

中國傳統戲場的聲學特徵

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摘要

中國戲曲是世界三大古老戲劇文化之一，是唯一保存至今而仍然活躍在戲劇舞臺上，又別具一格的表演藝術。與中國傳統戲曲相適應的表演載體—戲場建築，在世界建築史上也是獨樹一幟的。這種傳統戲場遍佈全國各地，現存者數以千計，其中最古老的始建於金代，距今已有 900 餘年歷史，有些戲場還在使用。

中國傳統戲場在建築形制上共有三大類型：廣場式、庭院式和廳堂式。在相當長時期內庭院式戲場是其主流。唱、唸、做、打是傳統戲曲的基本表演特徵，聽視同屬重要。而在清末民初，京津一帶素有聽戲之說，對演員唱工和戲場音質要求更顯突出。

三面向觀眾敞開的亭閣式舞臺較為普遍。面積不大的舞臺，不高的頂棚配有造型精緻的穹頂，有利於發聲和傳播到聽眾席，亦有助於演唱者的自我感受。演員在台口演唱，伴奏樂隊在舞台後部靠牆處，這種傳統佈局從音質角度來看很是合理的。至今仍沿用於日韓等國的傳統戲劇舞臺。

舞臺下設甕以助聲之說，流傳多年。經我們實地考據和聲學分析，純屬妄傳。這類誤傳也出現在西方，近年亦有學者對此加以澄清。

庭院式戲場是頂部敞開的空間，其聲學問題頗為特殊。以封閉空間為條件所演繹而來的賽賓理論和賽賓公式，以及經典混響時間參量在此是否適用，應予重新審議。作者近年研究表明，頂面敞開空間內的回聲圖(echogram)顯示其反射聲序列中出現了很大缺失，而且這些反射聲的空間分佈亦有明顯變化。因此，按經典要求用無指向性傳聲器接收所測得的混響時間，只反映了聲場內聲壓級的衰變率，不能充分反映庭院式戲場的真實混響感。如改用假人頭(dummy head)雙聲道接收到含方向性訊息的脈衝響應時，會發

現其混響感是不同的，那才符合實際感受。經系列聽音對比實驗，證實了這一現象的存在。因此在庭院式戲場中，用經典方法測量到的混響時間會給人以誤導。類似情況也出現在西方聲學界。例如近年國外發表的許多有關古希臘、羅馬露天劇場(也屬無頂空間)的現場混響時間測量，還都用的經典方法，顯然不妥。這是值得注意和進一步探討的問題。

Acoustical features of Traditional Chinese Theatrical Buildings

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Abstract

Traditional Chinese theatrical buildings are not only unique in the world history of ancient theatres, but also in classic Chinese architecture. The puzzle of vase resonators beneath the traditional theatrical stage for sound enhancement has been examined by the author through site investigations, literature research and acoustical analysis, and it was discovered just a myth. Various designs had been used for theatrical buildings in history, the pavilion stage opened on three sides and extended into the audience area is the most outstanding type. Hundreds of traditional theatrical buildings built in the Ming and Qing Dynasties still can be found all over the country. Some are well preserved and quite a few are still functioning today. As the traditional Chinese theatre was often built with a courtyard, the acoustics in such unroofed space is different from that of enclosed space. Therefore, the classic room acoustics, such as Sabine reverberation formula, is no longer applicable due to the lack of sound reflections from the ceiling. The sense of reverberance in a courtyard space is noticeably different from that of the equivalent 3D-T30 in an enclosed space. More detail discussions will be described in the oral presentation.