PROJECT PROPOSAL—

REPRESENTING ISIS AND NEPTHYS IN 3D ANIMATION

PROJECT SCOPE

On December 27, 2002 I will begin my second season of fieldwork in Luxor, Egypt. As Research Liaison for an Oakland-based digital heritage group called Insight, I and about eleven others will be continuing collaborative efforts with Louvre affiliates the French Mission/CNRS.[i] This year we will be creating 3-D animations via 3-D laser scan data. They will be based on mortuary rituals depicted in the burial chamber of Ramses II's tomb. Our ultimate goal is to project virtual 3-D reenactments of the burial rites inside the tomb "holodeck" style. This undertaking will involve about ten more years of combined work in the field plus extensive year-round work in our respective computer labs in Paris and Oakland.

This year my primary role will be to act as a creative and research consultant as we develop our animations. I will be proposing ideas about what to animate, how to present it, and how users might interface with it. All of my ideas will be subject to peer revision, as this is a collaborative effort. They will also be subject to the scrutiny of the specialized Egyptologists on the team, Dr. Philippe Martinez and Dr. Christian Leblanc.

To meet these expectations I am looking at other applications of virtual reality used in archaeology to obtain a sense of what is possible and what is useful. I am using the myth that tells of Isis and Nephthys reassembling Osiris as an armature from which to flesh examples of points to consider in visualizing the past. I seek to understand Isis and Nephthys as characters, as a film director would do, in order to suggest possible ways to interpret them creatively. I also use this myth as a focal point around which to construct a researched, informed set of questions and issues to consider in creating any of our animations.

PRECEDENTS

First I would like to address what digital reconstructions are and why they are useful. For one, they enable preservationists to record data about sites that are threatened by geological/environmental conditions (floods, earthquakes, erosion, air pollution) or by political conditions (as the Buddhist statues destroyed by the Taliban in Afghanistan). In the Valley of the Kings, geological uplifting and erosion by the Nile's tributaries now endanger the tombs. Ramses II's tomb, low in elevation, is particularly susceptible to water expansion damage because it hits a shale level. I know from direct observation that deterioration of the walls from crystallization of rock salt is a problem.

Digital visualizations allow researchers to continue investigating sites or objects beyond the length of their field season. 3-D documentation provides more information and less distortion than traditional photographs. A researcher can change digital variables, such as directional light, that allow her to see things she might not have seen in the field. No one argues, however, that digital representations are a *replacement* for the actual sites/objects; they are merely another *tool* to aid in research and education.

In "The Diversity of Archaeological Virtual Worlds," Barceló, Forte, and Sanders point out that digital visualizations can reveal relationships within a reconstruction more clearly; what is above, surrounding, next to an object/site? Archaeological visualizations can be linked to text, sound and image databases to enable self-guided education/ research. This research group also argues that visualization techniques in archaeology are about *improved ways of presenting knowledge to the public*.[ii]

Digital renditions of archeological material allow for broader dissemination of information. Digital data can be archived on the web so that researchers, whether second graders or postdoctoral fellows, can access it instantaneously. Data can also be contained on CDs or DVDs that are a lot easier to carry and maneuver through customs than statues or wall fragments. Site-specific examples such as projections in a museum environment, or in our case a tomb, allow for multi-sensory, intuitive modalities of learning that enrich the learning experience itself.

While ours is a novel application, the use of Virtual Reality to archaeology is now a well-established practice. All other visualizations I have encountered, however, only focus on architectural structures or objects, not characters in those sites using those objects. In the early 1990s, VR meant describing ancient buildings and artifacts via 3-D computer models.[iii] Today the term VR is used to describe many kinds of interactive visualizations.

Web-based virtual archaeology should be easily accessible and usable. A very basic example is the *El Brujo Project*.[iv] Pontificia Universidad Católica del Peru is restoring a collapsed ceiling from a 9th century temple. The 5000 fragments indicate that the ceiling had been decorated, a unique feature for that time and area. To reconstruct the decorative iconographic panel, researchers digitized the wall fragments on a flatbed image scanner. Using software called *ARMONDO* (meaning "assemble" in Spanish), they created a virtual "jigsaw puzzle" of wall fragments. Now, as standard digital files, the fragments can be arranged on the screen. The computer helps to fill in the missing parts using algorithms. The information can be stored on the internet, and the risk of damage is reduced with the reduced frequency of handling.[v]

An interactive newsletter documenting current excavations at Çatal Hüyük demonstrates a more sophisticated level of virtual archaeology, integrated into a scholarly site in a smart way.[vi] A QuickTime panorama allows the user to move as a camera eye around an excavation site (outside) and then through a corresponding temple (inside). The user can navigate up a ladder on to a roof for a view, and zoom in to take a closer look at sculptures, for example. Beyond the web, such an interface can be used on location to orient visitors, or be incorporated into a documentary film. Aesthetically, this visualization is professionally executed, with exquisite lighting effects and texturing on walls and objects. Still images and excavation diaries set the VR into a context of the history of the site and the history of the excavations there.

