

# Design of a Hillside House in Kirishima with a Small Office

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An approach is made here emphasizing of the temporal design in a hillside house in natural environment with a small office. In particular, to find individual personality, a creative workspace (CWS) as a part of the brain of house was designed. At the same time, the internet and information system between home and office is utilized without attending, realizing the maximum effect with the minimum effort for both of time and energy.

**Keywords:** temporal design, natural environment, creative workspace

## 1. INTRODUCTION

The rapid pace of change of the environment due to consuming energy is making people wonder how long this environment will remain suitable for living creatures including man. Up to the present, knowledge has been limited, and has not been able to resolve this anxiety. To begin with of addressing this question from the temporal perspective, an attempt is made here in design of a house.

From various human activities, we are trying to synthesize meaningful environmental planning, which will take the temporal value as well as the spatial value into consideration (Ando, Johnson and Bosworth, 1996; Ando; 2004). A representative example of the application of this concept of environmental design may be found in concert hall acoustics (Ando, 1985, Sato, Mori and Ando, 1997, Ando, 1998). The sound field in a room can be altered with careful manipulation of four orthogonal factors describing subjective preference. These factors comprise two temporal factors associated with the left hemisphere, and two spatial factors associated with the right hemisphere (Ando, 1998). The spatial factors (IACC and LL) can determine the architectural form of a concert hall under design. The temporal factors are closely related to design of a specific concert hall, which can be altered to showcase specific types of music, such as organ music, chamber music or choral works. It is worth noticing that subjective preference is the most primitive response, in which the direction is maintaining the life. Thus, brain activities corresponding to subjective preference may be found.

## 2. CONCEPT OF THE TEMPORAL DESIGN

It may be realized by addressing ourselves to three stages of human time (Fig. 1):

- (1) Time of the body;
- (2) Time of the mind, and
- (3) Time of creation based on a unique personality.

The third life is the source of creation and the most unique to man, who shall be responsible to any of living creatures. All healthy creations, which may contribute to the world including the human life for a long time, have been based on the unique personality of the individual. Therefore, the environment is designed for every stage of time. A well-designed en-

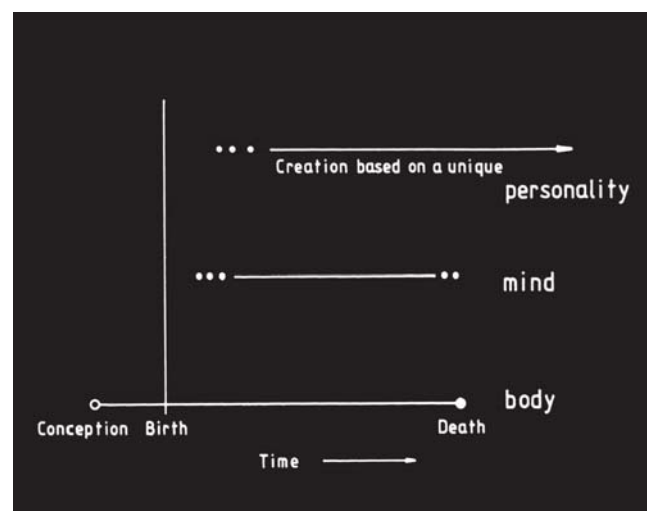


Fig. 1. Three time stages of human life to be considered in the temporal design.

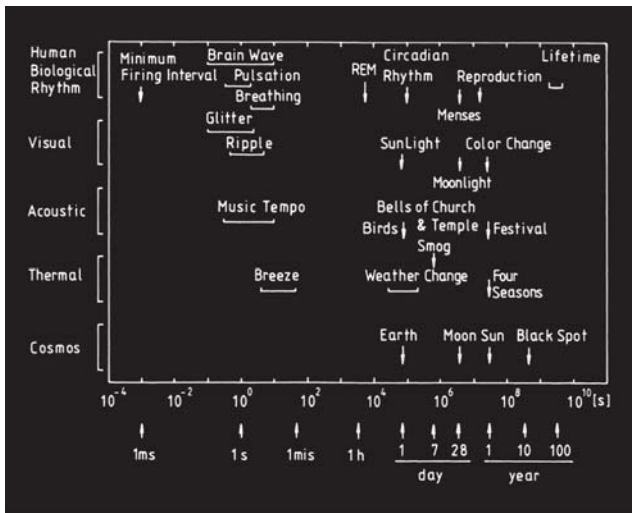


Fig. 2. Blending human biological rhythms and discrete periods of physical environments.

