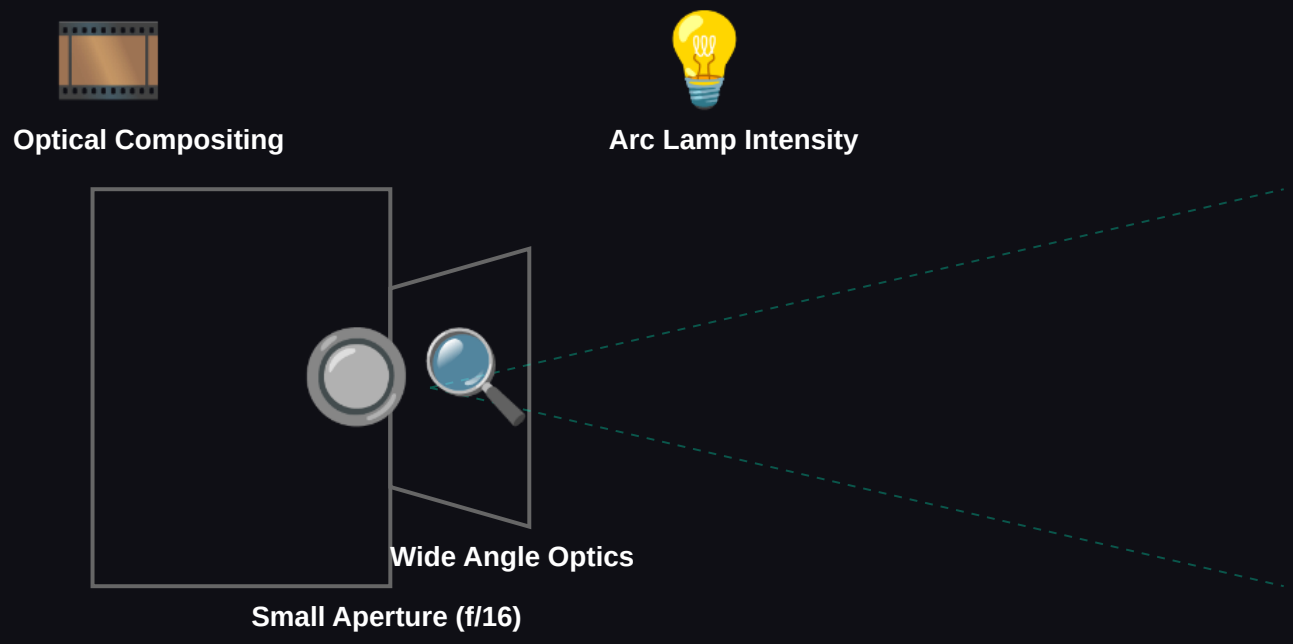


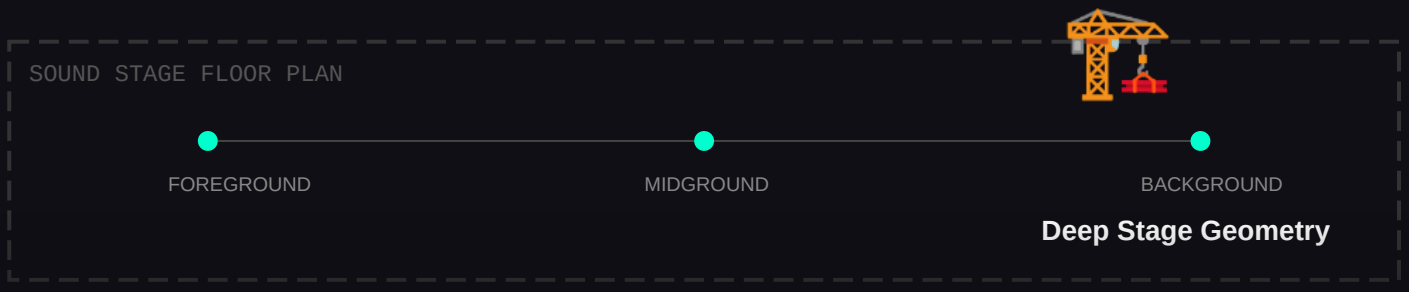


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# Technical history of deep focus cinematography from Renoir to Welles

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VECTREE · KNOWLEDGE MAP

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## 🔍 Renoir and Wide-Angle Evolution

Jean Renoir pioneered the democratic use of the film frame. Unlike the shallow-focus ‘Gish’ style of the 1920s, Renoir began using 18.5mm and 25mm lenses to allow actors to move freely between the foreground and background. This ‘staging in depth’ broke the theatrical proscenium and demanded a more fluid camera style.

By keeping the entire space in focus, Renoir connected characters to their social environments, a technique famously realized in ‘The Rules of the Game’ (1939). This necessitated better lens coatings to prevent the flare caused by capturing such a wide field of view.

## 🔘 The Physics of the Stop-Down

Deep focus is a direct result of ‘stopping down’ the lens aperture. By narrowing the opening to f/8, f/11, or even f/16, the ‘Circle of Confusion’—the area where light rays converge—is minimized. This significantly expands the Depth of Field, ensuring that objects near the lens and objects far away remain sharp.

Gregg Toland, the cinematographer for ‘Citizen Kane’, pushed this to the limit. However, closing the aperture reduces light intake exponentially, requiring massive compensations in other areas of the production, specifically lighting and film stock sensitivity.

## 💡 Arc Lamp Intensity

To shoot at f/11 or f/16—settings typically reserved for bright sunlight—indoors, Orson Welles and Gregg Toland required an unprecedented amount of artificial light. They utilized high-intensity carbon arc lamps, which were previously used primarily for Technicolor filming.

These lamps produced a ‘hard’ light that could punch through the small aperture. This required the actors to withstand immense heat and necessitated the use of ‘bloomed’ or coated lenses to reduce the internal reflections that such powerful light sources would create within the lens elements.

## 🏗️ Deep Space Set Geometry

Deep focus is not just a camera setting; it is a spatial philosophy. In ‘Citizen Kane’, Toland and art director Perry Ferguson designed sets with low ceilings and long hallways specifically to accentuate the depth provided by the lenses.

The sets often used ‘forced perspective’—making background objects smaller than they should be—to exaggerate the sense of distance. The camera was often placed in pits or low-angle positions to capture both the floor and the ceiling, anchoring the characters within a three-dimensional box rather than a flat plane.

## The 'Cheat': Optical Printing

Not all deep focus was achieved in-camera. For shots where it was physically impossible to keep a face inches from the lens and a background sharp (due to the limits of optics), Welles used the Optical Printer.

In the famous ‘suicide attempt’ scene in ‘Citizen Kane’, the foreground (glass/bottle), middle ground (bed), and background (doorway) were filmed as separate exposures and later composited together. This was a proto-VFX approach to deep focus that allowed for ‘hyper-real’ depth that even the best lenses of 1941 could not achieve alone.