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A Comparative Study on the Use of Aquatic Scenery in Open Spaces in Commercial Facilities in Japan and Australia

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Abstract

This is a study which examines aquatic scenery as it contributes to creating character and atmosphere in open spaces in commercial facilities. By investigating actual examples in Japan and Australia, and through cognitive evaluations by subject viewers in both Japan and Australia, this study attempts to determine what can be done for the future development of such aquatic scenery.

As well as establishing a direction for the development of aquatic scenery in open spaces of commercial facilities, the study revealed the need for Japanese to complement their economic wealth through close experience and assimilation of spiritual wealth of the kind possessed by Australians.

Study Goal

Open spaces in commercial facilities today are increasingly being transformed into areas that typify enjoyment of life and a spirit of relaxation and recreation. Plants and various forms of aquatic scenery are being introduced to create character and atmosphere. This study examines aquatic scenery for open spaces of commercial facilities and, through the observations and cognitive evaluations of subject viewers, attempts to determine what the future possibilities of such aquatic scenery are.

Method of Investigation and Analysis

First, records were researched to gain a good understanding of history and background of the development of open spaces in commercial facilities in Japan and Australia as well as of current attitudes to commercial activity and in this way relevant problem areas were established.

A total of 27 sites (13 in Japan and 14 in Australia) representing a wide diversification of configuration were then selected as targets of the study. A field survey was conducted to determine the characteristics of the study sites such as function, scale, illumination, type of open space, etc., and the configuration and type of aquatic scenery.

The cognitive evaluations obtained from 51 Japanese and 41 Australian subject viewers using slide projection images of the above mentioned 27 study sites as medium of stimulation are represented in Table 1 under 12 item headings. From average scores of

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Table 1 Items of Cognitive Evaluation

Japanese	Australian	Japanese	Australian
kakkido	lively	kokyukan	high-class
tanoshisa	pleasant	senrensei	refined
akarusa	light	kosei	original
utukushisa	beautiful	ochituki	serene
seiketusa	clean	chowasei	harmonies
yutori	relaxing	shinbolusei	symbolic

cognitive evaluation and factor analysis, the difference in cognitive evaluation structure between Japan and Australia was determined. With factor score as an external reference and open space configuration characteristics as descriptive variables, type I mathematical quantification theory was applied and the interrelationship of cognitive evaluation characteristics and open space configuration characteristics was determined.

Results of Analysis and Consideration

1) *History and Background of Development of Commercial Facilities in Japan and Australia*

The history and background of commercial facilities in Japan and Australia is shown in Table 2.

As for history, Japan and Australia are similar in that the trend has been from department stores to fashion buildings in cities, and from supermarkets to shopping centers in suburbs.

Japan and Australia share similar attitudes to commercial activity in terms of enjoyment of window-shopping, participation in commercial events and promotions and so on. However, what is sought in the commercial facilities differs for the two countries. For Japanese people, the objective is fashion and trend, whereas Australians seek expression of individuality.

2) *Configuration Characteristics of Study Sites*

Figure 1 shows the configuration characteristics of aquatic scenery at 27 sites. Figure 1 also indicates that the most common function of the study sites is that of thoroughfare (ten sites), with most being of a relatively small scale of 100–200 m^2 (nine sites). As for water configuration and type, combinations of fountain in pool or stream, or fountain and cascade in pool or stream were found to be most common (seven sites). For number of approachable sides and water surface shape, four approachable sides was most common. For open space type and illumination, outdoor with natural illumination was found to be most common (nine sites).

3) *Cognitive evaluation's structure*

On examination of the average scores of evaluation obtained from the eveluation experiment, of the 12 eveluation items mentioned above, the average scores of evaluation of Japanese people were found to be higher than those of Australians in regard to seven items, namely: lively, pleasant, beautiful, original, serene, harmonious, symbolic. The profile of average score of evaluation with regard to "beautiful" as a typical example is

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Table 2 History and Background of Commercial Facilities

