Environmental design for the third stage of human life (persistence of individual creations)

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ABSTRACT

The third stage is the life of ideas and creations that persist in social memory long after their individual creators have passed on. Ideas are created by individual personalities, communicated to others, and then enter human culture. Design for creativity is considered in terms of temporal and spatial factors and the two cerebral hemispheres. The temporal criteria drive the left hemisphere, for example, acoustic parameters related to voice, speech, and music as well as visual temporal patterns related to movements such as leaves in a gentle breeze, twinkling stars, pendiulum of wall clock, flame, or streamlet [1]. Factors related to spatial patterns, such as those generated in painting and sculpture, engage the right hemisphere. For creativity-enhancing design, creative working space (CWS) [2-6], separate areas are devoted to activities that mainly engage left cerebral hemisphere (calculation, writing sentences, reading) or right hemisphere (ex. drawing figures, painting, selection photographs). Such creative activities may keep a body in good health and a mind strong, no matter what the age, even up to the last moment of life hopefully without any mentally weak. Through individual creation i.e., “the most beautiful flower,” each individual develops respect for others. Mutual respect may avoid ill treatment of each other, and on larger social scales, may help avoid wars.

1. INTRODUCTION

1.1. Third stage of human life

It has been often said that a healthy body relates to a healthy mind. We have therefore typically believed that there are only two stages of human life, that of the body (the first stage of human life) and the mind (its second stage). It is obvious that these two stages are also common to animals as well as humans. But there is also a third stage of life in which the creations of individual human beings persist after their first two stages have passed (Figure 1). In this way, the works created may live on even after the end of the biological and mental life of their individual creators. Every person hopes to leave something good behind them. Money is often left to others, but can lead to legal disputes amongst beneficiaries. On the other hand, unique, non-monetary individual creations can become integrated into ongoing, evolving common human cultures, thereby benefitting human society as a whole.

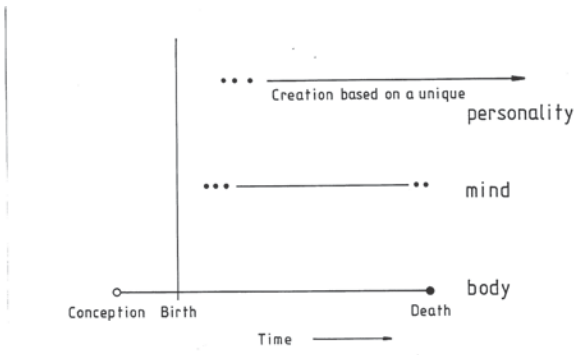

Figure 1 Three stages of individual human life; the first (body), the second (mind) and the third (products of mind that persist in individual memories and social cultures). Creations from personality (3rd) that is a pledge of affection to this world from individuals.

Photograph 1. Lilies (called Casablanca) with over 90 flowers grown in their preferred environment. Photo by author (2006).

In order to realize development of a third stage of life, individual creations must be nurtured. Each of us begins life with a genetic endowment, a set of DNA which can be considered as "a kind of seed," as shown in Figure 2. It has been often said that the "soul" or "psyche" of a child of three years old, persists throughout life, to even a hundred years old. Thus, after birth it is very important to nurture each individual seed by designing its environments appropriately, by optimizing the various spatial and temporal factors in accordance with individual life-purposes. This is the process that best maintains life.

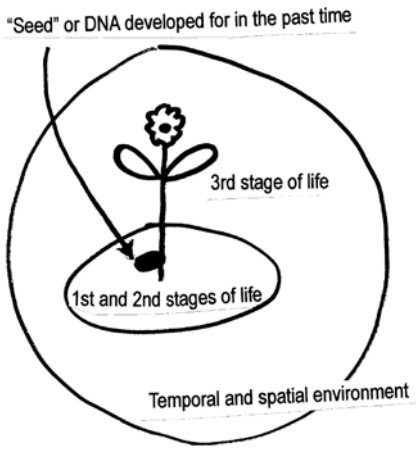

Figure 2. Development of the third stage of human life from a genetic "seed" that is then nurtured in an appropriate temporal and spatial environment. This seed in fact might be called as "the blue bird" [10].
Due to preferred environment, personality for unique creation originated by genetically "seed" (ex.: DNA) is well developed like a flower of plant.

