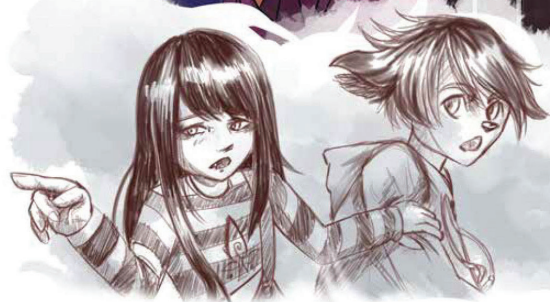Lissa Holloway-Attaway, Lars Vipsjö, Patrik Erlandsson

finns ett litet skogs-
n hoppar och tjoar,
grimaser och slår
ttor. Barnen i
n skrattar, men
a vet inte vad
rcka.
ett trick!
gon, men
irektören
lurig ut.

- Åh nej. Det där är inget trick,
viskar Kira förfärat.
- Skynda dig! Vi måste härifrån,
väser Luppe.

By its very definition and essence, Cultural Heritage is an inter- generational, multi-time-based narrative practice that merges and con/fuses past-present realities: It creates the illusion of being both here and there through participatory and collaborative acts with stimulus objects (artifacts) to displace those that encounter them to new realms of experience. Artifacts and their attendant stories merge objects and viewers and defy space and time. Cultural Heritage is, then, no less than time travel.

With the incorporation of digital technologies within Cultural Heritage encounters (in museums, at site-specific historical locations, and within other re-constructed locales and story worlds) the complex layers of space, time and narrative deepen. Particularly with the use of mobile Augmented Reality (AR) technologies, users are brought into increasingly complex relationships with the artifacts they encounter. Using personal smart phones to come into relationships with historical objects and sites through participatory and performative narrative acts engage the sensory body of the viewer/user and rely on affective response to stimulate the desired, necessary, time travel on which heritage depends. In our exhibition work, we share an on-going Digital Cultural Heritage transmedial storytelling project ("KLUB", or "Kira and Luppe's Bestiary") focused on re-telling the past history of the Skaraborg region in Western Sweden through a traditional children's book series and an Augmented Reality mobile application.
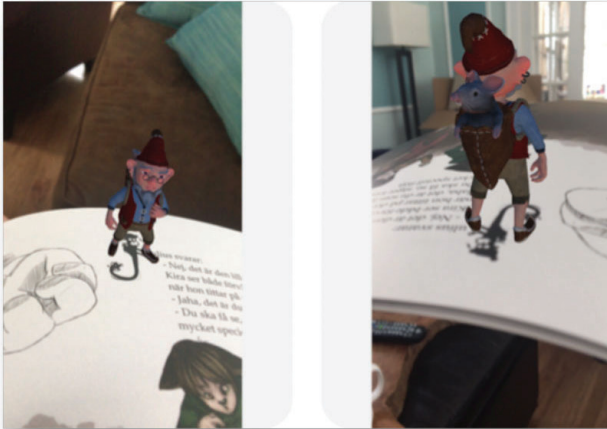
KLUB is a sub-project within the KASTiS Project (in English the "Cultural Heritage And Gaming Technology in Skaraborg" project) and is funded (from 2015-18) by a number of municipal and cultural partners within the region, including the Skaraborg Municipality ("Skaraborgs kommunalförbund") and the Games Education at the University of Skövde in Skövde, Sweden. *KLUB* is based on the collaborative development of a series of traditional children's books with an accompanying mobile AR application that incorporates the local histories and heritage sites of several municipalities within the region. The intended readers/users of the stories are primarily youth, but ideally also, their families who read/travel together to visit heritage locales referenced by the stories and interact with them via the application.

The books are collaboratively created with researchers and students from the University of Skövde, along with heritage experts, local schools and libraries to encourage both reading skills and knowledge of local history. In this way the stories embrace the idea of time travel through embodied, interactive and performative narrative experiences

Each book traces and follows a tale of ancient trolls and other mythical beings (based, in part, on ancient Swedish folktales), including an evil circus ringmaster, a troll hunter and researcher, and the lead characters: Kira (a girl-vampire) and Luppe (a boy-werewolf). Across the many inter-connected books and tales, Kira and Luppe work to hunt down the mythical "beasts" who have escaped from a circus. The characters and stories are distributed across many of the books, but are also supplemented with a mobile AR application that interacts both with figures in the books, bringing characters to life through animated 3D images in, but also on location at heritage sites in the region. Readers/Users of the books and application "collect" characters in their phones and then learn more about them in the application's "Bestiary", the mythical catalogue of beasts. The book series also hearkens back to earlier media forms, while building interaction with contemporary media. Partly based in design on Medieval Illuminated Manuscripts this book series uses decorated initials — letters that blend pictures and text to tell stories — as trigger images for the Augmented Reality experience. Particular letters are associated with specific characters and repeated throughout the book series. Users can download the associated "Bestarium" application (from Google Play or the App Store) and then by using their camera phone, they aim at the images in the book to collect the characters in their own compendium, or Bestarium, on the application in their smart phone or tablet. To date, eight books are completed and four more are in development. The mobile application continues to develop in tandem with the new books and stories.

We believe our exhibition of elements from the *KLUB* project, both in the physical books and virtual environments of tablets and smartphones ,can reveal how history, time, and space can converge to tell new/old stories in new co-located environments.

TRANSFORMATIVE CULTURE/TRANS*MEDIAL PRACTICE/POSTDIGITAL PLAY:
Exploring Augmented Reality Children's Books, Local Cultural Heritage and Intra-active Design
Lissa Holloway-Attaway

Between the dry world of virtuality and the wet world of biology lies a moist domain, a new interspace of potentiality and promise. I want to suggest that Moistmedia (comprising bits, atoms, neurons, and genes) will constitute the substrate of the art of our new century, a transformative art concerned with the construction of a fluid reality. This will mean the spread of intelligence to every part of the built environment coupled with recognition of the intelligence that lies within every part of the living planet. This burgeoning awareness is technoetic: techne and gnosis combined into a new knowledge of the world, a connective mind that is spawning new realities and new definitions of life and human identity. This mind will in turn seek new forms of embodiment and of articulation.
Roy Ascott from Art, Technology, Consciousness:
mind@large (2000)

Trouble is an interesting word. It derives from a thirteenth-century French verb meaning "to stir up," "to make cloudy," "to disturb." We— all of us on Terra— live in disturbing times, mixed-up, troubling and turbid times. The task is to become capable, with each other in all of our bumptious kinds, of response. Mixed-up times are overflowing with both pain and joy— with vastly unjust patterns of pain and joy, with unnecessary killing of ongoingness but also with necessary resurgence. The task is to make kin in lines of inventive connection as a practice of learning to live and die well with each other in a thick present. Our task is to make trouble, to stir up potent response to devastating events, as well as to settle troubled waters and rebuild quiet places.
Donna J. Haraway from Staying with the Trouble:
Making Kin in the Cthulucene (2016)

Troubled Times: a teaser

Our early 21st century media ecology is in a state of deep transformation and flux. Hybrid and ontologically complex virtual and material forms (worlds, bodies, devices) are mutually activated, and they circulate among us to sustain complex forms of meaning-making, signification, and inscription within culture. In this state of mixed(-up) reality, interfaces are continual transformed, changing tempo and shifting and moving across material/technical agents to mediate posthuman and more-than-human expression. Authorship is no longer considered singular or purely human-centric and reading requires multimodal, polysensual, and performative literacies (Braidotti, 2013; Drucker, 2012; Emerson, 2014; Rouse, Engberg, JafariNaimi & Bolter, 2015; Hayles, 2012; Parikka, 2010). In concert, stories and games too have converged in new formulations that radically transform the ways that we read and interact with them, as well as the characters, settings, and narratives they convey. We now encounter them in non-traditional settings and spaces, off the page of the book and beyond the domain of the computer and/or game console, and we interact *differently* with their materials, in newly troubled forms of embodiment and hybrid design, in story-games.

