the world. During the period all roads and towns in the area were revitalized. This kind of event should be held in this site before the park is constructed.

Studying nature in this park will provide participants a profound experience that continues over time. As a result, the park will be managed properly and the information of this park will be prevailed via net work and other deteriorated unused village forests and fallows will join this program. The exchange program of each region will revitalize the whole rural landscape.

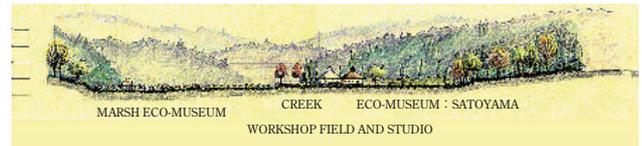


FIG. 12 SECTION : EXPERIMENTAL STUDY AREA FOR BIOMIMICRY



FIG. 13 MODEL LOOKING FROM THE SOUTH ENTRANCE AREA : AMPHITHEATER, RESTHOUSE, OPEN LAWN AREA, GAZEBO, WATER-PURIFICATION GARDEN, FLOWER CORRIDOR(MAIN ROAD), FOREST WITH PLAY AREA



FIG. 11 SCHEMATIC MASTER PLAN

III. ONE HUNDRED YEARS' VISION

In view of the area 's future unfolding the design respects traditional five-element theory, which acknowledges the presence of five elements (wood, earth, water, metal, and fire) and the effects caused by interaction of these elements.

Wood: The ecological relationship between vegetation



FIG. 14 MODEL LOOKING FROM THE NORTH : ECOLOGICAL WATER GARDEN, EXPERIMENTAL ENVIRONMENTAL FIELD, FOREST FOR INSECTS, WIND GAZEBO, ECOHOUSE PARTIALLY BURIED IN THE HILL, LAND ART HILL, WORKSHOP STUDIO, ARBORETUM

and human activity is the key design challenge of this site. Forest vegetation consists of red pines and their succession group, a secondary forest. The forest and its succession was maintained until the 60 's by using pines and oaks as fuel. To insure the continuation of the forest it will be necessary to clear and plant prudently so that natural succession can continue.

Earth: Minimize the change of grading, so that the surface soil will be kept and microorganisms will be preserved. The land's fertility will provide a rich farmland area in this region.

Water: The watershed should be preserved as it is. Each water spring will also be utilized as a natural cascade without changing the slopes. Whenever rain falls a creek will emerge. Each watershed gathers to a stream as it runs down

and goes into the reservoir area where a hydrophyte botanical garden is planned.

Metal: Stones are used for street furniture and amphitheatres. Metaphorical archeological fields of the Iron age are provided for education purposes.

Fire: Natural light sources are to be maximized and artificial light should be minimized. This site will provide an opportunity to see the stars and the moon reflected on each rice field.

These five elements (Wood, Earth, Water, Metal and Fire) which compose the universe are interwoven in this symbiotic park. The layers of these elements create profound scenery which will last for hundreds of years.

Thus rural landscapes of this area will continue succession and be preserved at the same time.

IV. CONCLUSION

Through researching and designing the site as a case study, we concluded that the common critical issues of this country, that is the deterioration of rural landscape could be rectified if each site is planned and designed in the manner we have described.

Landscape design informed by MEMORY OF LAND, LAND ART and BIOMIMICRY can restore Japan 's rural landscapes. With its visual beauty and sustainable ecology intact Japan will again be 'the garden island 'in its new meaning. Thus a new layer of tradition will be created on each site.

Note 1 : WORKSHOP: The concept of workshop method was created by Laurence Halprin, a landscape architect and a teacher of the author, in order to utilize the collective energies and talents for creating spaces, such as parks, towns and housing communities. This method has been used for citizens' participation all over the world.

Note 2 : Non-Design : A place not intentionally designed by a designer, that has its own beauty as if it were designed.

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NOTE : 'A SYMBIOTIC PARK IN KASHIWAZAKI' (tentatively named) is the project sponsored by Tokyo Electric Power Co., Inc. The project was given from the city to Japan Greenery Research & Development Center in 1998. I was one of the professional workshop participants and our office took a role as the working team. After this master plan was approved, the soft programming session started in 2000 which means it is on going project.

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