	History of Development				Social Backgroud
	Japan		Australia		
Period	Urban Center/ Subcenter	Suburbs	Urban Center/ Subcenter	Suburbs	
1920	Department Stores	Shoppig Streets	Department Stores	Corner Shop	
	↓ • Top end of	↓	↓ • Logical	↓ • Development	
	↓ retail Business	↓	↓ Development	↓ by community	
1930	↓	↓	↓ • Originality	(Old) Shopping	Using U. S.
	↓	↓	↓	Center	as Model
	↓	↓	↓	↓ • Joint	Spread of
	↓	↓	↓ • Many types of	↓ management	Automobiles
	↓	↓	↓ services	↓ among stores	/Refiger-
	↓	↓	↓	↓	ators
1950	↓ • Sales by directive	Supermarket	Metropolitan Center	Supermarket	
	↓ of stores special-	↓ • Self-service	↓ • Window	↓ • Chain stores	
	↓ izing in sundries	↓ • Discount	↓ shopping	↓ • Discount	
1960	↓ • Growth halted	↓	↓	Shopping Town	
	↓ by influence of	↓	↓	↓ • Surrounded	
	↓ supermarkets	↓	↓	↓ by parking	
1970	Fashion Centers	Shopping Center	Fashion Building	↓ lot	Mass Com-
	↓ • Non-nuclear	↓ • Nuclear	↓ • Trend and style	↓ • Department	munication
	↓ specialty stores	↓ stores	↓ leadership	↓ stores and	creating
	↓ collective	↓	↓	↓ specialty	Information
	↓	↓	↓	↓ stores	Society
1980	↓ • Amusements	↓ • Larger scale	↓ • Ornamental	↓ • Refined	Improved
	↓	↓ • More com-	↓ design	↓ • Mall structu	Income
	↓	↓ plex		↓ re	Level Varied
	↓				Lifestyle

shown in Figure 2. The only evaluation item where Australians' average scores of evaluation were higher than those of Japanese was "clean". This profile is also shown in Figure 2. The average scores of evaluation of the two nationalities were found to be very similar in regard to "light, relaxing, high-class, refined" (four items).

Table 3 shows the result of factor analysis of the average scores of evaluation described above as basic data. This study utilizes lst -3 rd factor for which eigenvalue is to be 1.0 or more.

For Japanese, in the case of lst Factor, the loading for evaluation items such as "beautiful, clean, high-class, and refined" is high; therefore, this factor was judged to show "high-class". In the case of 2 nd Factor, the factor loading is high for items such as "lively, pleasant, and light"; this factor was judged to show "lively". In the case of 3rd Factor, the factor loading is high for item such as "relaxing"; this factor was judged to show"relaxing".

For Australians, in the case of lst Factor, the loading for evaluation items such as "pleasant, beautiful, serene, and harmonious" is high; therefore, this factor was judged to

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	Item	Location Characteristics									Space Characteristics																
		Function					Scale (m^2)				Configuration of Aquatic Scenery					Approachable Sides & Water Surface Shape						Space Type & Illumination				
																4 Approachable Sides			3		2	Indoors				Outdoors
																						1F		Atrium		
	Category	Thoroughfare	Meals	Scenery	Rest	Events	100 or under	100～200	200～300	300 or more	P or S	Por S+F	Por S+C	Por S+F·C	PorS+L·C	Plane	Other Function/Plane	Line	Plane	Line	Plane	Natural	Artificial	Natural	Artificial	Natural
Japan	1				●					●		●				●										●
	2				●			●					●						●							●
	3		●						●		●					●										●
	4		●				●				●					●										●
	5				●			●							●				●				●			
	6	●								●				●						●				●		
	7	●					●				●								●				●			
	8	●						●					●			●							●			
	9					●			●						●				●							●
	10			●				●				●							●						●	
	11			●					●				●								●				●	
	12	●							●		●									●			●			
	13			●						●		●									●		●			
Australia	14				●					●	●					●										●
	15			●				●					●				●						●			
	16		●					●			●					●								●		
	17	●					●							●							●					●
	18			●					●					●		●										●
	19	●					●					●				●										●
	20		●				●						●			●								●		
	21		●					●						●		●								●		
	22					●			●					●			●								●	
	23	●							●					●				●				●				
	24		●				●					●				●							●			
	25	●						●						●		●						●				
	26	●						●				●				●						●				
	27	●					●					●				●								●		
Total		10	6	5	4	2	7	9	7	4	6	7	5	7	2	14	2	1	5	2	3	3	7	5	3	9

P : Pool, S : Stream, F : Fountain, C : Cascade, F·C : Fountain & Cascade, L·C : Large Cascade