Increasingly we find such story-games (that is narratives that utilize play as embodied forms of reading and writing in interactive virtual/material worlds) in social and cultural contexts such as art galleries, museums and heritage sites. Here, storytelling, as with the KLUB project, is often co-located, interactive and experiential, and it includes for example 'pervasive,' 'augmented,' 'locative,' and 'affective' forms for engagement. Together these media

forms reflect intricate design challenges requiring inter-disciplinary expertise from computing, cognitive science, user-experience, interaction design, narrative and literary studies, and game design. Thus, the act, and the art, of storytelling require new analytical modes and design practices to accommodate these difficult, troubled affordances and mixed-up media times. Not merely interactive by nature, now we must recognize the intra-active, hybrid, and deep material entanglements they convey.

To that end, in this reflection I offer a long view of the times that these new media forms recall from the past, and call to in the now and future media that move us forward and backward, at once. I position myself, then, in solidarity with Donna Haraway who at the core of her recent book *Staying with the Trouble (2016)*, claims that it is time to find our relations and to define our relata with our "oddkin," our almost-relations, who are not our traditional "godkin and genealogical and biogenetic families," but who are rather our monsters, or our "Chthonic ones" (p. 2): Chthonic ones are monsters in the best sense; they demonstrate and perform the material meaningfulness of earth processes and critters. They also demonstrate and perform consequences. Chthonic ones are not safe; they have no truck with ideologues; they belong to no one; they writhe and luxuriate in manifold forms and manifold names in all the airs, waters, and places of earth. They make and un-make; they are made and unmade. They are who are. (p. 2)

I suggest that these too are the "multicritters" at the spirit-core of the KLUB project (p. 2). Like the Chthonic ones Haraway imagines, the books, contexts, characters, and modes of use for KLUB are simultaneously "both ancient and up-to-the-minute" (p. 2). They are a mash-up of traditional and new media and systems for use: they are books, mobile application, localized history, and fluid folkloric agents to engage users in play. As such KLUB, and its attendant oddkin resemble the Chthonic one Haraway imagines as "replete with tentacles, feelers, digits, cords,

and whiptails" (p. 3). They transgress time and space, and they affiliate, with no single allegiance to form or function. Collectively the media, users and interfaces they employ represent the layered virtual/material relational components that comprise these new emergent 21st century media forms.

I stand too in solidarity too with Ascott's promotion, made at the cusp of the 21st century, of the "moist domain" as an exemplary model for the future—one to support and inspire transformative technological creations (deeply mixed and hybrid media types) and inventions, comprised of human and nonhuman agents—that is of mixed-up "bits, atoms, neurons, and genes" (p. 2). In this context, and with Haraway's claims in view, we can explore KLUB from its literal and figurative dimensions. Literally KLUB is a children's book series about local histories that includes a mobile Augmented Reality (AR) component. But if we consider the many virtual, imaginative, fanciful and other complex material dimensions that comprise its interface, we may also recognize it as much more: it is fantasy and fiction, history and folklore, located and mobile, and ultimately human and non-human; it is a host of multicritters and its agencies move intra-actively among all components. Moving one, then the other, and sometimes many at once, into focus, it operates like a kaleidoscope of lighted shapes and forms that come in and out of view. Full of shifting symmetry, and with a firm twist of the hand, the worlds they reflect are multidimensional, dynamic, and elusive. As such, I recommend that if we take the time as, Haraway suggests, to stay with its trouble and to unpack the host of layered interspaces that Ascott also affirms as the "substrate of the art of the new century" (p. 2), we can discover new hybrid forms that complicate and converge, like a kaleidoscope, our haptic agency, our perspectives, and our desire to keep art in action. Here, there, we might also find in it a example of a new interdisciplinary critical form of transmedial and transformative boundary play, driven forward by its

multiple intra-activities, its twists and turns, and 21st media more-than-human aesthetic desires.

Digital Humanities and Digital Cultural Heritage: new allegiances

How might we begin then to recognize KLUB, and its potential oddkin (its future mutant, twisted offspring) as indicative of new directions for production and critical intervention? One critical entry point might be to consider contemporary discussions in the Digital Humanities (DH) that recognize media not only in their formal constructions, but rather as sets of interactive and performed experiences. As with Ascott's technoetic state, where human consciousness and technology mutually adapt, resisting technologically deterministic perspectives, we can see mixed reality approaches to Digital Cultural Heritage (DCH) as similar to new practices and theoretical perspectives ongoing in DH studies. DH research has moved away from considerations of static texts that require deeper analysis by computing tools and other technologically enhanced interventionist practices to reveal newly discovered truths. This is the old "humanities computing" approach where texts and the computing tools that work on them are discrete binary agents that work together, but separately and differently, to expose new data sets. Now the field of DH has grown to include more interdisciplinary sources and subjects and it is frequently recognized as comprised of more fluid and mutually adaptive set of human-machine processes that move beyond simple divisions as these. (Holloway-Attaway, 2018).

Matthew Gold, in *Debates in the Digital Humanities*, for example characterizes new DH approaches to scholarly research as driven by more affective, expressive and constructivist principles. For Gold, and for others like Johanna Drucker, media instability (media in perpetual transformation) is a source for new research into design practices and a core issue for humanistic inquiry as it moves into alignment with computing technologies. It is also stimulation to uncover research perspectives that can characterize the always transforming, kaleidoscope-like, shifting dimensions. Drucker claims DH now works at a "performative, not mechanistic" level (Paragrah 13) and that the multimodal texts in creation and under analysis must be studied holistically from their inception, not only in their product-phase when encountered by users:

> The challenge is to shift humanistic study from attention to the effects of technology (from readings of social media, games, narrative, personae, digital texts, images, environments), to a humanistically informed theory of the making of technology (a humanistic computing at the level of design, modeling of information architecture, data types, interface, and protocols). To theorize humanities approaches to digital scholarship we need to consider the role of affect, notions of non–self-identicality of all expressions, the force of a constructivist approach to knowledge as knowing, observer dependent, emergent, and process-driven rather than entity-defined (Paragraph 7).