The same is true for plant life – if the environment is well designed, such that the relevant, essential temporal and spatial factors are taken into account, then plant life thrives, and we can enjoy many of its products, such as the wonderful flowers in Photograph 1.

In the past, it has been believed to great extent "time is money," thus for the first and second stages of life only. This failed to lead persons, so as to competitive and stress; environmental disruptions; hard on individuals, and conflict of interests subjected to result never ending wars. However, in future if concept, "time is life," introducing the third stage of human life, i.e., creative due to each unique personality to be integrated as human culture and may live even after end of life. Preferred environment for each individual creation may be designed, and respective each individual might result lasting peace.

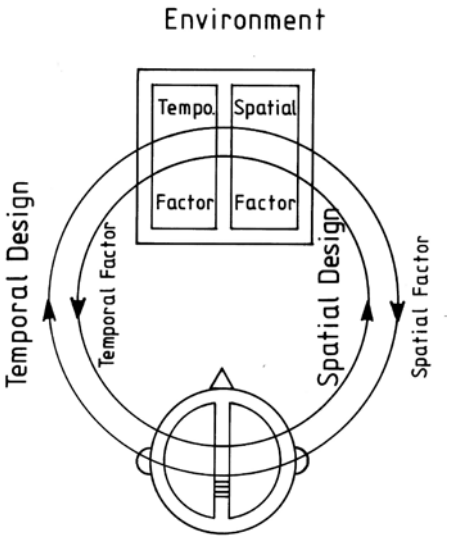

Figure 3. Method of environmental design due to subjective preference theory [8]. Temporal design involves optimization of temporal environmental factors that are typically processed in the left cerebral hemisphere, whereas spatial design is concerned with optimizing spatial factors that are processed in right cerebral hemisphere [1].

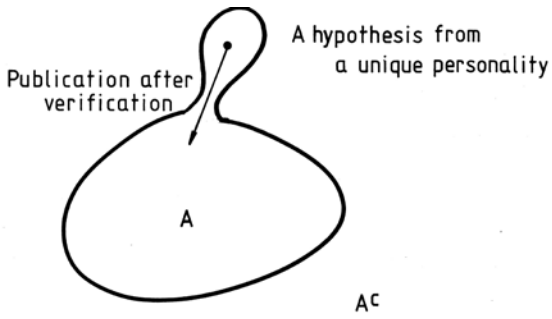

Figure 4 Integration of individual explorations and creations into human social memory (culture) through communication (publication) after testing of verification. A: Limited knowledge clarified previously, which can be shared socially and enter into culture. AC : Infinite number of unknowns. Problems waitig to be solved by individuals.