Fig. 1 Configuration characteristics of aquatic Scenery

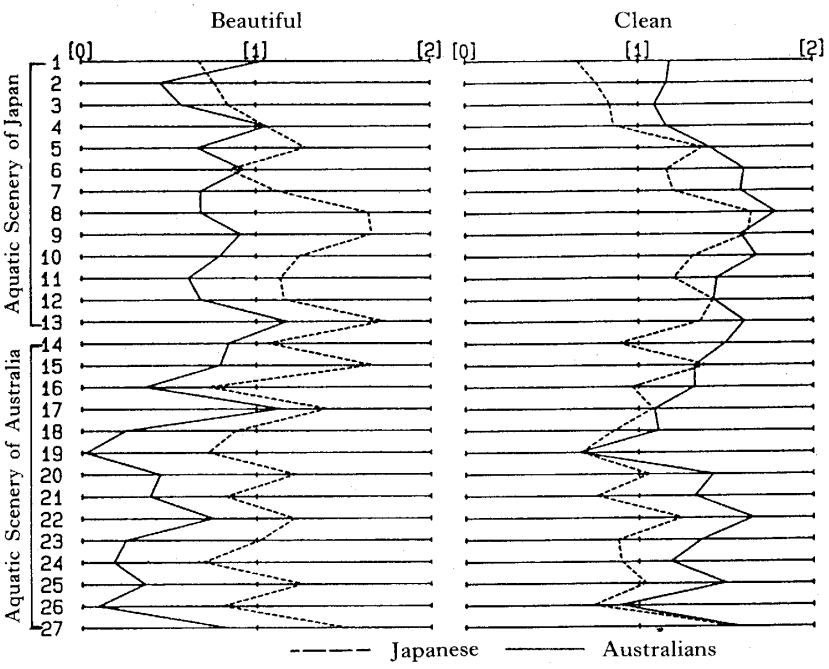

Fig. 2 Profiles of Average Scores of Evaluation

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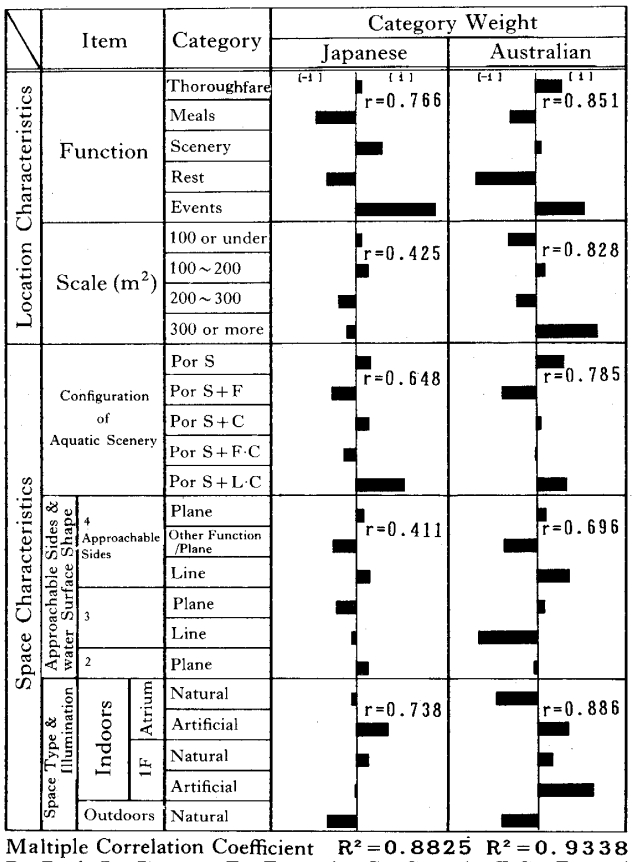
Table 3 Result of Factor Analysis (Factor Loading)

	Japanese			Australians		
	1 st Factor	2 nd Factor	3 rd Factor	1 st Factor	2 nd Factor	3 rd Factor
Lively	−0.259	0.917	−0.193	−0.015	0.186	0.724
Pleasant	−0.212	0.937	−0.125	0.878	0.184	0.323
Light	−0.109	0.807	−0.312	0.200	0.055	0.842
Beautiful	0.862	−0.091	0.219	0.767	0.414	0.254
Clean	0.899	−0.223	0.171	0.038	0.873	0.167
Relaxing	0.160	−0.130	0.799	0.970	0.055	0.043
High-Class	0.876	−0.354	−0.051	0.312	0.877	0.069
Refined	0.883	−0.219	0.080	0.496	0.784	0.077
Original	0.427	−0.006	−0.029	0.381	0.342	0.190
Serene	0.133	−0.768	0.385	0.895	0.216	−0.062
Harmonies	0.236	0.252	0.309	0.791	0.395	0.111
Symbolic	0.529	0.235	0.247	0.336	0.365	0.125
Eigenvalue	5.536	2.971	1.304	7.325	1.590	1.177



Maltiple Correlation Coefficient $R^2=0.8825$ $R^2=0.9338$
P : Pool, S : Stream, F : Fountain, C : Cascade, F·C : Fountain & Cascade, L·C : Large Cascade

Fig. 3 Element Analysis Concerning "High-class"

show "reflects general comfort and pleasantness". In the case of 2 nd Factor, the factor loading is high for items such as "clean, high-class, and refined"; this factor was judged