Both Drucker and Gold identify truly transformative texts as ones where subjectivity is also complicated. For them, non-self identicality (elusive subject-agents and subjectivities, from texts to authors to characters) actively perform their semiotics and come into unique begin when they are acted upon, and with designers, users and multiple other agents: "No text is self-identical; each instance or reading constructs a text; discourses create their objects; texts (in the broad sense of linguistic, visual, acoustic, filmic works) are not static objects but encoded provocations for reading" (Drucker).

This kind of shiftiness is what Mark B.N. Hansen in *Feed-Forward: On the Future of 21st Century Media* claims is central to formulate a "radically environmental perspective" for emerging media (p. 2). Drawing inspiration from Andrew Galloway and Eugene Thacker's perspectives on new networks, at the end their book *The Exploit*, for Hansen this means we must view media as elementally comprised, that is made beyond only-human form and agency. They may be broken down into micro and macro constitutive parts that reassemble on the fly, after natural states of undoing. Following Thacker and Galloway, Hansen says, "we must rethink agency as the effect of global patterns of activity across scales in networks, where absolutely no privilege is given to any particular individual or node, to any level or degree of complexity" (pp. 1-2). These patterns of activity suggest media are adaptable to circumstance and must be malleable and robust in their interface and intra-active design possibilities. Further, they are driven forward by their ability to engage, process, and release data and experience so it may be processed in the now, but then reinvigorated and re-contextualized for future operations. Hansen "associate[s] the technical transformations that lie at the heart of twenty-first-century media—and that witness a full-scale installation of a calculative ontology of prediction—with distinct modifications in the structure of experience" (p. 186). These media are multi-dimensional and take into account a host of features and operations beyond pure cognitive, human processing: They are "indelibly and inseparably technical, performative, affective, experiential, and sensory" (p. 186). They are indicative of what others have termed a form of "networked affect" where technologies and our expressive feelings about them, as well as our desire to replicate and to process them have become inseparable and so vital (Hillis, Paasonen, & Petit, 2015).

N. Katherine Hayles in *How We Think: Digital Media and Contemporary Technogenesis* (2012) further supports finding new theoretical models to explicate change and adaption in DH studies, and she outlines at length in her review of contemporary DH and Digital Media studies the complex temporalities of human/machine interactions. She characterizes the new multimodal and interdisciplinary texts after the first wave of Humanities Computing initiatives, and after the first wave of Internet-influenced text production (of hypertext and hypermedia, for example), as more deeply evolutionary than first encountered. Ascott's moist, technoetic forms, then, for Hayles are framed as an adaptive human-machine interaction model she calls technogenesis: this formation is "about adaptation, the fit between organisms and their environments, recognizing that both sides of the engagement (humans and technologies) are undergoing coordinated transformations" (loc. 1641). Here there is deep and continual time flux:

> Obviously, the meshing of these two different kinds of complex temporalities does not happen all at one time (or all at one place) but rather evolves as a complex syncopation between conscious and unconscious perceptions for humans, and the integration of surface displays and algorithmic procedures for machines. The interactions are dynamic and continuous, with feedback and feedforward loops connecting different levels with each other and cross-connecting machine processes with human responses (Chapter 1, paragraph 25).

Posthuman and Non-Human Matters: new intra-activities

This kind of model is one also embraced by and theoretically adjacent to Posthuman, Nonhuman and New Materialism approaches which also seek to de-centralize human agency and to find dynamism and vitalism in other networks and processes. (Although media is not always an overt subject of these considerations that often seek wider paradigms for considering material culture in general.) Collectively these

models may also be used to understand the deep time and deep space transformations at play when we consider a Digital Cultural Heritage and story-game work like KLUB that attempts so many boundary crossings and transformations. Rosi Braidotti, for example, in The Posthuman (2013) recognizes in contemporary techno-media culture a force similar to Ascott's technoesis and Hayles technogenesis based on what she qualifies as a self-organizing principle of mutual adaption between nature and culture:

> My point is that this [Posthumanist] approach, which rests on the binary opposition between the given and the constructed, is currently being replaced by a non-dualistic understanding of nature–culture interaction. In my view the latter is associated to and supported by a monistic philosophy, which rejects dualism, especially the opposition nature–culture and stresses instead the self-organizing (or auto-poietic) force of living matter (p. 3).

For Braidotti the influence of technological development and of new scientific approaches and interventions in the social sphere make for a very cloudy, troubled context in which to understand the effects of media, and of its political import, one where the call to investigate the deep, foundational paradigm shifts is essential:

> The boundaries between the categories of the natural and the cultural have been displaced and to a large extent blurred by the effects of scientific and technological advances. This book starts from the assumption that social theory needs to take stock of the transformation of concepts, methods and political practices brought about by this change of paradigm. Conversely, the question of what kind of political analysis and which progressive politics is supported by the approach based on the

nature–culture continuum is central to the agenda of the posthuman predicament (p. 3).

Braidotti's posthuman mission (or predicament) then is to challenge the forces of human exceptionalism that separate the world into clear binaries in order to mediate the boundaries between two simply defined worlds: sophisticated human culture and the raw matter of untamed nature. Media in this context is an attempt to translate the raw into the refined. Braidotti, and the many who follow this posthuman condition—where multiple affordances for non-dualistic constructions offer transmutations, transformations (hinting of transmediality) in favor of other translations are generative in the context of emerging media. As with Hayles and Hansen, Ascott and Haraway, and so many more, the power of transfigurations and their many relata (or trans* principles as we might characterize them), is in the acceptance of multiplicity and of the more-than-human agencies, the oddkin. And we might find it deep within the timely designs and mixed-up media forms of projects like KLUB.

Such trans* power is particularly overt for Jussi Parikka in *Insect Media: An Archeology of Animals and Technology* (2010) where non- and more-than-human dimensions are characterized, as his title indicates, by the imaginative power of another set of multicritters: insects. For Parikka, the subject-matter of insects as actual material for analysis in reference texts from the 19th century forward, as well as their metaphoric resonances in the current cultural imagination are useful as models to study media technologies. For Parikka, *"insectlike models of media"* are more than metaphors for technically-enhanced networked formations (like the Internet), swarms (social media hive-life), or other vast assemblages of interactive dynamic agents (databases, Internet of Things) associated with insect life. Contemporary descriptions of insects with media cultures have more profound elemental and radical environmental connections (to recall Hansen). And so "in-

sects as media" ("Introduction," paragraph 9) is then a much deeper configuration that Parikka also qualifies as multiply trans-figured. In fact the aim of his book, he declares, "is not to write a linear history of insects and media but to offer some key case studies, all of which address a transposition between insects (and other simple forms of life) and "media technologies" ("Introduction," paragraph 9). Elsewhere in the book, including the "Epilogue," specifically titled "Insect Media as an Art of Transmutation," he qualifies the rich, affective processes that circulate across and among contemporary media and material culture when we recognize its trans* potential which is also then an acknowledgement of the power of the multicritter, or that which Parikka names, the "bestiality of media technologies as intensive potentials" ("Introduction," paragraph 10) (Such bestial affiliation is one clearly accounted for in the KLUB AR application where creatures and characters from the book are collected in the Bestiary. This is a story-fied database where reader/users both capture the book figures in their tablets and smart phones after scanning figures in the books and landscapes, but also learn more of them and their imaginative powers and potentials.) For Parikka, these affective bestial possibilities (time traveling agents for the future) are not found in mere translation—that is using the "metaphoricity of technology" merely to interpret insect models ("Introduction," paragraph 10). Instead they are seen as more intra-active and interpolative:

> [N]ot merely as denotations of a special class of icky animals but as carriers of intensities (potentials) and modes of aesthetic, political, economic, and technological thought. Translation, then, is not a linguistic operation without residue due but a transposition, and a much active operation on levels of nondiscursive media production. ("Introduction," paragraph 10.)