Certainly not all archaeological VR is on the web. By far the most exciting project I found in terms of technical sophistication, and the project that I believe will offer our team the most inspiration given our interests, is the *Meta-Museum* project being developed in Tokyo by Reiko Kadobasyashi, Kazushi Nishimoto, and Kenji Mase. They describe the Meta-Museum as a "supportive augmented reality environment for knowledge sharing." They aim to

combine virtual reality and artificial intelligence with conventional museum exhibits to provide an "interactive, exciting and educational experience for visitors."[vii] Real, sensual objects will hyperlink to greater detail about these objects via a multimedia version of 3-D graphical models overlayed onto the real. Visitors will personalize their learning experiences by feeding data about themselves into an agent system. Gesture interfaces will create a full body immersion experience. Large screen video images of a virtual village will be projected and, through the use of software called VisTA-walk, a limited gesture recognition vocabulary will be programmed into the scene. Thereby, not only will visitors walk through virtual villages, they will also be able to point to objects therein to link to more specific information.

So how might any of these ideas from other visualizations and reconstructions influence our 3-D animations and eventually our immersive digital environment in the tomb of Ramses II? To construct an example I will use a mortuary myth about Isis and Nephthys, investigate what to consider in interpreting, evaluating, and prioritizing points of content, and consider how tomb paintings were created in order to recreate them in a manner that strives to consider the original artists' intentions. Then I will offer ideas for use in visualizing this content.

A MYTH ABOUT ISIS, NEPHTHYS AND OSIRIS

I found many versions of the myth describing the role of Isis and her sister Nephthys in restoring Osiris, who was brother to Nephthys, brother *and* husband to Isis. In all, the first element is the demise of Osiris by their jealous brother Seth. Some versions tell that Seth cast Osiris to the ground. Others say that Seth drowned Osiris in the Nile, or lured him to lie in a beautiful sarcophagus and set it to sail on the river. No matter how the body was incapacitated, Isis looked tirelessly until she found him in Byblos. According to some, his coffin was sealed into a pillar at the Temple of Ashtart, and Isis had to negotiate to get it excised. She took the body back to Per Uto, Egypt, for proper burial. With the help of her sister Nephthys, she breathed the breath of eternal life (afterlife) into Osiris through his heart, and patiently fanned the air with her wings until she conceived their son Horus. Isis stayed in Per Uto for the duration of her pregnancy, and the cobra goddess Ua Zit helped to midwife Horus into this world. She

left town, handing the care of Horus to Ua Zit. While she was gone, Seth snatched the body of Osiris again and cut it into 14, or 16, pieces. Isis returned to hunt for, and consequently found, every last fragment except the phallus; Seth had supposedly fed it to the fish in the Nile. Widowed, she ruled with Horus on her lap.

Other versions explain Horus' conception differently. They only tell of one vengeful act to the body of Osiris; Seth cut him into pieces straight away, either setting the *pieces* in the sarcophogus that ended up in Byblos, or scattering them about the land. Isis and Nephthys together gathered all of the pieces as they deeply mourned. According to Martinez, it was Anubis (a god who judged the dead) who reconstructed the pieces.[viii] Then Isis gave Osiris breath from her protective wings. She fashioned the missing phallus from clay and impregnated herself with it to conceive Horus. Sometimes she is shown doing so as a bird who descends upon the reattached phallus. Isis took pride in her act of courage, cleverness and power: "O Osiris…I am thy sister Isis; there is no god who has done what I have done, nor a goddess: I made myself to a man, though I am a woman, in order to make thy name live upon earth."[ix] Because of her generative and procreative power, "Isis can…stand for both love and union as well as for the individuality and individualized power of the 'Virgin' Mother."[x]

As Isis raised Horus alone, she protected him from Seth and educated him. When he was old enough, Isis took Horus to the divine Court of Justice and initiated a lawsuit against Seth. Seth was punished, Horus gained the throne and cosmic order was restored. Thus Horus became associated with the sun and day; Osiris, ruling the netherworld of the afterlife, was associated with the night. Every king became associated with Horus in life, his rule legitimated through creation cosmology. The deceased King became associated with Osiris in the afterlife. Because kings claimed decent through Isis and Osiris, Isis was closely related to symbols of royalty and the throne.