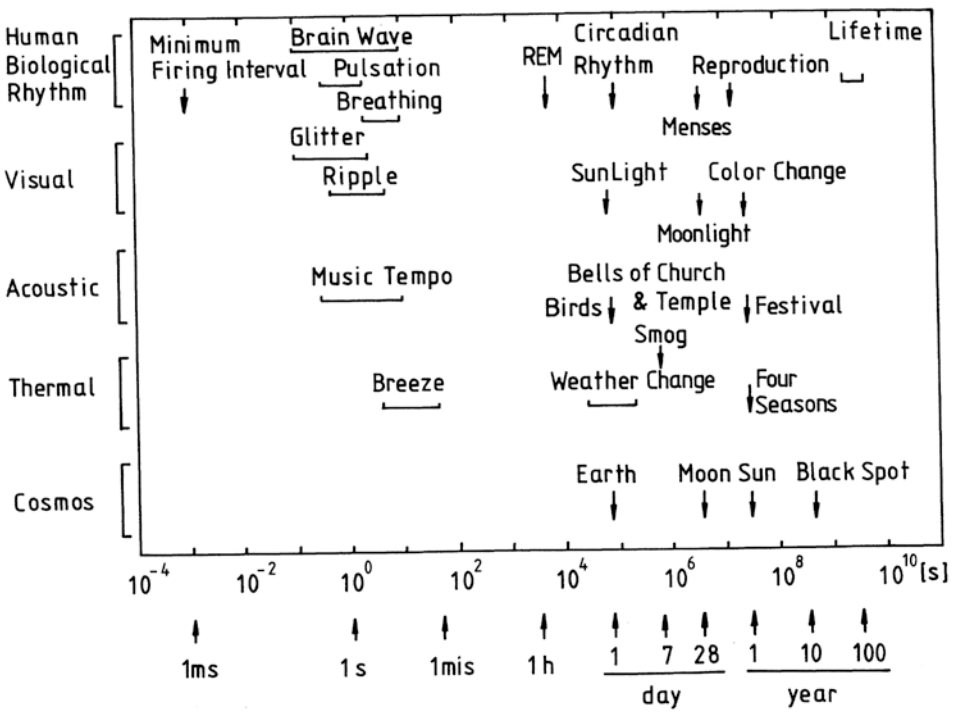

Figure 5 Discrete periods in temporal design, 1 ms, 1 s, 90 min (REM rhythm), 1 day, 1 week, 1 month, 1 year，30 years, 90 years, …

1.2. Human preference and cerebral heisphere specialization

We have previously proposed a general theory of environmental design that uses observed human preferences to optimize physical factors that are psychophysically related to human perceptual qualities [1][4]. Temporal factors involve physical parameters that determine stimulus qualities, such as the auditory qualities of pitch, timbre, and loudness, and the visual qualities of texture, whereas spatial factors involve physical parameters that determine aspects of the stimuli associated with perceived locations in external space. The preference theory for the sound field is described, and demonstrated by means of an example of calculation (see Appendix). We have investigated the observable neural correlates of perceptual factors and preferences, and have consistently found the temporal factors to be associated predominantly with the left hemisphere, and spatial factors associated with the right hamisphre, as shown in Figure 3 [1][2]. Results of a number of experimental works revieled that a preferred auditory and visual environments may activate both hemispheres, and this may optimally motivate creation. We believe that the satisfaction of subjective preferences in temporal and spatial realms always moves in the direction of maintaining life.

A well-designed environment and an individual's personality may resonate and thereby play an important role for facilitating unique creative works that can then be shared with other people. A hypothesis pursued by a unique personality may expose an aspect of the world that had not yet been explored (Figure 4). The set A^C in the diagram indicates an infinite number of unknowns to be solved by individuals. The hypothesis and the experience of the individual can be communicated to others through publication.

2. DESIGN STUDIES FOR DEVELOPING THE THIRD STAGE OF LIFE

An important question arises, how can we discover personality. One of effective way is to provide environment due to individual preference, which is judged for direction of maintaining vivid life for every distinct period in environment and human (Figure 5). Due to above mentioned theory of subjective preference, for example, factors discovered in sound and visual fields are, 1) temporal factors of design, associated with the left cerebral hemisphere, and 2) spatial factors of design, associated with the right cerebral hemisphere.