environment would be a meeting place for art and science, and in turn may help to discover the individual personality as the minimum unit of society. Animals do not have any third life, but the first and the second. Communication between man and animals may be made only through the non-verbal channel, which is associated with our right cerebral hemisphere.

In our life, as shown in Fig. 2, experiences of discrete periods for man and physical environments may be blended. Remarkably, there are certain significant periodic “eigen” values in both human biological rhythms and physical environmental activities in the time domain to be designed. Following the musical tempo of order of 2 s, there are eigen values, such that about 90 minutes corresponding to rapid eye movement (REM) or period during sleep and wakefulness in man, one day, one week, one month, one year or four seasons, about 30 years as a generation change, about 90 years as a human life time, the cosmic time and so on. Thus, we do not need to consider every “real” time period, or an infinite number of scales of time. Thus, a crucial factor in the temporal dimension of the environment related to man is cycles. Every aspect of the passage of time is bound up with cycles: birth and death, the changing of the seasons, sleeping and waking, work and leisure. The present theory suggests that these cycles should be explicitly recognized during the design process as well. The passage of time in the designed environment should be as consciously considered as the three-dimensional organization of the space itself (Ando, Johnson and Bosworth, 1996).

The purpose of this paper is to apply this design theory in which temporal factors are explicitly considered in individual house design introducing the CWS. We emphasize here need of the brain part corresponding to the left and right hemi-

spheres in each house.

### 3. DESIGN STUDY OF A HILLSIDE HOUSE WITH A SMALL OFFICE

The house is located at a hillside in Kirishima, Kyushu, Japan about 700 m above the sea. In the first stage of time, the bedroom, for instance, is designed with three parts of small windows, so that it reminds like a cave with a little amount of natural lights making body relax. For the second stage of time particularly for the periods of day and four seasons, windows in the living room, kitchen and bathroom are carefully designed to have enough lights from outside and to look at trees and the large scale of natural garden including the Sakurajima with active volcano and the bay. The skylights full the porch and table. The veranda is joyful space for tea and food in the morning and afternoon.

In the third stage of time, which is very human, a proposal is being made a space for working at home with the office system. The temporal period of work must be about 90 -120 min., which corresponds to the sleep and wakefulness (REM) period (Othmer, Haydn and Seglbaum, 1969). An example of the creative workspace (CWS) making fully activation of both hemispheres is shown in Fig. 3.

Previously, eight systems of this kind of CWS have been introduced in March 2002 to Ando Laboratory, Kobe University. It consists of “three different panels” specialized for the

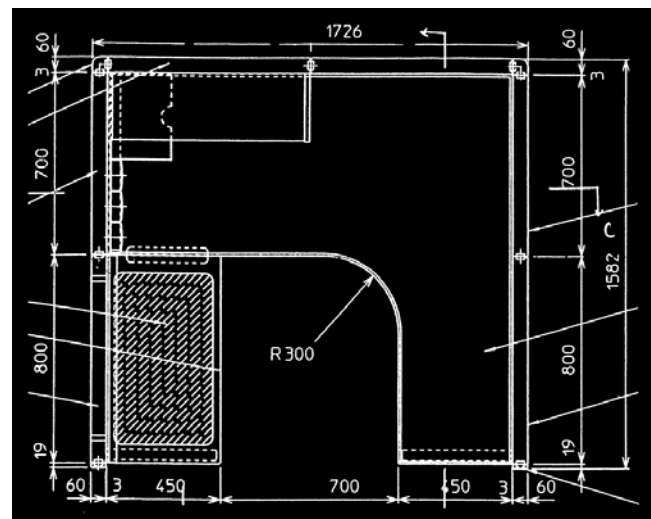


Fig. 3. Panels of a “creative working space (CWS)” introduced at Ando Lab., Kobe University, in 2002. A shaded part of desk panel on the left-hand side is used for working space such as for painting, drawings and handicraft (the right hemispheric tasks). For example, a front panel and a right panel are used for the information system and for works with temporal processing such as for writing, calculating and logical works (the left hemispheric tasks), respectively.



