Research and Development of a Digital Archive of the Acoustic Environment:
Toward Landscape Design to Create a Congenial Environment

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In this study, I explore a methodology for the effective introduction of sound design, which takes sound as a point of entry to the landscape design process, and I present a progress report on research conducted in the Digital Archive Project for the Acoustic Environment. I have proposed several related systems which enable us, using multiple viewpoints, to classify and communicate the acoustic environmental data obtained in a survey of central Kyoto. The aim is to merge information on the acoustic environment, geographic information, and information on the local community, among other elements, and thus to help provide new resources for local landscape planners. The following results have been obtained so far.

(1) The relationship between the acoustic environment and related fields
In this project on the acoustic environment, in which surveys, analysis, and data transmission form a single "flow," it is essential to collaborate with researchers in the fields of the ecosystem, geographical information systems, and information transmission. I have deﬁned the concept of a "soundscape zone" based on the relationship between acoustic ecology and landscape ecology.

(2) Classification of sounds
In preparing the sound archive, it is important to classify the sounds obtained in the survey into types. From the viewpoint of environmental engineering, it is essential to include the whole of the acoustic environment at a site, assigning equal value to all of its elements. To make it easier to represent and reinterpret a particular situation, it is particularly important to establish the categories "sound signs" (alarms from other sounds that function as signals) and "media sounds" (sounds from ampliﬁed sound systems), which are likely to account for a major part of acoustic environmental design in the future.

(3) The present state of the acoustic environment in central Kyoto
The acoustic environment was found to vary in characteristic ways at different points in the city’s street...
plan. Traffic noise predominates on and around the main streets, while on side streets the sounds of daily life are more prevalent. Also, the mean value $L_{an}$ differed by about 7dB (A) between the main and side streets. Traffic noise predominates around the clock on the main streets, while on side streets it peaks in the morning and evening and the sound composition varies greatly with the time of day. The survey confirmed that, in spite of their proximity to the main roads, on the side streets where most local residents live, the acoustic environment is rich in different sound types, and most sounds, being produced by human activities, are on a human scale.

(4) Utilization of the results of factor analysis
The data analysis (factor analysis) used in this study expresses the relationships among sampling points, based on the participants' subjective assessments, in a two-dimensional arrangement (i.e., a plane figure). I consider factor analysis to be a basic operation in the development of sound tools such as "sound palettes," "sound prescriptions," and "sound samplers," which serve to transmit sound archives and to introduce and communicate sound data in the urban planning process.

(5) Practical applications of this project, and future issues
In future, while continuing to amass data on the acoustic environment, I believe it is vital to work with local residents to create the conditions in which this project can yield practical benefits in the field. In order to shift from assessing the present state of acoustic environmental data to utilizing them for practical purposes, I believe it is important to create opportunities, even in a small area of the community, for local residents to take part in the flow of activities, using the design of the acoustic environment as their point of entry. To do this, we need to establish a forum for working with local residents to evaluate sounds and to find ways of optimizing them.

音環境のデジタルアーカイブ研究開発
- 快適な環境創造のための景観設計に向けて -

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１はじめに
本論考では、景観設計の過程において、音を切り口とする「サウンドデザイン（音環境デザイン）」を有効に導入するための方法論を模索し、音環境のデジタルアーカイブ事業の研究成果の中間報告を行った。具体的には、京都市中心地区を調査した音環境データを多角的視点から捉え、一連の発信システムを提案し、音環境情報・地理情報・地域情報等を蓄積・融合させ、地域の景観計画に向けての新たな情報提供に寄与することを目的にしている。

従来の景観設計では観光とはされがちであった音環境分野の潜在的特性が、近年大きく注目されるようになった。音環境デザインの対象は、音楽にとどまらず「音（非美音領域）」を網羅している。さらに聴覚の領域だけでなく、視覚分野や、文化・社会の背景に配慮した文脈主義（contextualism）の領域も含まれる。最終的には、発音者と音楽者との関わりのなかで生まれる共同設計（collaborative design）や関係性のデザイン（relational design）が、サウンドデザインでは求められている。

そもそも景観計画の対象は、視覚分野を凌駕した他の感覚領域を含む「トータルな景観デザイン」を捉えることが多い。そうした意味からも、音環境が従来の景観設計に寄与する可能性が高まります。音環境デザインの主軸メディアとして捉えることで、包括的な景観計画に貢献できると筆者は考えている。

音環境は、可視化・表現・追検証が難しい領域である。音環境データは、時間経過を伴った異なった状態を、それをカバーし得るハード技術の確立が困難であった。また、音環境の既往研究は、音質などの不快音の制御問題が主流であったが、近年、音の質的側面を重視するようになり、音環境データを等価に網羅させるような収集が、今後の大きな課題である。

景観設計の施行に際しては、事業主体（クリエイター）・設計者（デザイナー）・受益者（ユーザー）の三者のなかにアーキテクチャを意識する必要がある。従来からの要素還元主義的なアプローチでは、受益者の要求が計画執行に直接反映されないことが多かった。ユーザーが設計プロセスにコミットする可能性を、音環境デザイン事業に求めるといえる。具体的には、市民