2.1. Provisions or creative work spaces

Improving the environments of pre-school children is of particular importance, because in this period, major parts of their brains are developing. Any creation is possible from this time, and it can be realized if the environment encourages children to do something. Small provisions for creativity can have profound effects. For example, a worktable with soft crayons make it easy to begin to draw, to form a house or any animal that their minds desire. A piano in the room invites its playing and may lead to experimentation with composing music according to their interests and imaginations. It is well known that Mozart began composing music at the age of five. Such creatvitiy is not directly related to conventional, competitive education, but stems from an ability to find one's own unique personality or "seed" (Figure 2), such that it can blossom. Such a "seed" has existed in each of us – every individual person – from very beginning of our lives. This process of finding that which motivates, engages, and causes us to create is much more important for personal fulfillment, happiness, and meaning than the job- and money-oriented training regimens that dominate most standard educations in the world today.

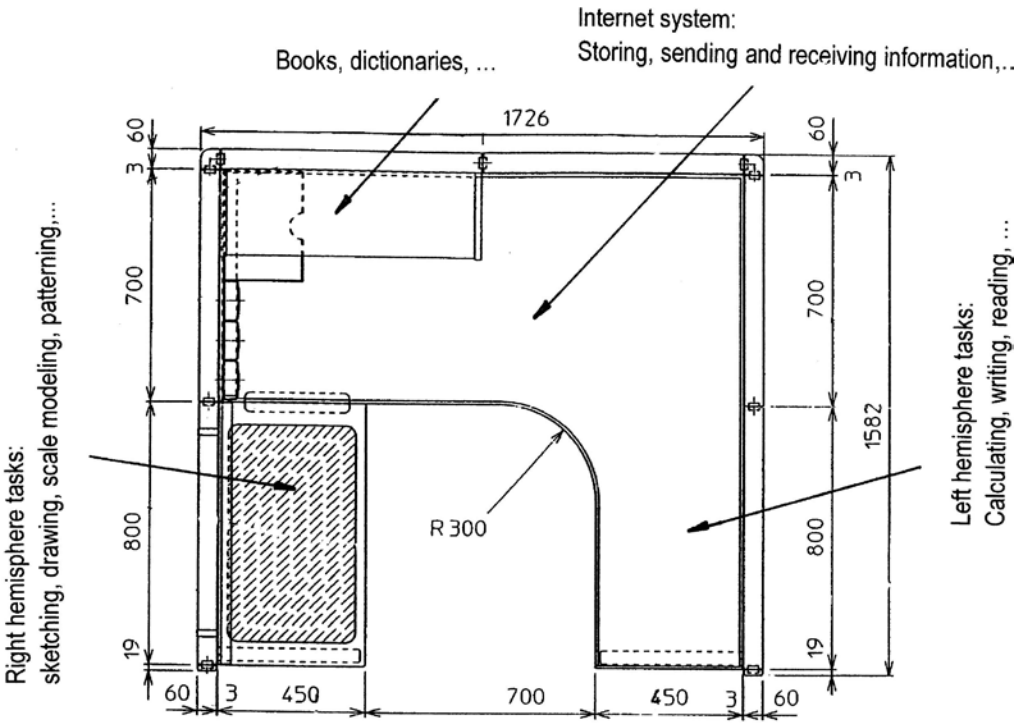

Figure 6 An example of a creative work space (CWS). The left hand panel is designed a worktable for right hemisphere tasks such as crayon work, drawing figures, painting, and making scale models. The right hand panel is for left hemisphere tasks, such as reading, calculating, and writing manuscripts. The center panel is devoted to communication and internet access.

Photograph 2. An example of a creative work station (CWS), eight of which were introduced into the Ando Laboratory at Kobe University Graduate School, 2002.

We have engaged in the process of designing creative work spaces (CWS) that encourage and enhance human ingenuity [3,4]. It is hoped that a creative work space such as the ones shown in the figures and photographs below could play a formative role finding one's own personal direction that consists of specialized panels the left and right hemispere tasks (Figures 6, Photograph 2). Techniques that enhance creativity and actualization are absolutely valuable because the works that are subsequently created as a result can live on as culture for long periods of time even after the end of the lives of those who originally made them. Eight users reported that their productive efficiencies were increased more than two-fold relative to the usual desks ($p < 0.01$).

