The Dramaturgies of Volumetric Capture

Joanne "Bob" Whalley, Lee Miller

This article offers an examination of the space between the audience and the object in the complex territory of immersive capturing of live performance practice. By reflecting upon the interplay between the recordability of a live event and its inherent resistance to fixity, what follows considers to what extent this uncertainty is encoded in the transmission. This exploration extends from the reception of the spectator to the nuanced relationship between the tangible materiality of a performance and its digital output. In so doing, we seek to investigate how emerging volumetric and capturing technologies have the potential to reshape the documentation, archiving, and accessibility of performance work. It interrogates how these technological advancements influence the dynamic relationship between live and mediated experiences, impacting dramaturgical strategies within ephemeral, process-driven practices. By offering a critical reflection on the challenges inherent in documenting live performances and acknowledging the intrinsic gap between the source and its representation, we assess the complexities afforded by use of a developing digital medium. Ultimately, this article underscores the ephemeral nature of the archive and the unavoidable obsolescence that accompanies it.

The Relationship between the Live and the Mediated

Erin Manning in the text *Out of the Clear* reminds us that we have bodies and that these bodies collide in messy scenarios: "[t]he world is made of actual occasions. But since the occasions are forever perishing, the extensive continuum cannot but be alive with the minor matterings of all that has come to actual expression. This naturing of nature can be felt as a thresholding of actuality and potential. Not a body yet – a bodying, a mattering." (Manning 2023, 46). The "mattering" of this article considers the potential to shift significantly how performance work is documented, archived, and accessed through the emergence of volumetric and capturing technologies (such as LIDAR, structured light, photogrammetry, 360-degree video, and light fields), and virtual production contexts. As these blended realities impact upon the relationship between the live and the mediated, what follows reflects on the potential impact that these developments may have

upon dramaturgical strategies employed within ephemeral, process-driven performance practice.

While there may be little novelty in acknowledging the challenges presented in the documentation of live performance practice, or the close relationship between documentation and dissemination in the context of artistic research, there is nevertheless still work to be done on the dramaturgy of the document. As we approach this territory, the potential doubling afforded by the original referent and its digital twin evokes for us the concept of quantum entanglement, requiring an acknowledgment of the cleaving between the source and its document. We might understand this as the inevitable gapping of the archive. Curation is always a framing and, as such is determined, directed, and informed by intent. The question of the digital serves only to underscore the inevitable obsolescence and ephemerality of the archive.

If everything disappears, and this uncertain future in a time of climate-urgent certainty brings the concept of endings closer, perhaps we must simply train ourselves, or should that be retrain ourselves?, to tell stories. Of course, stories are no less partial or prone to forgetting. In *As We Have Always Done*, Leanne Betasamosake Simpson refers to a transfer of knowledge, a learning that has a "living resonance" (Simpson 2017, 151), that is held through and across bodies and individuals. This theory finds its way from the ground up and is one that also returns to the soil. It gives space to stories, and when we give space to stories, they "direct, inspire, and affirm, an ancient code of ethics" (Simpson, 2017, 152). Stories that work themselves from the ground up offer different ways of doing, of telling.

Rather joyously, we can never fully get outside of the story being told to get to the story itself. What follows serves as a speculative imagining of the once-or-never-was tangible. In *All Incomplete* by Stefano Harney and Fred Moten, the knowledge across bodies is also cyclical: "[w]e turn each other over, dig each other up, float each other off, sink down with each other, and fall for each other" (Harney and Moten 2021, 120).