These Posthuman, Nonhuman, and New Material approaches offer finely nuanced consideration of materiality to support DCH investigations in the design and use of transmedial artifacts, such as KLUB. When we can consider mixed media and transmedial design properties, where live action, print texts, material artifacts, and AR/VR content might be combined, we are considering not only a plethora of content choices translated into different media and storytelling modes. We are also confronting a re-circulation of their non-discursive properties, of embodied affects and performative properties that elementally change the environments (disciplinary, institutional, social) where we encounter media and we are changing the notions of how we see time and its affects through its processual unfolding. As Parikka suggests, this is a storytelling that depends on a deep understanding of non-human transmissions but also how to record and pass time in non-human terms: "Stones and geological formations are recordings of the slow passing of time and the turbulence of matter-energy. Plants and animals constitute their being through various modes of transmission and coupling with their environment" ("Introduction," paragraph 11). This happens when we, for example, create locative experiences in historical sites at the center of ancient folkloric traditions (as with many of the KLUB books). Here we are asking users to consider the power of the landscapes to tell their environments: We ask the ancient Viking burial grounds of Falköping (in the Jättinnan KLUB book) to give up their dead as part of the narrative, who've become part of the earth, and to allow them to be potentially recovered again in the smartphone application; Readers/Users can stand in place and look out over the wide watery perspective from the shores of Lake Vättern in Mariestad, pictured in the book, and call, like Kira and Luppe, to the mythical sea creature (as they are invited to do), to the Vätterjungfrun, a creature known mostly to just the locals who live on this lake, and entice her in. But she won't necessarily appear. Elementally made of the water

and its other sea creatures and at home in her reported, but undiscovered sunken ship, she is a hyper-specific in her localized history, but an elusive figure who resists human desire. She might appear, but more than likely only comes into view only when she wants to, or is forced to (such as when the circus director hauls her up in a fishing net). But even then she is able to escape. She follows her own time and exists outside the requirements of human desire. And, as such, she can be said to represent the kind of elemental, distributed storytelling that plays with space and time and crisscrosses many boundaries in 21st century media forms

For Parikka, the kinds of insects as media (or Vätter-jungfrun as media) offer much more than pure representation in human historical terms: "[T]here is a whole cosmology of media technologies that spans much more of time than the human historical approach suggests" and accordingly we must learn to design for it ("Introduction," paragraph 11).

KLUB at the Nexus of Time Travel: Entangled Trans* Design for the Posthumanities and Beyond

In an effort to explicate some of nuances of this unfolding cosmology, and in the context of these troubled, cloudy waters of 21st century media, I can now place the KLUB project at the center of my discussion. KLUB is a collaboratively composed augmented reality (AR) and traditional children's book series focused on engaging with the local cultural heritage in the small towns and villages of the Skaraborg Region in Western Sweden. I believe that KLUB, and its process of making and intra-activities exemplify the transformative and transmedial practices addressed by Ascott and Haraway in their respective epigraphs that frame this discussion. Developed and designed as it is as a kind of cooperative, with faculty, students, local librarians, and historians, and heritage experts, it is a work that is intra-disciplinary, but also transcultural. It moves in and out of many institutional domains and finds allegiance with many "masters" and

knowledge-keepers, refusing a singular authority. The work itself has been exhibited in local libraries, but museums and universities have also hosted talks and lectures about its development and it has been the center piece for workshops with children from local schools to "play" with the AR components and inspire their own creations. Deliberately open and active, it is more than its content, and rather part of a performative cosmology of use.

One can discover its resonances also in the contemporary reflections on DH, DCH, Post- and Non-Human theories, and New Material studies that allow us to explore 21st century media, deep in transition, historically, formally, and culturally. It is important that we find ourselves again on a cusp of invention, in a state of in-between-ness where we accept that times are rapidly changing and media too then requires a new attentiveness. Ascott, who writes at the very beginning of the 21st century, responds to a new digital wave of invention driven forward by the explosive potentialities of the 1990's Internet. For him, the WWW births new knowledge forms and hyper-connects users to virtual worlds beyond their own familiar understanding and articulation capacities. But ultimately, for Ascott, virtuality leads him back to the contemplation of the material "living planet" to wet biology and moistworlds—not hardware and software exclusively (p. 3). He resists the impulse, as had many others who embraced the move towards pure virtuality as a marker of freedom from a myriad of convention (space, time, art, identity) and reminds us that matter, in fact, matters, and we should look to new forms of embodiment to express its presence. Only a decade and a half into the 21st century we find ourselves again at a new stage of media development and transition when AR/VR technologies have become commercially accessible and digital tools are ubiquitous and accepted in cultural sites, such as museums. Museum studies scholar Ross Parry, for example, in *Recoding the Museum: Digital Heritage and the Technologies of Change* has argued, museums exemplify a "postdigital"

age where digital tools are not only a regular part of exhibition spaces and interactive experiences for visitors, but they are expected. Given this expectation, the focus has moved from increasing digital tools and establishing IT personnel in museum and heritage settings to enhancing the critical practices surrounding their use, we find ourselves in an important time for new critical models:

Postdigitality in the museum necessitates a rethinking of upon what museological and digital heritage research is predicated and on how its inquiry progresses. Plainly put, we have a space now (a duty even) to reframe our intellectual inquiry of digital in the museum to accommodate the postdigital condition. (Parry, 36).

Incorporating a work such as KLUB into heritage environments, as well as library and school settings requires then a critical focus to match the complexities of the times it engages.