2.2. Design study for creativity: Kirishma hillside house

In 2004 Thomas L. Bosworth and the author designed a hillside house in Kirishima, Japan with full temporal and spatial design for the third stage of life in mind [6]. Our goal was to design a living space that would enhance creativity and productivity. The plan (Figure 7) included a CWS for writing book manuscripts as indicated in Photograph 3 as well as creative kitchen space (CKS) for preparing preferred foods. Living in this house during the years of 2004–2009 (Photograph 4), the author produced four manuscripts for books including [1][2][5].

2.3. Creative stage design of theatre

Another example of architectural design for creativity comes from Elizabethan England. The first Fortune Theatre building (built in 1600, destroyed by fire in 1621) was the venue in which most of William Shakespeare's play were performed while the playwright was alive in his later years (Figure 8 [7]). The theatre's performance area consisted of three stages, a larger front stage, a smaller rear stage and an upper stage known as a Juliet balcony. The plan was much more interesting than a single stage theatre, such that the design lent itself to more creative dramatic production.

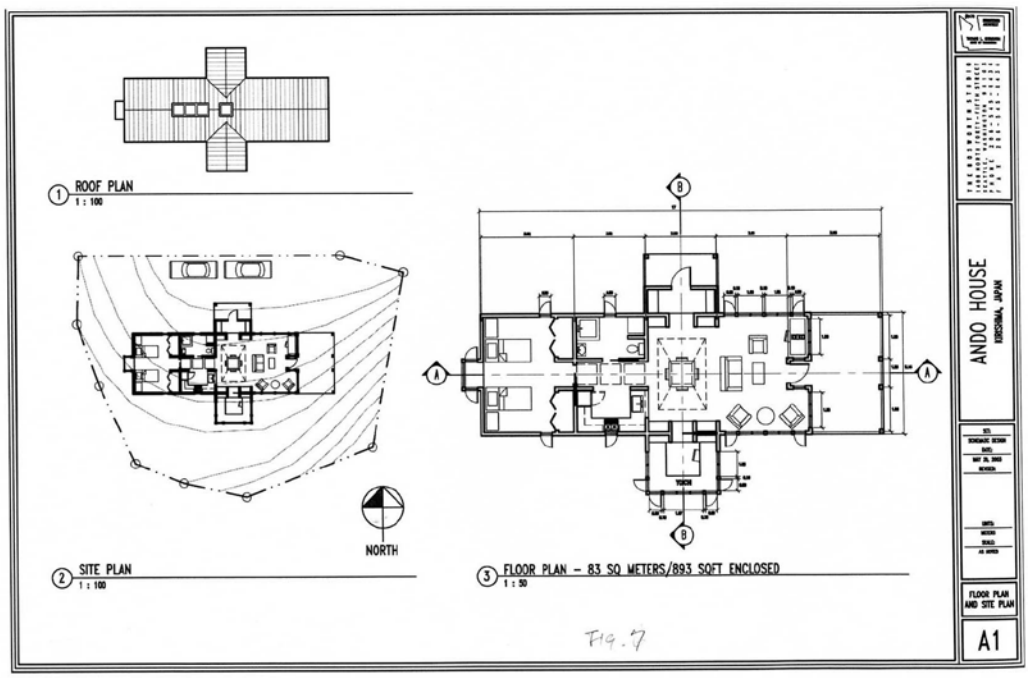

Figure 7. Plan of the Kirishima hillside house.