The politics of the tale extends from Gilles Deleuze and Félix Guattari's notion of "minor literature," surfaced in their 1975 essay "Kafka: Toward a Minor Literature," in which they offer those small, marginal stories as counters to "major" and dominant discourse (Deleuze and Guattari 1986). This shifting of focus to the margins is to invite a decentered approach, one which evokes bell hooks and her assertions that a "space of radical openness is a margin – a profound edge" (hooks 1990, 149). It is just such a profound edge offered by Christian Ulrik Andersen and Geoff Cox, who with their concept of "minor tech" position a technology on

the fringes. Framing "minor tech" alongside the broad horizons of major "big" tech, they outline it thus: "A characteristic of minor technologies is that everything in them is politics […] A minor technology is that which a minority constructs within the grammar of technology […] A minor technology is an intensive utilisation of technology – it utilises the inner tensions of technology" (Andersen and Cox 2023)

Everything uttered is framed in the previously spoken, "everything in them is politics" (Anderson and Cox 2023, 5). The materiality of technology, the humanitarian and ecological cost of lithium mining, the drone technology that simplifies film making and warfare, are all part of the same piece. In Paul Carter's 2004 book *Material Thinking: The Theory and Practice of Creative Research*, he offers the following: "[t]he term 'material thinking' describes a kind of procedural consciousness, a way of knowing in which thinking and making are inseparable. To think through materials, then, means to devise a method that thinks with them, a method that taps into their potential to become something they have not been before." This, in dialogue with the minor tech of Andersen and Cox, tips us toward a recognition that the dramaturgical strategies employed in any digital capture or reconstruction of the live offers a materially different way of thinking and. therefore, being. This evokes the writing of dance academic Freya Vass-Rhee who observes a series "distributed dramaturgies" when considering the choreography of William Forsythe's ensemble. She notes that these are "distributed in a broad plurality of senses: among participants, across individual and shared dramaturgical practices, and across different spaces and times" (Vass-Rhee 2015, 89), with dramaturgical approaches anticipating the multiple and, therefore, distributed accordingly.

The multiplicity afforded by distribution is a way into thinking about the dramaturgy necessary for the anticipated shift to new technologies. Rather than keeping this in the abstract, we should perhaps ground our speculation in a named documentary approach, even if we are not yet thinking about the direct application in the capturing of specific performance. The idea of distributed dramaturgy is particularly helpful when imagining how to prepare to create work for a volumetric-capture stage, specifically, the HOLOSYS™ volumetric-capture system built by 4DViews of Grenoble.

Grove the Muppet, Puppetry, and the Body

Although it might seem a somewhat strange way into discussing this technology, upon first encountering it we were reminded of Grover the Muppet, specifically his explication of near and far in an episode of *Sesame*

Street. If you are unfamiliar with this, it is a scene 2 minutes 22 seconds in length, first broadcast in April of 1975, but now available on multiple video hosting platforms on the internet. Borrowing from the approach founded by Gilbert Ryle (1949) and later developed and popularized by Clifford Geertz (1973), what follows is a "thick description" of Grover's (performed by Frank Oz) demonstration of the conjoined concepts of near and far. The term *thick description* emerges from Ryle's discussion of what constitutes a meaningful explication in social practices. In differentiating between mere action and the significance behind that action, Ryle provided examples, such as the difference between a twitch and a wink. While both may look alike, a wink carries with it intention, context, and cultural meaning that a twitch does not. Clifford Geertz adopted and expanded upon Ryle's concept, taking its consideration into the realm of anthropology. For Geertz, thick description was a way to capture not just behaviours but also their embedded meanings in cultural contexts. It is just such thickness that is invoked here in the introduction of Grover and the way in which his disembodied embodiment serves to illustrate the rich potential of action as a route to understanding. Grover is in direct dialogue with his audience, offering a performative and dramaturgical navigation of perspective through the two-dimensional interface of the screen. He is navigating the assumed, or perhaps the performed-projected uncertainties of an imagined audience. Instead of shying away from the ambiguities inherent in imagining a dialogue with an absent child, Grover acts as his own dramaturg, turning them into opportunities for creative exploration. He is engaged in the performance of speculative problem-solving, where the unknown is less an obstacle and more an opportunity for innovation.

The direct address to camera is presented as a one-sided conversation with an absent other, one who cannot understand the distinction between the conjoined concepts of near and far. This ludic direct address evokes the way in which affective exchanges function in co-creative or co-constitutive processes in live performance. Although performed for an entirely imaginary responder, the lack of any other agent in the scene allows us to imagine Grover's mode of engagement and address as being in dialogue with Jacques Rancière's "emancipated spectatorship" (Rancière 2011), Karen Barad's "intra-action" (Barad 2007), and John Fiske's "audiencing" (Fiske 1992). Even at a remove, the assumed unresponsiveness of his interlocutor points to the messy entanglement of audience / performer subjectivities. Perhaps it is the way in which this scene filmed in the mid-1970s presages a gradual move in theater and performance from an audience with assumed

passivity toward one with more explicit and complicit engagement in the generation of the outcome that drew our attention.