Photo 1. Exterior view of the hillside house in Kirishima.



Photo 2. Exterior view of rear of house.



Photo 3. CWS (small office) in the hillside house with a view of south window of the office making relax of the brain. The left hand side of panels is specialized for the right hemispheric tasks and the center part of panels is used for the left hemispheric tasks. And also, the right hand side of panels is used for the left hemispheric tasks.

left and right hemispheric tasks (Sperry, 1974, Ando 1988, 2001) and for the integration of knowledge by an information-communication system. The left hemispheric task is the temporal processes including writing, reading, speech hearing, calculation, and logical considerations. The right hemispheric task is the spatial processes including pattern recognition, space forming, drawings, paintings and making of a scale model. It is promising that multiple dimensional ideas might be created by such a multiple dimensional workspace. This quite differs from a usual “one-dimensional” working space, which might create only one-dimensional similar idea. Eight users were reported that the total qualities of this system were 2.5- 15 times (average 7 times) better than one-dimensional desks, which they have used, and efficiencies of works increased to 2 -15 times (average 5 times). All of users, therefore, reported efficiencies were more than 2 times at least ( $p < 0.01$ ). Verbal and non-verbal materials previously created by a user, which are displayed on the walls around the three panels, may induce further creations.

Photo 1 is the hillside house designed by one of the authors, which includes the CWS activating two cerebral hemispheres (Photo 2). An inter-net system between home and office may realize the maximum effect with the minimum effort for both of the time and the energy, without attending everyday to the working and studying places (Photo 3).

#### 4. THE ARCHITECTURAL DESIGN CONSIDERATIONS

The plan of the house has two axes (Fig. 4). The dominant east-west axis is the backbone of the house and is placed parallel to the contours of the steeply sloping site. Situated along this axis are the human activities associated with the



Photo 4. Ladder to loft above the bedroom.