Haraway, writing only a decade and a half later, is also deeply affected by the time complexities emerging from the first wave of digitization and cyber invention that she claims re-arranged our modes of self-perception and knowing. This is similar to that "technoetic" time that Ascott addresses, and one predicted in her own initial cyborg fantasies of freedom in her "Cyborg Manifesto" (Haraway, 1991) in the 1990's that foreshadowed other 21st century revolutions. But she clearly connects time to space and is also inspired to explore more fully the next wave of deeply intertwined worlding practices (where time and space and matter come together to perform dynamic states of existence). First contemplated by Heidegger in *On Being and Time* (1927) this is a state of ongoing and generative presence in the world. And now Haraway writing at the onset of the Anthropocene, the current geological epoch defined by the affects of human activity on the environment and climate and its new attendant temporalities, sees new possi-

bilities to understand worlding, including through technical devices. In this time, Haraway says, "it remains important to embrace situated technical projects and their people" (p. 1). This is a time of the deep present, a time of now, but also of the past and future, one of layered configurations:

Staying with the trouble does not require such a relationship to times called the future. In fact, staying with the trouble requires learning to be truly present, not as a vanishing pivot between awful or edenic pasts and apocalyptic or salvific futures, but as mortal critters entwined in myriad unfinished configurations of places, times, matters, meanings. (p. 1)

This too is a kaleidoscope time, and at the core of the intra-active design process I imagine for these times, and one exemplified by a work like KLUB, is a desire to draw into conversation a number of these mixed-up theoretical and practical processes. I believe we might figure out what exactly we are doing and being and mattering by investigating and applying these disruptive principles engaged by trans- and post- perspectives. Engaged in these states, we are able to identify and deploy a series of complex media entanglements that keep the kaleidoscope turning , as it were, keeping elemental matters of all shapes and colors in dynamic view.

We can also work toward claiming the essence of the deep present as a core principle for design and development, when we recognize the power of being knotted together in naturecultures (non-binary) states of being, not ones imposed by media translation models. These deep material entanglements in the context of media development are evident too in the agential realist approach developed by Karen Barad in *Meeting the Universe Halfway: Quantum Physics and the Entanglements of Matter and Meaning* (2007). As with Haraway, Barad too sees worlding as a series

of inter-linked performative potentialities. For Barad, our aim must be to invest in practical and theoretical processes that demonstrate these dynamic acts of material becoming (P. 11) Such performances become themselves scientific demonstrations of the viability of the process towards meaning making, not on a valorization of the technology to reveal some truth. "The move toward performative alternatives to representationalism changes the focus from questions of correspondence between descriptions and reality (e.g., do they mirror nature or culture?) to matters of practices or doings or actions" (p. 28). Seen intra-active-ly - a neologism for Barad that intensifies and multiplies inter-actions—as within the non-binary processes engaged by DH, DCH and posthumanism, for example—the perform-ing matter comprising the phenomena of the world is in an emergent state of becoming and it serves to negotiate and transform (in its deepest trans* sense) purely discursive, representational practices.

In a work such as KLUB where reader/users are en-couraged to find and activate, bring to life, the decorated in-itials associated with characters and creatures in the books (combined picture-texts that act as trigger images for the AR application) they do not merely replicate in a different form the characters from the books. Many of the AR representa-tions offer alternative 3D and 2D versions of the characters. Some have animations associated with them, and some reveal early sketches of what the figures once were, in process. Here the story and game elements are not defined by, or comprised of, their clear finished technical and/or aesthetic properties. They are not replications (translations) of book content, products to reveal meaning. Nor are they discursive cultural materials that overlay the natural world to tell or translate its story, or folkloric and actual histories, to bring them to life in contemporary forms. Rather these complex and vital materials keep their representational values in process, moving across time registers, to keep telling the stories in varied ways, using the oddkin method

to engage curiosity, affect and surprise. (One needs only to watch the users of the AR application the first time they see the figures appear on the phones or tablets after activating the trigger images to see their delight and curiosity for more exploration. It's a visceral response that bears little rela-tionship to wanting to learn more about historical facts in traditional, pedagogical interactions).

These kinds of intra-activities reveal the intersec-tional dimensions evident in the design, production, play, engagement with, and analysis of such phenomena. They also illustrate the non-human, human, natural, cultural, creative, performances (and a myriad of other forces at work) at the center of any media encounter of this kind. The work emerges when seen and enacted through its differing material constellations, and like a kaleidoscope, it does not operate via static mediation, by displaying a singular entity in a unitary perspective, and it certainly does not teach local history though an accounting of facts. These are Chthonic multicritters in action, and the affective dimensions of KLUB are also evident in the ways that it attempts to teach local history through an embodied sense of play (collecting characters from the books in the AR app via the books but also through on-site visits to historical locations where one is encouraged to look for AR markers.) Here there is a mix-ing of fact, fiction, myth, and history and of reading, play, and physical discovery. Across the whole of the KLUB book series many different legends, histories, and landscapes are invoked and mixed together. Readers/users are urged to to discover them in multiple ways, through imagination, but also through practical exploration of historical sites in proximity to the towns, which they might not otherwise have found. In many Swedish heritage locations within the Skaraborg Region, as with its many ancient petroglyph and rune stone sites, for example, the historical materials are unmarked, and they may seem quite innocuous and under-whelming if one just sees them from the roadside. Especial-ly to a child, but also to many adults, an iron age petroglyph

site might look like rocks in a field, blending in to the normal countryside with little fanfare. One could easily see them each day and miss their historical relevance. Of course many archeological sites have been well developed through scientific investigation, and they are formally document-ed and incorporated into museum and heritage locations. KLUB purposefully draws from both of these sources and encourages investigation of all types, illustrating history can be formally discovered, but also in process, open for further investigation. Sometimes it is right in front of you, accessi-ble on a ride to the bank, or behind a fenced cow pasture, and sometimes it is formally institutionalized. All kinds are included in KLUB.

This mixing of elements is quite evident in the Lindormen book for example, set in the real town of Tidan, where a time-traveling theme is overtly used. In this book the main protagonists Kira and Luppe travel back in time (ca. 400-600 AD) with the help of two talking Ravens, Hugin and Munin. Well-known figures in Norse Mythology (from the migration period, at least) these figures might be known to many Swedish children, although one might not expect to find them in such a little town within the region. When Kira and Luppe follow their instructions form the Ravens and leave the present time, they confront King Rane, another well-known figure, but this time mostly from more local Swedish mythology. long associated with the region in the area of Tidan. Discovering King Rane through the help of the Ravens, and entering a magic portal found at the site of a mysterious gathering of Rune stones, called the Stone Ship (or the "skeppssättning" in Swedish, an actual location out-side Tidan), they work to free his buried treasure with the help of a magic water serpent, the "Lindorm," for whom the book is named. Because some of these characters and set-tings are known from broad Nordic myths and some from hyper-local legends, and others are discovered in previous books in the series, the reader/users move among many planes and registers of reality and imagination. But they

also move from reading activities to physical activity and playful exploration should they be encouraged (as they are in the books and the app.) to further explore the landscapes, museums, and heritage sites in the region. And for children, this means too they must do so with parents or other adults, encouraging collaborative exploration. Once on the move, there is even more to discover. In the case of the Stone Ship, for example, reader/users can not only activate AR figures from the decorated initials in the book connected to the site, but when they travel to the actual locations, more history is available on signs and plaques. But additional AR trigger images, recognizable form the books are also found in situ, and they can be activated through the AR application. When these particular figures are animated, different content (textual and graphical) from what they find in the books is also revealed. This way the story operates in a configuration of performances and encourages many modes of activation.