And, of course, he is a puppet, which is important. Grover's puppet-self intervenes helpfully into the field of enquiry that includes the dramaturgical potential of the volumetric stage. Grover, or rather Oz performing as Grover, has to imagine his embodiment and project it through his performance. His puppet-self is important because of the lengths the performer goes to ensure that his puppet-self is not an interruption. We see Grover in a mid-shot. Of course, we do, we must. We know that he doesn't exist below the waist. Or rather, he does exist, but his materiality shifts from performer to performed. His animation is dependent upon the body of another. Despite this knowledge and this need, Grover is nevertheless performed as fully grounded. Think of the sound his shoes make as he asserts "here," or the sound of his footsteps and his breath as he navigates the points between "near" and "far." Dramaturgical strategies of connecting the wider mise en scène to the active communication of a bodily presence are employed to unsettle the potential distancing that his half-body might otherwise evoke. He is a plurality. These are strategies that might feel familiar to the historian of modern dance who recalls the role of fabric in the choreographic strategies of Loïe Fuller nor the importance of breath and its sounding in release-based dance practices. Grover is not unique in the deliberate scoring of the presence of the body, and the grounding of his puppet-presence is something we will return to.

Grover is included here not because we are zeroing-in on puppetry, but because of an attendant animation that must be imagined in approaching the volumetric stage. As we begin to approach creating work for a volumetric capture system, there is a plurality akin to the consideration of Grover, yet different nevertheless, because rather than a performance intricately tethered to another body, we must develop dramaturgies to account for unknown devices, unknown objects, unknown tech. Not unknown in the sense that they cannot be named and enumerated, but unknown because these technologies require a different way of presenting oneself as a performer. The approach to the self, witnessed by multiple lenses in one moment, speaks to a sense of distribution. The prospect of this distribution leaves us feeling thin, wild, and frayed at the edges, anxious. As performers, as makers, we must imagine an audience that fully encompasses, and such speculation opens up the space for anxiety, which is perhaps why we find ourselves thinking of the advice offered by scientist Rachel Armstrong on ways of sitting with the speculative: "Black Sky Thinking is […] reaching beyond current frameworks and pre-determined projections, into the

terrain of the unknown. But more than this, [it] bring[s] this unknown into the present in a way that has immediate effects and engages others, always cognisant that the 'Future Is Messy', not linear and deterministic." (Armstrong 2017.)

Armstrong's Black Sky Thinking helps us to remember that we are refractive bodies. We see things through others, and by the time that the light has left them, and reached us, it is inevitable that we are seeing it differently. The words of Armstrong refract through us and lead to others, to the writing of Lola Olufemi, who focuses on the uses of the feminist imagination and its relationship to futurity, political demands, and the imaginative-revolutionary potential, writing that reminds us that when connecting point A to point B, we should always invoke the otherwise. In *Experiments in Imagining Otherwise* (2021), she offers her reader:

> a note on language - If I ask you to connect point A to point B and you inevitably draw a straight line, what do you think you think of history? If you draw a circle, do you think of history as living commotion, a sprawling mess of the not-quite-said, or did-it-actually-happen, or what-year-was-the-massacre, or what-ushered-in-the-epoch? I want you to remember that most things are an invention. I am not the first person to invoke the otherwise, and I won't be the last. Most concepts with potential start to droop from overuse. I might present it to you limp. Indulge me! I write to say, I do not wish to box you into the otherwise. We are not trying to put a finger on it; I bet you have heard that before. Here, the otherwise is a linguistic stand-in for a stance against; it is a posture, the layered echoes of a gesture. I promise you that no approximations will be made. Only pleas, wishes, frantic screams, notes on strategy, contributions in different registers. Substitute the otherwise for that thing that keeps you alive, or the ferocity with which you detest this world. (Olufemi 2021, 3.)