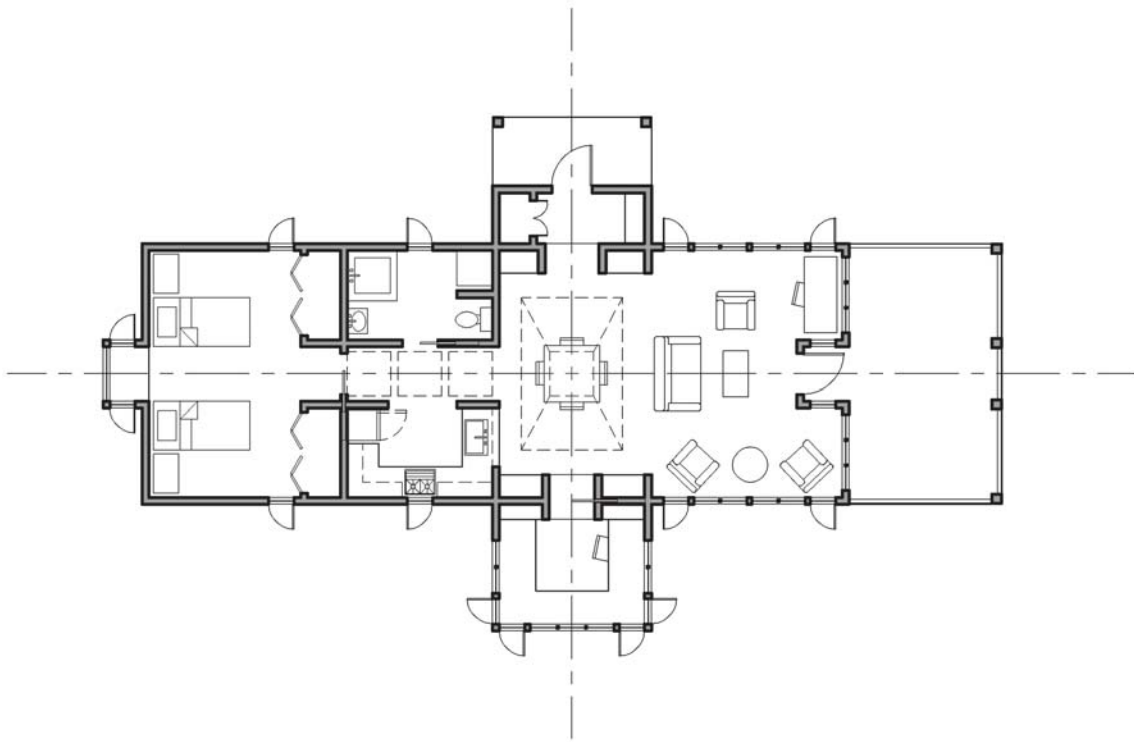


Fig. 4. The floor plan of the hillside house designed by Thomas L. Bosworth, including the CWS.



Photo 5. View of kitchen.

time frames of the body and the mind. This axis stretches from the dark quiet of sleep in the bedroom of the west end (Photo 4) through the areas for washing, cooking (Photo 5), eating, and socializing (Photo 6). It then proceeds to the brightness of the porch (Photo 7) with natural light from three sides, and finally continues through space reaching into the infinity of the rising sun in the east.



Photo 6. View of living room.



Photo 7. Entrance to porch.