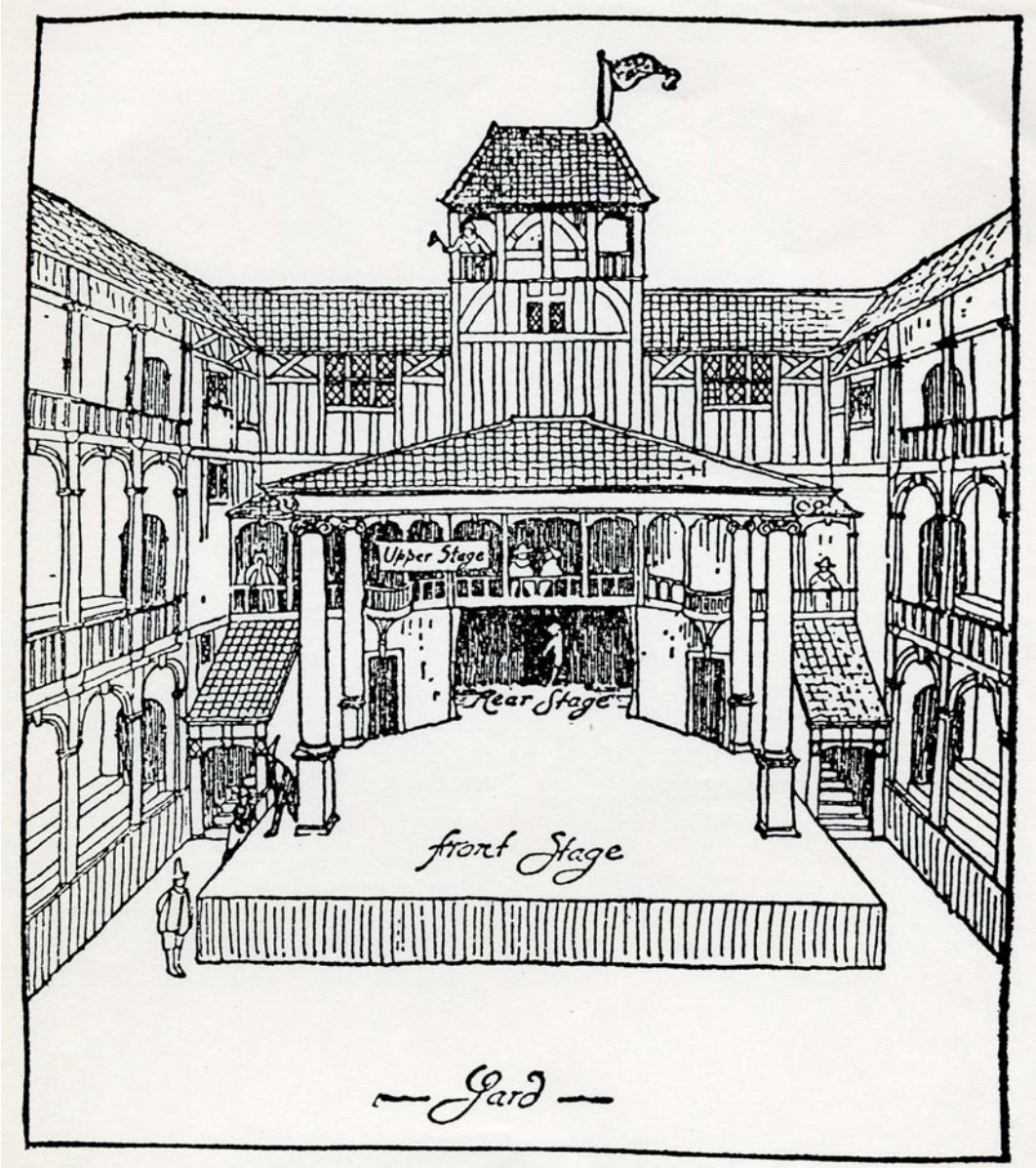

Figure 8. Artist's reconstruction of the first Fortune Theatre building, an example of creativity-enhancing stage design [7]. It is interesting to point out the three stages of real human life as described in Figure 1.

3. CONCLUDING REMARKS

Three stages of individual human life are defined. The first stage is the existence of the body, the second stage is that of the mind, and the third stage is persistence of personality-based creative works. The first and second stages are common to humans and animals, but third one is unique to

humans, and permits our species to develop an ongoing human “culture” that outlasts the physical and mental lives of its participants.