To date, the vicissitudes importing into the United Kingdom after Brexit, and the institutional complexities of finding a permanent home for complex and large-scale technology, mean that this writing is based on our reflections of an eleven-second clip of Lee Miller's failure to execute a handstand. As with Grover, however, this early experiment in VolCap requires just such a pause and level of thickness and detailed consideration, not least because of the evident paucity of actual material to discuss, but also due to the way in which his disembodied embodiment serves to illustrate the rich potential of material as a route to understanding. Lee is evidently not in dialogue with his audience. His gaze is self-regarding, his physicality draws in, and while he does eventually open up, it is into an action and not into engagement. He is surrounded by cameras, and like

Grover, he too is navigating the assumed, or perhaps the performed-projected uncertainties of an imagined audience from whose gaze he cannot retreat. There is no here-and-now moment. He is engaged in this performance imagining the as-yet-unknown looking-at of an audience, who will either be positioned (in the case of this short clip) by the animator, or potentially by the machine learning of the unreal-engine, or the active agency of the audience member wearing a VR headset. There is no way to project a certainty of reception in the light of so many cameras. He cannot perform out as Grover / Oz were able to, as there is no "out." Or perhaps the issue is that there is nothing but out, all around. (Figure 1.)

Figure 1.

Source: Photo by Georg Finch

By unacknowledging the camera (for what else can we call performing in front of hundreds of cameras encircling the 360-degree performance space?), his is not a one-sided conversation with an absent other, but it is nevertheless freighted with the co-creative or co-constitutive processes familiar to live performance. And just as with Grover, his action is inevitably in dialogue with Rancière, Barad, and Fiske. His brief choreographic score even at a remove, even as it acknowledges the unresponsiveness of

his interlocutor in the space, nevertheless points to the messy entanglement of audience / performer subjectivities.

Grover as puppet is clear, but so too is Lee as puppet. His puppet-self is important because of the lengths the animator has gone to ensure that his puppet-self is not an interruption. And yet, although once upon a time, Lee really did stand on a volumetric stage and create a short physical score, his animation is dependent upon the body of another. Dramaturgical strategies of connecting the wider mise en scène to the active communication of a bodily presence are employed to unsettle the potential distancing that seeing the transition from green screen to digital environment might otherwise evoke.

Figure 2.

Source: Photo by Georg Finch

Artist Jeanne van Heeswijk has developed "Trainings for the Not-Yet," as a way of negotiating uncertainty. To bring "together methodologies of approach, of connecting, of building, of learning, of listening, and of all these practices," she uses what she calls "protocols, or pathways, of engagement" (Heeswijk, Hlavajova, Reaves, and Wilson 2021). Van Heeswijk's protocols, or pathways, field a preparation for the not-yet, a training for

the not-yet, as "a way of saying that what we are trying to do is to collectively rehearse and practice certain toolsets together, to learn in order to build forward" (Heeswijk, Hlavajova, Reaves, and Wilson 2021). This "building forward" and building out are interesting to us in this moment of unknowing, a way to mobilize an agentic "middle," a kind of being between bodies and between ideas.

Grasping the Nettle: More on the Rapidly Changing Technology

This initial training for the not-yet is a recognition that we are working toward understanding how we might balance agency, autonomy, and presence as we similarly try to understand these same questions in the context of the emerging practice of volumetric dramaturgies. Not to acknowledge the difficulties of being embodied in the exact moment of encountering this in the studio would be amiss. And with this, perhaps now is the moment to grasp the nettle and discuss the technology. The volumetric studio we are referring to is the HOLOSYS™ solution built by 4DViews out of Grenoble. The HOLOSYS™ is a fully transportable volumetric-capture system, with modular freestanding pods, allowing quick assembly and disassembly for on-site volumetric capture. Each pod has three cameras and three LED lighting panels. It has a capture volume up to a diameter of 5 m and a height of 2.4 m. It captures at a frame rate up to 60 FPS, and outputs to .4DRAW(1), .4DS & .ABC formats. The texture resolution is up to 2,880 pixels, and it has a recording capacity of 110 minutes at one time, although the system is built with a storage capacity of up to 30 hours of volumetric data. This is the out-of-the-box solution, but it can be upgraded as necessary.