DIRECTOR'S NOTES

In assessing the characterization of Isis, aside from knowing that she was protective, maternal, and clever, it might help to consider some of the titles by which she was addressed in texts: Mistress of the Cosmos; Ruler of the House of Life; Almighty Lady of Wisdom; Establisher of Justice; Inventor of Agriculture; Source of Healing Herbs;

Controller of the Wind and Thunder. These titles tell something of how she must have held herself, something of the esteem in which the Egyptians held her, and something of her perceived power, intelligence, skill, and empathy. She was also looked to as a savior goddess, for her role in assisting women in childbirth, her knowledge of medicines and her gifts of healing.

It might also be helpful to look at the role/s and status of women in that time to hypothesize how any feminine character might be reconstructed. We see from records found in the tomb workers' village of Deir El-Medina that women there were literate. They held religious titles of singer and priestess. Documents telling that a widow named Nauankhe willed her estate to her sons during the reign of Ramses V prove that women could control wealth and had legal rights (Reeves, Wilkinson, 23). Monuments throughout Egypt advise respect for mothers and wives. We know that Middle Egypt was matrilineal. Women were allowed to inherit the throne if there was no male heir, and we know that a few women ruled independently, at least for short periods of time, usually following periods of civil unrest. (Others, such as Nefertiti and Hatshepsut, might have co-ruled with men.) Females in Ancient Egypt "were not obedient slave women, but the equals of their husbands."[xi] From these cues, I hypothesize that an ancient Egyptian "animator" would understand and portray a female character, and especially a *goddess*, from a perspective of respect for her as a whole person and for her contributions to society whether as a mother or otherwise.

PARADOX OF PERSPECTIVES

However, one must exercise caution when trying to interpret the past from a contemporary perspective. Jane Caputi wrote, "One of the most significant developments to emerge out of the contemporary feminist movement is the quest to reclaim that symbolizing/naming power, to revitalize and create a female oral and visual mythic tradition and use it ultimately to change the world."[xii] This involves exposing patriarchal biases and reinterpreting myth by focusing on female divinities and powers that value female will.

Archaeology aims to be an impartial, empirical discipline that requires the formulation of theories from material evidence. Yet objectivity is unavoidably obscured by archaeologists' own life experiences: cultural and educational backgrounds, personal religious or moral beliefs, and gender, whether male or female, can all create lenses when looking back. Today more than twenty years ago archaeology is more apt to recognize that interpretations are working models that should always remain open to new evidence or new ways of looking. Still archaeology tends to abide by a dualistic Western modality that splits intellect and emotion, academic and experiential. This is where some feminist scholars of the past few decades who focused on goddess study rebelled by calling for new methods of interpreting and seeing that *do* embrace the intuitive and experiential. These methods allow for questioning feeling and belief in ritual, for example, where traditional archaeology cannot. Yet we must remain cautiously critical of these interpretive methods, too, as:

> subjectivity without awareness can lead to a colonization of the past whereby the remains of ancient lives get sucked into a self-centered image of modern desires. In the rush to reclaim female history …writers have not addressed the complexity and diversity of the archaeological record [or] engaged with the primary evidence in a way that respects its context."[xiii]

As contemporary artists we are used to dealing in the realm of the subjective and intuitive. In creating visualizations of the past, however, we must take in a wide range of ideas, voices, and interpretations, both traditional and innovative, intuitive and book-derived, in assessing how to best represent antiquity. The scholars do not all agree; that is clear from all the contradictions I found in researching this paper. This fact allows room for imaginative interpretations to be proposed. Yet experts have critical focus and experience that will ground interpretations in historical *plausibility*. This vital approach may require us to construct multiple visualizations of the same themes, perhaps multiple versions of the same myths, so as not to enforce one interpretation. Multimedia/VR modalities allow for this well, with hyperlinks allowing for multiple story lines.