These sorts of mixed up materialities suggest that some learning is found through knowing (comprehensive discovery of fact), but other kinds are set in place via more physical, embodied states of being and doing. Once again, these states are accounted for in the some of the work of Barad when she addresses the importance of moving be-yond models of pure rational understanding as a mode for innovation and discovery. (Given the fact she is based in the scientific discipline of Physics, one might see this as a more radical departure or claim than in other fields.) Barad's proposed intra-activities, designed to support innovation and discovery of the material world, are always connected to affective states—those states beyond cognitive, rational knowledge production. They are seen as an intrinsic part of worlding (re Haraway) but also of mattering in/and/with phenomena. Intra-actions with phenomena begin with an intentionality of movement, what she refers to as an "agential cut" (p. 140), but that intentionality is not imposed externally to reveal some pre-determined meaning, and it certainly does not come only from human intervention and

desire. These cuts may operate with a twist of the wrist, as with a kaleidoscope, an initial movement to stir things up (to trouble) matters, but such intentionality is seen as a natural result of the designed affordances of the device in union with the more human wrist action. Kaleidoscopes are meant to be twisted, but the desire to activate that movement is not only found in the affordance of the human wrist; it is also intended in the affective delight and promise of the dancing colors and shapes placed in tantalizing view. It is designed in the desires of the function of the apparatus to redistribute its matter. And its agency is fulfilled by the many other more-than-human elements (light, force, perception, emotion, reception) that must ally to make a kaleidoscope work. Here too KLUB is designed for such mattering, allowing many different access points along its dynamic interface to entice users to play with the forms and to find desire in its multiple worlding entanglements and shape-shifting ways.

For Barad, this worlding is a kind of physicalized state, but it follows too an onto-epistemological trajectory (one comprised of being and knowing) found in all the elements, agents, atoms, of the universe. Universally, matters circulate in time-space configurations, in networked, swarming visions and they are inseparable from meaning: "They are inextricably fused together, and no event, no matter how energetic, can tear them asunder" (p. 7) Because knowledge is not pre-determined, experimentation is key to discovering new processes and new impacts as matter is circulated (as in media content, for example). The urge for innovation is not to reflect the world as it is, but rather to defract it, to scatter it, and to operate from a state of difference (p. 3). Inspired by Haraway, who sees diffraction as "an optical metaphor for the effort to make a difference in the world, Barad goes even deeper and explores it from the perspective of a quantum physicist, as much more materially/naturally situated and impactful:

Mattering is simultaneously a matter of substance and significance, most evidently perhaps when it is the nature of matter that is in question, when the smallest parts of matter are found to be capable of exploding deeply entrenched ideas and large cities." (p. 3)

From this perspective, emergent transmedial experiences like KLUB, experimental by natureculture, may release new visions and align in politically and ideologically surprising and open ways, but also in innovative material ones. And for Barad they cannot operate only on intellectual levels: "To theorize is not to leave the material world behind and enter the domain of pure ideas where the lofty space of the mind makes objective reflection possible. Theorizing, like experimenting, is a material practice" (p. 55). The agencies deployed by such intra-activities are further materialized in the post-, non- and more-than- human bodies that they circulate and ascribe to defy pure human subject positions. As forms of disruptive resistance (to traditional media, history, and storytelling), convergent transmedial experiences like KLUB, do not then easily fall into the domain of human understanding and translation. The reader/user (or player) of this media type is not set apart from the technical apparatus, the affordances for interaction, or the affective flows released in the experience of playing or encountering its content, which is in-book, in-game, and in-world and its mattering is therefore wide-spread and materially consequential. KLUB moves from the space of the book to the many located heritage sites it includes in its story form, and it engages its participants through active and embedded learning, following the lead, literally, of its protagonists. The main characters, Kira and Luppe, are involved in a chase (after the evil Circus Ringmaster who has captured a host of creatures and forced them to perform in his circus). A central conceit of the stories, repeated across each of the books which are each located in a different town or village, is to keep on the move and to find new but related expe-

riences in each of the books. Each town/book holds a new adventure and one discovers it by giving chase, by racing against time to free the creatures from imminent threat and danger. The real challenges the KLUB materials pose when they ask us to play with them is to suspend our disciplinary understanding of the body of the work as some (or one) representative thing we can clearly recognize; instead we must see their extended influences across a range of sectors and physically, intellectually, and affectively engage its content.

In this way, we might even find grounding with feminist technoscience positions, as with Nina Lykke in *Feminist Studies* (2010) who has classified a theoretical process that she terms feminist corpomaterialism. From this view, feminist approaches to materiality and corporeality work to undo essentialist definitions of the body—as gendered, human, and with biologically ascribed characteristics, for example. Extended in the work of others, like Stacy Alaimo in *Bodily Natures* (2010), the concept of trans-corporeality further conceives of understanding human bodies as mutually constitutive with their environments. These kind of (non-) human embodiments are "entangled territories of material and discursive, natural and cultural, biological and textual" (p. 238). For Alaimo the material world includes "human actions and intra-actions, along with intra-actions of man-made substances, all of which intra-act with natural creatures, forces, and ecological systems as well as with the bodies of humans" (p. 259). And in her recent work, *Exposed: Environmental Politics and Pleasures in Posthuman Times* (2017), she also evokes the Anthropocene age as a time for troubled, twisted critique, not one for sorting out. She declares in the opening sentence of her book that this is no time for natural propriety:

"The anthropocene is no time to set things straight. The recognition that human activity has altered the

planet on the scale of a geological epoch muddles the commonsensical assumption that the world exists as a background for the human subject. New materialisms, insisting on the agency and significance of matter, maintain that even in the anthropocene, or, especially in the anthropocene, the substance of what was once called 'nature,' acts, interacts, and even intra-acts within, through, and around human bodies and practices (p. 1).

And although perhaps it seems silly and somewhat lofty to place this set of AR-enhanced children's books, about a small and little-known region in Western Sweden, in the critical context of global geological transformation and Anthropocene, can we be at least intrigued by its twisted impulses? I wonder what might happen if we make/see/play DCH story-games in the spirit of vast environmental relata we encounter in the bestial oddkin world of KLUB. How might we activate and recognize these trans* practices and design ideologies?