We offer the specifications here because the technical properties of the capturing technologies speak to specific dramaturgical affordances and the need to acknowledge and account for this in any planning. At the outset of this writing, we referred in passing to the entanglement of quantum mechanics, and it is in dialogue with the specifics of the technology and the performers' unknowing of the gaze that these ideas most explicitly emerge. In the volumetric stage, we are working at a remove, not just spatially, but existentially. Action at a distance is rooted in various fields of study, from physics to philosophy, and perhaps the most notable instance of its use is in quantum mechanics, where entanglement allows particles to instantaneously affect each other regardless of the distance separating them. It is the concept where objects in the physical universe can affect one another even when they are not in direct contact or proximal to one

another. In classical physics, gravitational and electromagnetic forces also act over distance without direct contact.

In the context of volumetric capture, action at a distance speaks to how the cameras function as a Benthamian intervention into behavior. The knowledge that the performance is being captured in 360 degrees simultaneously shifts the idea of where we are being observed from and obviates any possibility of actorly attempts to "cheat" it upstage – there is no upstage, and the audience has the potential to move freely through the scene at any moment – even if the work will ultimately be rendered for a "flat" viewing experience as is the case with the short clip we are reflecting upon. The performer is aware in the moment of being captured that the possibility of reception is multiple and entirely dependent upon the chosen output. This is to say nothing of the potential that volumetric data may allow for new interactions with future and as yet unplanned digital representations from afar, or indeed, how the captured data might have effects in distant or different virtual environments. The panoptic gaze is no longer imagined and feared, but actualized and deliberate. For the performer, context is unsettled, because it is always in a state of un-becoming.

It is inevitable that contemplating this futurity takes us into the cloud. As Tung-Hui Hu reminds us, the cloud, much like the future, is always there. A drifting and diaphanous network, "[l]ike the inaudible hum of the electrical grid at 60 hertz, the cloud is silent, in the background, and almost unnoticeable [. . .] It is just there, atmospheric and part of the environment" (Hu 2015, ix). Work with a potential future beyond the intention of its inception has the potential to float off in a way quite unlike the ephemerality of live performance. In contemplating this untethering, we are slowly realizing that hardware is the least interesting part of this process. When trying to accommodate the dramaturgical affordances of technologies that are only now becoming, and imagining the strategies needed to account for an audience that might not yet know their role in the exchange, the speculative becomes a grounding, drawing us forward by the writings of Armstrong, Heeswijk, Olufemi, Vass-Rhee and others.

The presence of the volumetric data in the cloud removes the need to think of performance in terms of absence or presence, because to be speculative is to always be in the process of becoming. This speculative approach requires a kind of selective forgetting so that we may hope to construct coherent narratives of those bodies held in a perpetual panoptic moment. Even as these bodies are rendered data and held in the constant stasis of the not-yet, as photographer Georg Finch reminds us that their images have fidelity up to the point of holography, we find our thoughts unpeeling

from histories of categorization to divine extended ways of looking instead. Things that sit alongside Gillian Rose's visual methodologies (Rose 2016), for example, or draw on the embodied strategies of looking offered by choreographer Emilie Gallier, whose concept of the "vection" of a spectator calls for an active engagement with, and narration of, the experience (Gallier).

In Closing

The speculative nature of what we are speaking about surfaces more questions than it answers. While we could try to move toward some pat assertion that the landscape of performance has always been in flux, constantly reshaped by the tools, mediums, and ideologies of its time, it should come as no surprise that with the integration of cutting-edge technologies such as volumetric capture and LiDAR scanning, we find ourselves standing at the precipice of yet another transformative era.

Inevitably, the inherent nature of emerging technologies means that they are often not fully understood, even by those employing them. Volumetric capture has evolving capabilities and limitations, meaning that the early-stage practices we are entering into are unlikely to fully leverage its strengths or might even serve to inadvertently expose its weaknesses.

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