The third stage of individual life is developed most fully by a well-designed or preferred environment. An environment can be well-designed by the theory that takes into account human percepts and preferences, acting so as to optimize preference and therefore to facilitate creative action that maintains and enhances individual life [1] – [5].

Through individual creation, each individual develops respect for others. Mutual respect may avoid ill treatment of each other, and on larger social scales, may help avoid wars. Conflict is generated by the ill concept of “time is money.“

A combination of art and science may help us recognize an individual personality (soul) as the minimum unit of society [9].

From birth through pre-school years, the human brain develops the most, with the child’s environment acting as a constant, non-verbal teacher. Therefore, it is important to design social and provate environments well, based on the preference theory, in order to promote the development of ideas and creations that can persist on as cultural contributions in the third stage of life. Good design can facilitate creative productions. For example, if there is a worktable, then clay work is easly performed to do three dimensional modeling, which is the very beginning of creation in the child.

Creative workspaces can enhance the creativity and productivity of both children and adults. A creative work space (CWS) is designed with three panels specialized for right hemisphere tasks (non-verbal communiation, drawing, making figures and modeling); for left hemisphere tasks (calculation, reading, and logical work), and for computer- and internet-based investigations. Similarly, creative kitchen spaces (CKS) apply these design principles for creation of new recipes and preparation of food.

Doing such a creation preferred by individuals though DNA that may be happy keeping health untill even just before the end of their lifes. Thus, so called “the blue bird” [10] may be existing at the center of every individual from the very beginning of the life.

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APPENDIX PREFERENCE THEORY FOR THE SOUND FIELD

Since the number of orthogonal acoustic factors (I) of the sound field, which are included in the sound signals at both ears is limited. The scale value of any one-dimensional subjective response may be expressed by [8]:

$$S = g(x_1, x_2, \ldots x_I). \quad \text{(A.1)}$$

It has been verified by a series of experiments that four objective factors act independently on the scale value when changing two of four factors simultaneously. Results indicate that units of the scale value of subjective preference derived by a series of experiments with different sound sources and different

subjects have appeared to be constant [8,9], so that we may add scale values to obtain the total scale value such that

$$S = [g(x)]_{left\ hemisphere} + [g(x)]_{right\ hemisphere}$$

$$= [S_2 + S_3]_{left\ hemisphere} + [S_1 + S_4]_{right\ hemisphere} \quad \text{(A.2)}$$

where S_i is the scale value obtained relative to each orthogonal factor, which is related to the left cerebral hemisphere or the right. Equation (A.2) indicates a four-dimensional continuity.

Common formula for the four normalized orthogonal factors

From the nature of the scale value, it is convenient to put a zero value at the most preferred conditions. These results of the scale value of subjective preference obtained from the different test series, using different music programs, yield the following common formula

$$S_i \sim - \alpha_i |x_i|^{3/2},\ i = 1, 2, 3, 4 \quad \text{(A.3)}$$

where values of α_i are weighting coefficients, which were obtained by experiment with a number of subjects. These coefficients depend on the individual. If α_i is close to zero, then a lesser contribution of the factor x_i on subjective preference is signified.

The factor x_1 is given by the sound pressure level (SPL) difference, measured by the A-weighted network, so that

$$x_1 = 20\log P - 20\log [P]_p \quad \text{(A.4)}$$

P and $[P]_p$ being the sound pressure at a specific seat and the most preferred sound pressure that may be assumed at a particular seat position in the room under investigation:

$$x_2 = \log (\Delta t_1 / [\Delta t_1]_p) \quad \text{(A.5)}$$

$$x_3 = \log (T_{sub} / [T_{sub}]_p) \quad \text{(A.6)}$$

$$x_4 = IACC \quad \text{(A.7)}$$

where $[\Delta t_1]_p$ and $[T_{sub}]_p$ are the most preferred conditions calculated by the minimum effective duration of the running autocorrelation funetion $(\tau_e)_{min}$ of source signals [1],[5],[8],[9].