One way here has been to look more elementally at KLUB, to uncover its troubled methods for keeping things twisted and to embrace its bestial media potentialities in the times and tempos it utilizes. We might find one twist in its situatedness/dislocation with concerns of re-telling, re-playing heritage content and local histories in order to find new contexts and resonances where they may be revitalized via connections to new affective assemblages. KLUB offers a connection to the past in the present, from both a content and a technical dimension. It uses the timeless appeal of mythical creatures (of trolls, sea creatures, fairies, mermaids, vampires and shape-shifters) as hooks to engage interest and to set the scene for cultural imaginaries which can be discovered together, by families, for example, but also by siblings and grade-school classes who are introduced to the books in workshops an interactive library

events. By so doing it bypasses the premise of reading as a private act (as with traditional books, if not children's books). But it also rejects the logic of reality as part of an historical heritage encounter for users. It sets the books in familiar contemporary and normal everyday places (grocery stores, banks, and bus stops), but it draws on fairytale and folklore as a device to deliver mixed-up messages (familiar, and yet not quite true). In this way it is diffractive, not reflective in its semiotic and material meaning-making. It's important, for example, that users find the actual library in Skara depicted at the center of the first book ("Trollforskaren" or "The Troll Researcher"). The Library is set at the center of the town in the book (just as it is in the center of the actual town of Skara). But it is also at the center of the trans* metaphoric action, an agent for discovery for all the other creatures who are ultimately revealed throughout the KLUB books, but who are first found in the research texts and ancient volumes in the Skara library stacks.

It's important too that KLUB uses an AR application in conjunction with a traditional media form, the picture book. In this way it draws the differing media into allegiance, without trying to make them the same, and yet extends the experiences into new transmutations. Using the diffractive rules of Haraway and Barad, and the model of "insects as media," it fittingly places them in the AR Bestiary. This modern repository for accessing new multimodal knowledge (images, audio, text) time-travels too, and it recalls the 12th century texts, the ancient Bestiaries that mixed fact and fiction, human and animal, and which inspired their 21st century design resurrection in the KLUB project. Putting this kind of multicritter media at the center of a performative, affective nexus in KLUB is the kind of twisted design choice that is imperfectly suitable for the mixed-up imperatives of new DCH game-stories.

Transmedial Literacies, Postdigital Play and Transformative Culture: Looking Forward (and Backward)

How might we move from here, then? I believe we can further these transformative media practices and trans* design practices by researching and nurturing their eco-systems. These rich, mixed, trans-corporeal networks for exchange support meaningful intra-actions that deeply engage culture. We can follow, for example, Mary Flanagan and her central premise in *Critical Play*, that is to find the transformative power in media designed for cultural intervention when it is re-situated: "Critical play is characterized by a careful examination of social, cultural, political, or even personal themes that function as alternates to popular play spaces" (p. 6). Flanagan recognizes games as complex "cognitive and epistemological environments" that may support users advancement of meaningful actions if designed within a "critical game-design paradigm" (p. 6). Drawing on the influences of the early 20th century avant-garde art movements (another tradition that emerges on the transformative and troublesome cusp of a new century). Flanagan considers games as ways to disrupt traditions, evoke political reflection and promote social change. Along with the Anthropocene imaginary and with other trans*corporeal materialists, post-digital design allows for a deeply transformative way of re-thinking the networks and contexts for, and at play within current postdigital DCH projects.

Brian Schrank in his *Avant-garde videogames: playing with technoculture* (2014) also recognizes the power of games and playful forms of active and embodied storytelling that can be transformational for ideological revolutions. Schrank also explores the connections between the political motivations of the avant-garde art movements, and their relationship to the cultural systems that engage them. Like Braidotti and her investigations of posthuman nature-cultures, Schrank, identifies "technoculture" as a sphere of

powerful transformation, and he imagines it as a site for radical play one of deep convergence and interdependence between culture and technology. As such his impulses are trans* figurative, temporally dynamic, and resistant to human-centric models. He too finds the access to moistworlds, to the oddkin, when moving within media cultures in states of transition and transformation, when moving toward Chthonic invention and away from technical determinism. Thus, avant-garde videogames for Schrank are powerful vehicles to engage users in the affordances for change through disability and difference:

> Each game becomes a microcosm of technoculture itself. Games teach players how to engage and optimize systems as well as how to manage their desire in a contemporary world. This makes the world of games a principle site to expose, unwork, and rethink the protocols and ritual that rule technoculture. (p. 4)

Following Flanagan, Schrank, and the many others who believe that games create deep, compelling and complex environments for players to engage with culture and radically transform it, I urge us to embrace the unstable media forms we find in new DCH story-games and work to undo them. From such disarray, we can enact the agencies of these complex material eco-systems and open up their affective and fluid dynamics. We can find the mutual relationalities that emerge in critical play when trans* and post- ideologies circulate in entangled and twisted matters.

References

Alaimo, S. (2010). Bodily Natures: Science the Environment and the Material Self. Bloomington, IN: University of Indiana Press

Alaimo, S. (2017). Exposed: Environmental Politics and Pleasures in Posthuman Times. Minneapolis, MN: University of Minnesota Press.

Ascott, R. (2000). Art, Technology, Consciousness: mind@large. Bristol, UK: Intellect Books.

Barad, K. (2007) Meeting the Universe Halfway: Quantum Physics and the Entanglements of Matter and Meaning. Durham, NC: Duke University Press.

Braidotti, R. (2013). The Posthuman. Cambridge, UK: Polity Press.

Drucker, J. (2012). Humanistic Theory and Digital Scholarship.In: Gold, M. (Ed) Debates in the Digital Humanities. (Kindle version.) Minneapolis, MN: University of Minnesota Press

Emerson, L. (2014). Reading Writing Interfaces: From the Digital to the Bookbound. Minneapolis, MN: University of Minnesota Press.

Flanagan, M. (2009). Critical Play: Radical Game Design. Boston, MA: MIT Press.

Gold, M. (Ed.). Debates in the Digital Humanities. Minneapolis, (Kindle version.) MN: University of Minnesota Press.

Hansen, M.B.N (2006). Bodies in Code: Interfaces in Digital Media. Minneapolis, MN: University of Minnesota Press.

Hansen, M.B.N (2006). Feed-Forward: On the Future of Twenty-First-Century Media. (Kindle version.) Minneapolis, MN: University of Minnesota Press.

Haraway, D. J. (1991). Simians, Cyborgs and Women: The Reinvention of Nature. New York, NY: Routledge.

Haraway, D. J. (2016) Staying With The Trouble: Making Kin in the Chthulucene. Durham, NC: Duke University Press.

Hayles, K. N. (2012). How We Think: Digital Media and Contemporary Technogenesis. Chicago, IL: University of Chicago Press.

Hillis, K., Paasonen, S., Petit, M. (2015). Networked Affect. Boston, MA: MIT Press.

Holloway-Attaway, L. (2018). Embodying the Posthuman Subject: Digital Humanities and Permeable Material Practice.In: Åsberg, C. Braidotti. R. (Eds.), A Feminist Companion to the Posthumanities. New York, NY: Springer Publishing.

Holloway-Attaway, L. & Rouse, R. (2018). Designing Postdigital Curators: Establishing an Interdisciplinary Games and Mixed Reality Heritage Network. In: Ioannides, M., Martins, J., Zarnic, R., Lim V. (Eds.), Advances in Digital Heritage. New York NY: Springer Publishing.

Lykke, N. (2010). Feminist Studies.: A Guide to Intersectional, Theory, Methodology, and Writing. New York, NY: Routledge.

Parikka, J. (2010) Insect Media: An Archeology of Animals and Technology. (Kindle version.) Minneapolis, MN: University of Minnesota Press.