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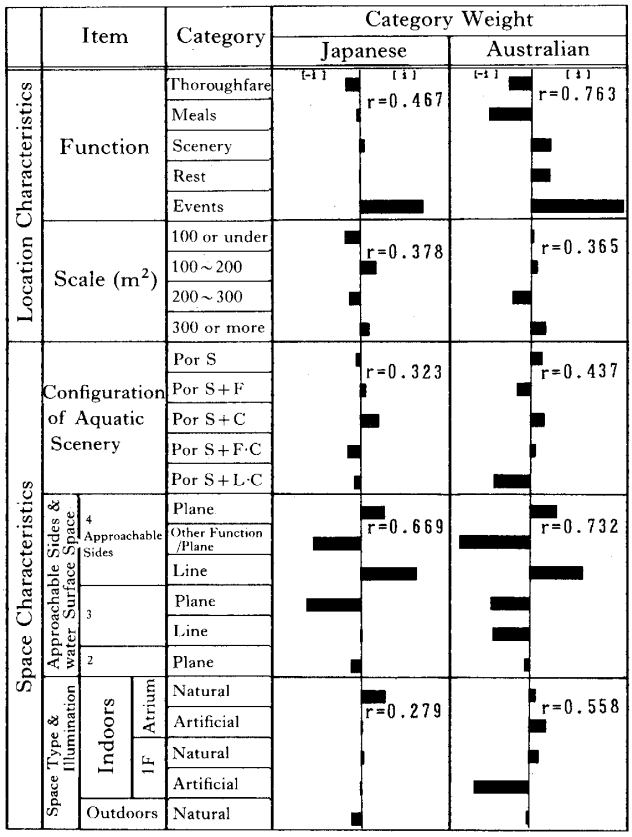

Maltiple Correlation Coefficient $R^2=0.7350$ $R^2=0.7987$
P : Pool, S : Stream, F : Fountain, C : Cascade, F·C : Fountain & Cascade, L·C : Large Cascade

Fig. 4 Element Analysis Concerning "Lively"

to show "high-class". In the case of 3rd Factor, the factor loading is high for item such as "lively and light"; this factor was judged to show "lively".

As a result of this analysis, it is observed that factors common to Japanese and Australians are "high-class" and "lively". However, taking the 1 st factor, which is the principal axis of the evaluation, into consideration, an index that expresses "high-class" economic wealth is noted for the Japanese, and one that expresses general comfort and pleasantness is noted for the Australians, displaying a distinct difference in cognitive evaluation's structure of the two countries.

4) *Open Space Configuration Characteristics Relating to Evaluation Characteristics*

Figure 3 shows element analysis results of open space configuration relating to evaluation of "high-class" for Japanese and Australians using type I mathematical quantification theory. Figure 4 shows element analysis results of open space configuration concerning evaluation of "lively" for both countries.

Figure 3 shows that, in the range of 1.0 or higher, the items that most strongly ifluenced the "high-class" evaluation were function, number of approachable sides, water surface shape, open space type, and illumination. Range values show that the open space configurations that tended to be evaluated highly for "high-class" were, with regard to function, thoroughfare type, scenic type, and event type for both countries. The water configurations that were evaluated highly were the pool or steamtype, and pool or stream combined with cascade or large cascade. For open space type and illumination, single

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storey indoor type with artificial illumination and single storey semi-open-air type with natural illumination were rated highly.

Figure 4 shows that, in the range of 1.0 or higher, the items that most strongly influenced the "lively" evaluation were function, number of approachable sides, and water surface shape. Range values show that the open space configurations that tended to be evaluated highly for "lively" were, with regard to function, scenic type and event type for both countries. For number of approachable sides and water surface shape, four approachable sides and line shape were evaluated highly.

The results of the analysis described above show that the factors which influence cognitive evaluation are similar for Japanese and Australians despite the fact that their environments differ from each other historically and culturally. However, these open space configuration characteristics are judged to have created a universality which will raise the quality of evaluation of aquatic scenery in open spaces.

Conclusion

The open space configurations that were found to elevate the common Japanese/Australian cognitive evaluation of aquatic scenery for open spaces as obtained from results of factor analysis of open space configurations with regard to cgnitive evaluation are considered to be indicators of the future direction of aquatic scenery design for open spaces in commercial facilities. However, as determined from attitudes to commercial activity, open space design that features universality only will not be sufficient; rather, the contribution of originality and individuality by space management will be of great importance.

Furthermore, the difference in cognitive evaluation's structure between Japanese and Australians is taken to indicate that Japan's wealth is merely economic. In order to come closer to the spiritual wealth possessed by the Australians, it is considered that presenting aquatic scenery rich in amenity in commercial open spaces, which are intimately connected with our daily lives, and assimilating this spiritual wealth as an immediate experience, will be a theme of importance for the future.

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