Thus, scale values of preference have been formulated approximately in terms of the 3/2 powers of the normalized objective parameters, expressed in the “logarithm” for the parameters, x_1, x_2 and x_3. Thus, scale values are not greatly changed in the neighborhood of the most preferred conditions, but decrease rapidly outside of this range. The remarkable fact is that the spatial binaural parameter x_4 is expressed in terms of the 3/2 powers of its “real values,” indicating a greater contribution than those of the sound presssure and the temporal parameters.

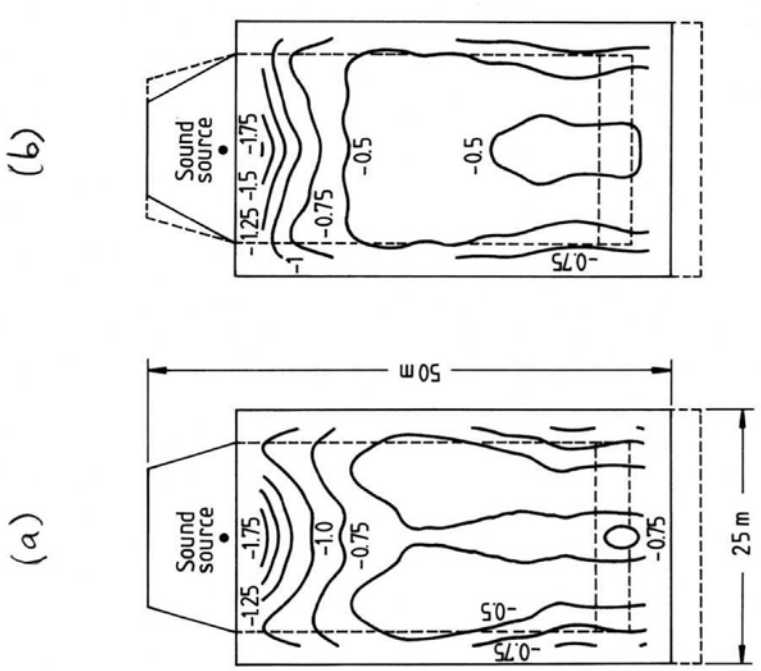

Figure A.1 Examples of calculating scale values with four orthogonal factors using Euations (A.2) through (A.7).
(a) Countour lines of the total scale value for Boston Symphony Hall calculated with original stage.
(b) Countour lines of the total scale value calculated for the stage side walls optimized.

Example of calculating subjective preperence at each seat position

As a typical example, we shall discuss the quality of the sound field at each seating position in a concert hall with a shape similar to that of Symphony Hall in Boston. Suppose that a single source is located at the center, 1.2 m above the stage floor. Receiving points at a height of 1.1 m above the floor level correspond to the ear positions. Reflections with their amplitudes, delay times, and directions of arrival at the listeners are taken into account using the image method. Contour lines of the total scale value of preference calculated for music motif B with $(\tau_e)_{min} \sim 40$ ms are shown in Figure A.1a,b. Results shown in Figure A.1b demonstrate effects of the reflection from the sidewalls adjusted on the stage, which produce decreasing values of the IACC for the audience area. Thus the preference value at each seat is increased, in comparison with that in Figure A.1a. In this calculation, the reverberation time is assumed to be 1.8 s throughout the hall and the most preferred listening level, $[LL]_p = 20log[P]_p$ is set for a point on the center line 20 m from the source position.

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Photograph 3. An example of a CWS designed for a hillside house in Kirishima, Japan that was designed and built in 2004 [2][6].

Photograph 4. The Kirishima hillside house built in 2004 [6].