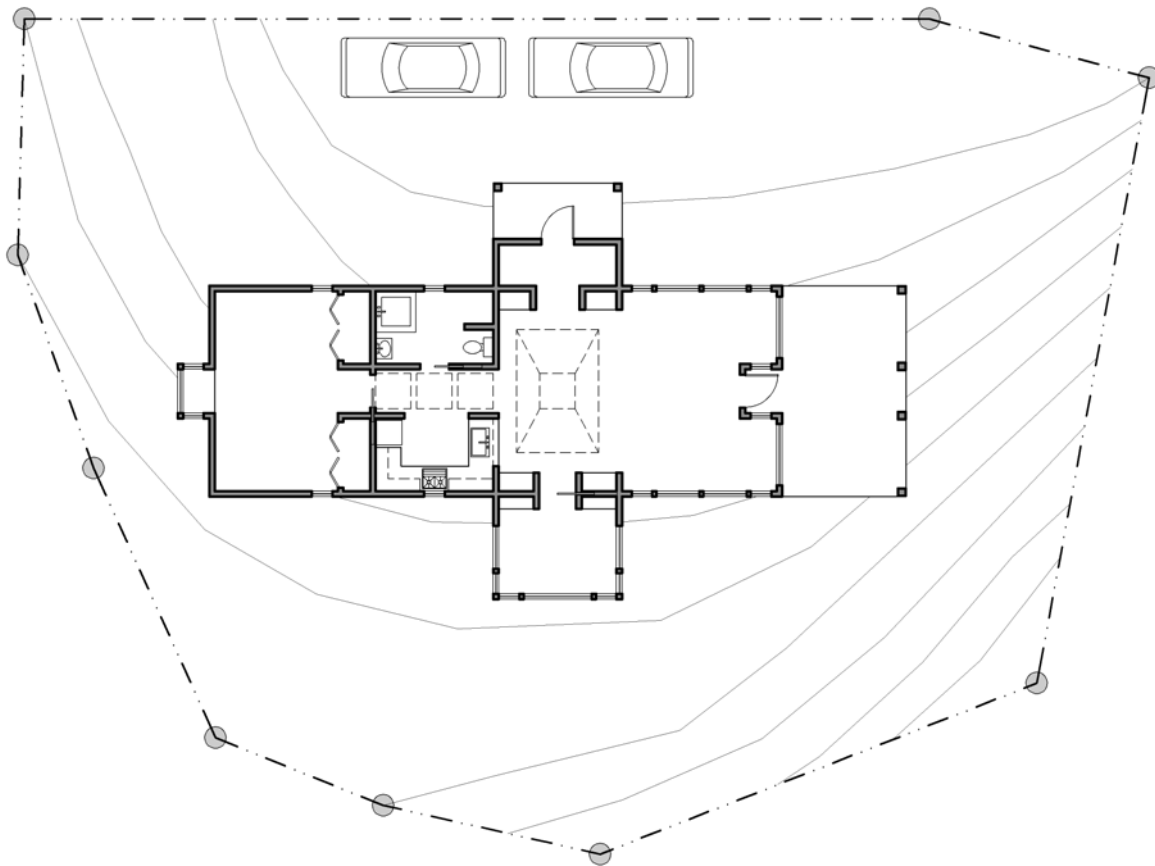


Fig. 5. Floor plan with site.

The secondary north-south axis begins at the entrance porch on the north flank of the house (Fig 5), progresses through the house crossing the main axis under the central sky light,

and terminates in Professor Ando's study attached to the south flank of the house (Photo 8 and 9). This room seems to be suspended in space over the sloping hillside that drops



Photo 8 and 9. Relaxing view out of south facing windows in office.



Fig. 6. North elevation.

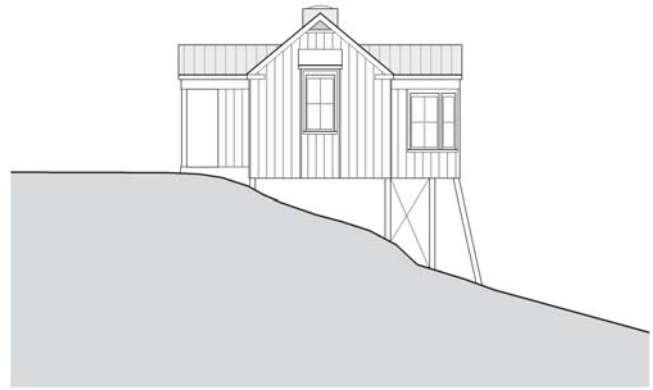


Fig. 9. West elevation.

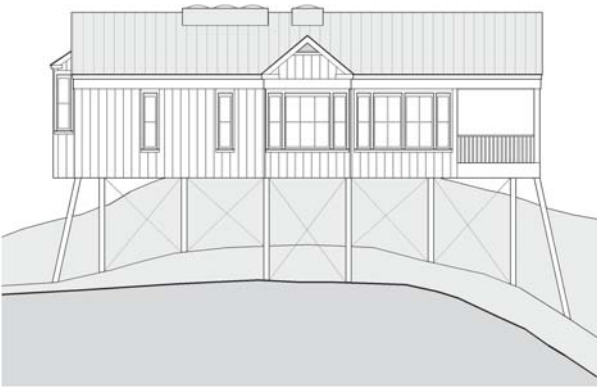


Fig. 7. South Elevation.

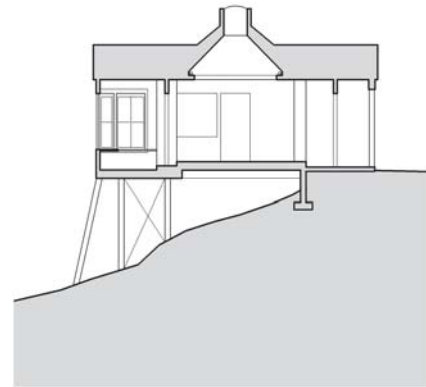


Fig. 10. Cross section.



Fig. 8. East elevation.

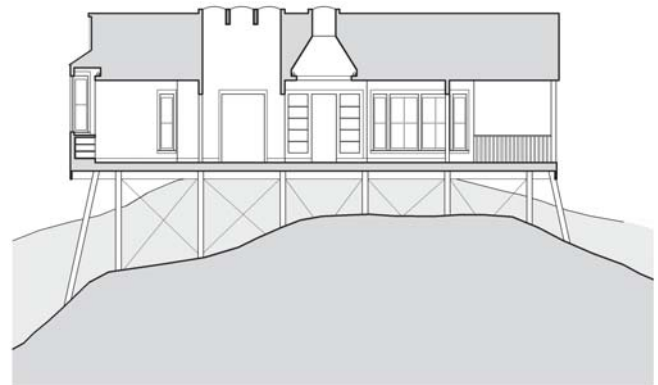


Fig. 11. Longitudinal section.

away below it. There are windows on three sides and it is organized into three work areas (each with its own window and unique view) according to the design principles developed by Professor Ando to facilitate creation by a unique personality.