Parry, R. (2013). The End of the Beginning: Normativity in the Postdigital Museum. In: Dudley, S. McCarthy, C. (Eds.), Museum Worlds: Advances in Research. New York, NY: Berghahn Books.

Rouse, R., Engberg, M., JafariNaimi, N., Bolter, J. D. (2015). Special Section: Understanding Mixed Reality. In: Digital Creativity, vol. 26, issue 3-4, pp. 175-227.

Schrank, B. (2014). Avant-garde Videogames: Playing with Technoculture. Boston, MA: MIT Press.

A Theoretical Bestiary (or Glossary of sorts) for 21st Century Media

*Note: As with any Bestiary, references and definitions are loosely formulated and tenuously attributed; as such, these contents may be insufficient to satisfy the aspirations of the reader seeking truth. "Here Be Monsters."

Term(s), Potentialities, Intensities	"Definitions, " Provocations, Necessary Placeholders	Origin Stories, Legacies, References
Affect/ Affective Media	Visceral and vital forces, intensities experienced beyond emotional response and/or pure cognition, affect circulates among all the things of the world, leaving evidence of states of in-between-ness, beyond pure human knowing or control; non-binary and organic, excessive and more-than, affect emerges among bodies set in motion within networked assemblages. Digital interfaces and performative encounters with contemporary media and other human-machine relations become affective media	Hansen 2006; Hillis, Paasonen, and Petit, 2015
Anthropocene	A geological epoch, proposed as the current time, where human impact or human influences are a defining factor for geology, other earthly systems and and ecosystems (such as climate change).	Haraway 2016; Alaimo, 2017;
Oddkin (vs. Godkin)	A challenge to the notion of natural kinship and relatedness, Oddkin remind us of the many non-genealogical ways the matters of the world are brought into relation. Defying the concept of Godkin, naturally and rightfully proclaimed relationships and proper associations, Oddkin invite us to seek out others, to question our connections, and to uncouple our ethics and cultures, Oddkin support multispecies and more-than-human assemblages.	Haraway, 2016
Insectmedia/Insects as Media	Insectmedia allows one to find transposition (not translation) between insects and media. They are not a metaphoric category wherein one views media as like insects, a mirrored representation of them. Instead, insects as media, offers a model to see entities like insects as deeply transfigured potentialities that impact aesthetic, political, and technological development and design. Under analysis, they reveal media (like insects) to be a contraction of earthly forces, revelatory of environmental relationships and elemental milieus. One must study the hive in situ.	Parikka, 2010

Term(s), Potentialities, Intensities	"Definitions, " Provocations, Necessary Placeholders	Origin Stories, Legacies, References
Intra-actions/Intra-activities	Intra-actions are encounters with the phenomena of the world tied to states of embodied, ontological knowing. Beyond cognition, traditional modes of representation and semiotic systems, intra-actions are primitive relations with the matters of the world, and they are experienced and produced through performative practices (science experiments, art and Tweeting, maybe).	Barad, 2007
Mixed-Up Media (Time)	Mixed-(Up) Media are affiliated with mixed media realities and devices—those that are both material and virtual in their matters and interfaces. As a descriptor for the 21st C media age, the evocation of this time assumes a deep, elemental set of entanglements with no promise or desire to be fixed or straightened. It defies a sense of linear time and/or history, and is therefore suitable for DCH game-stories.	Holloway-Attaway (here)
Multicritters/Chthonic Ones	Time-defiant monsters, these kinds of beasts resist singular definition and symmetry. They defy ideologies and are found in the past/present/future all at once. They are as likely to have tentacles as extra digits, and they challenge our sense of what is right and true. And they are everywhere. Look for them, but don't try to comb their hair or wash their face(s). Look for some in the KLUB books and Bestiarium.	Haraway, 2016
Moistworld/Moist Domain	Moistworlds remind us that technologies are not hardware alone and that organic bodies are not the only ones that bleed. Somewhere between the virtual and technical domain lies a Moist Domain, and digital art, a smartphone, or a tablet-assisted museum artifact, can take you there. Bring towels and Kleenex. Maybe a hammer or a book.	Ascott, 2000
Naturecultures	Naturecultures remind us that "nature" and "culture" binaries are artificially separated and are created to support patriarchal and hierarchical agendas. Seen as one, they do not erase these divisions, but they work on, within, and against the tensions to trouble them.	Haraway, 2016

Term(s), Potentialities, Intensities	"Definitions," Provocations, Necessary Placeholders	Origin Stories, Legacies, References
Non-Human/More-Than-Human	Non-Human and More-Than-Human perspectives directly counter theoretical positions that privilege human-centric models for analysis and design. They favor theoretical and practical models that account for the affordances of many kinds of bodies and materials. In fact, they insist on them.	Haraway 2016; Parikka 2010
Postdigital (Museum)	In Postdigital times, digital media is ubiquitous and expected. The focus is not on the presence/use of technology; rather it is on designing modes of intra-action with users at the center who are familiar with digital media, possibly even suspicious of it, or bored with it, or too expert for their own good. One must surprise them, make them tingle. Think Pokemon Go or The British Natural History Museum with a dinosaur-enabled smartphone. History is hip and now and monsters are in your iPad.	Parry, 2010; Holloway-Attaway & Rouse 2018
Posthuman	Posthuman perspectives bypass human-centric or structuralist approaches to knowing and doing. Instead they privilege 'other' avenues to understanding. Human bodies are not the natural starting point for dividing the world into insides and outsides and/or organic and technical matters. Rocks have feelings too. Ask a fossil to tell you a story.	Braidotti 2013; Hayles, 1999
Story-Games	Story-games feature storytelling and narrative as central and elemental to their design, but they unfold those dimensions through deliberate and playful interactions with users: readers become players, images become playable objects, and historical artifacts fight back when you try to know them. Also swiping right may lead to heartbreak.	Holloway-Attaway (here)

Term(s), Potentialities, Intensities	"Definitions," Provocations, Necessary Placeholders	Origin Stories, Legacies, References
Technoetic	Combined of Techne—an active display of craftsmanship—and Gnosis—a supreme display of knowledge—Technoetic approaches combine making and doing with knowing. Crafty-doing leads to the embodied articulation of something secret and divine. Crocheted tea cozies are deeply entangled with histories of female domestication and boredom, and finger painting reveals childhood secrets about what your cat really looks like without rules.	Ascott, 2000
Technogenesis	Like Technoetic approaches, Technogenesis presumes humans and technologies mutually adapt and co-evolve. Humans do not 'invent' technologies without environmental input and ecological resonances. Weather patterns influence GPS design and rainforests guide us through touch interface design. Monkeys know why we made cameras.	Hayles, 2012
Trans*/Trans* Design	Trans* states are flux states: dynamic, defiant, non-discursive, and anti-representational. Trans* Designs have multiple interfaces, and they are polysensual and disloyal to media traditions. They don't like metaphors, and they refuse translation. Affect is welcome.	Holloway-Attaway (here)