The body of the house (Fig. 6) is composed of traditional forms which envelop the two organizing axes, and is supported on legs of varying length (Fig. 7) which stand firmly on the sloping site (Fig. 8). Because of its upright rather than

seated posture on the ground, the house is imbued with life (Fig. 9) which reflects as well as contains the vital human activities within.

Natural light, by its daily and seasonal fluctuation and by its sensitivity to changing weather conditions, reveals and defines the exterior form and interior spaces of the house (Fig. 10). The variations of the quantity and quality of this light and the accompanying shadows are constant reminders to the inhabitants of their own animation as participants in the flow of

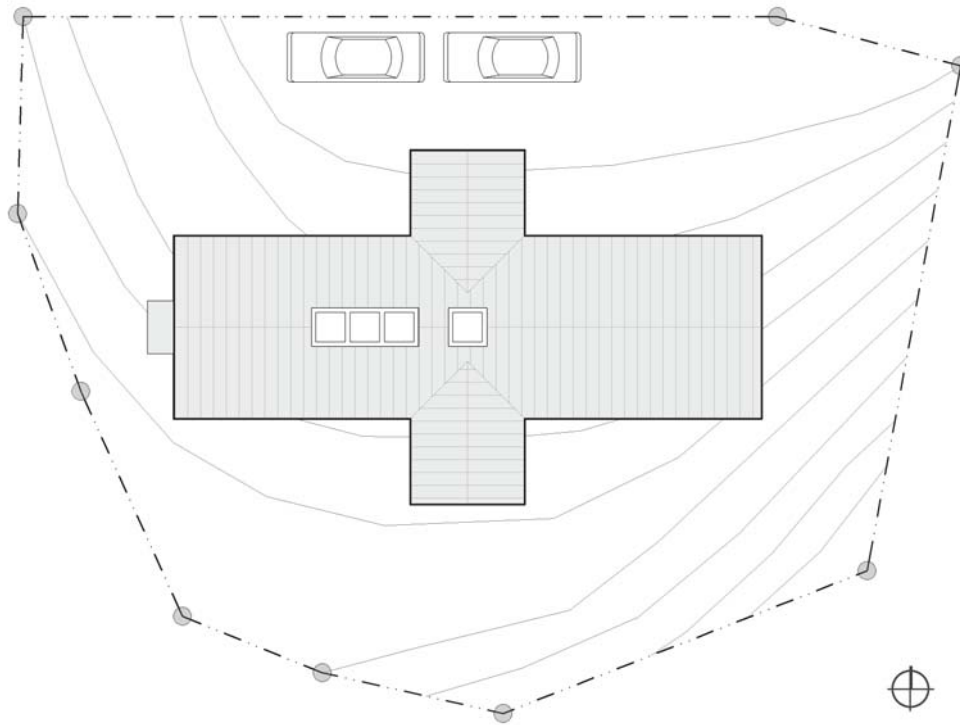


Fig. 12. Roof and site plan.



Photo 10. Exterior view of east side of house.

time (Fig. 11). The pattern of the skylights (Fig. 12) on the main axis of the house forms an exclamation point which symbolizes the excellence of Yoichi Ando's professional contributions.

## 5. REMARKS

(PHOTO 10) It is hoped that the survey presented here taking both temporal factors associated with left hemisphere and spatial factors associated with the right hemisphere in design of architecture and the environmental into account can sug-

gest a suitable line for further works of each individual. As a further example in urban planning, first of all, the "brain part" such as a church, a museum, a concert hall, a library and an institution, which may act as an important role for creation, should be considered. The transportation, communication systems and others corresponding to the first and second life may be automatically developed after then.

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