CASTING

All that said about Isis, women in Egypt, and historical analysis, I dare put forth some recommendations for creating Isis and Nephthys as characters. In theatre directors ask: *What is the character's motivation?* From the research I have done on Isis, I would say that her motivation in restoring Osiris is two-fold. One, she is motivated by love for her husband/brother. Two, she is motivated by empathy for the people of Egypt. She wants to see that *ma'at,* (order, as it pertains to the cosmos as a whole, and an all-important concept in Pharonic society) is restored and maintained. Later she is also motivated by love for her son Horus. Here, too, however, I interpret her protection of him to be for the greater good of Egypt *as well as* an expression of maternal instinct. I propose that as a character Isis would feel deeply, but would channel her emotion into power rather than be swept away or weakened by it. She is graceful and self-assured. Her body language is aristocratic, centered and with movements that are controlled and close to her body. She should not be represented as a typical "action figure" because she uses her magic and her mind as her primary tools rather than extraordinary physical might. She would need to be emotionally open in order to possess the empathy of which texts speak.

Nephthys seems to be a shadow of Isis. Little is written about her, and she does not seem to carry story lines of her own. Her primary motivation seems to be to help Isis. I see her body language looking more worried, nervous. She might take shorter faster steps and hold her shoulders up, whereas Isis would hold her shoulders back. She might be pulled into emotional undertows if she did not have Isis to look to as her example and leader. She is a supporting actor.

I refrain from casting body types to these characters because I recommend that we adhere to, as much as possible, the harmonic proportions that were codified in Pharonic times. Men were 18 squares high, and women a bit smaller. The 3:4:5 triangle was sacred, and 1:2, 1:4, and 1:8 proportions were important. Symmetry was a near-constant. Since the same rules applied for painting and for sculpture, I suggest that as we extrapolate these 2-D figures and their props to 3-D and turn them in space, we try to maintain these harmonics. The computer is perfect tool to make such math-intensive translations.

ART DIRECTION

I would like to see us estimate the original palette of Ramses II's tomb in our animations. We can look to Sety I's tomb (that of Ramses' father) as a guide; but even though the color is well preserved, it is still thousands of years old. Light microscopy, x-ray defraction, x-ray flourescence, and electron microprobe reports from the Getty's physical restoration of Rameses' wife's tomb (Nefertari) provide detailed chemical analyses of the pigments used. Whites were made of calcite and anhydrite with traces of huntite, iron and stronium; blacks from charcoal; "Egyptian blue" from cuprorivaite and calcite; green from malachite; red primarily from iron oxide and gypsum; yellow primarily of limonite and iron oxide; blue-green from silicon, calcium, copper, iron and sodium. Finely ground pigments (red, yellow) appeared to be shinier because they sunk into the binder (such as gum arabic), course pigments (blue) appeared to be more matte. I suggest we contact raw pigment specialists such as Sinopia here in San Francisco or Kramer in New York, if not an actual restoration lab, to help us recreate these rich colors.

I also suggest that we visually teach the *process* by which tomb paintings were created. Many tombs in the Valley were left incomplete because they had to be sealed 72 days after the death of the pharaoh.[xiv] We can see that first preliminary cartoons were sketched in red; they were refined in black line; pigment in a binder was laid on next; varnishes of beeswax or natural resins completed the scenes. Why not take advantage of animation as a medium that can educate about a time-based process? The scenes could begin as loose red line cartoons, morph to the precise black lines as they moved, and gradually acquire color. The hands of carvers could even be present in the beginning, and completed carvings could peel from the wall as they came to "life" under the magic incantations of the priests.[xv]

STORYBOARDS

Given that I have yet to see images of the myth of Isis and Nephthys from the beginning, to use this approach we would likely have to start in the middle of the story and go backward. For example, we could start from a wall

image of Isis impregnating herself as a bird. I encourage paying heightened attention to her wings flapping because: 1) the action is symbolically important, 2)visually wings can conceal and reveal. To start a story mid point like this, for example, a wing could act as a stage curtain, and then reveal a new scene, a flashback to the beginning of the story. This strategy might also be useful for creating scene changes from Byblos to Per Uto when Isis brings the body back to Egypt, instead of animating the same trip along the Nile in reverse.

One of the ideas I am most excited about for this project, especially since we will have a haptics engineer on the team, is experimenting with the use of gesture interfaces as inspired by the Meta-Museum concept described earlier. Pharonic art is so rich in symbolism. I would like to enable participants to point to a deity, an attribute or tool, a canoptic jar that stored organs, and access a description that materializes next to it. This would require the team to create a database of symbols and definitions, as well as people (or programs) to translate them into many languages. If we want to minimize the verbal, because this is intended for an international audience, we could link to things like family trees of the gods. The family tree idea is actually vital to understanding the story of Isis, Nephthys and Osiris, especially because contemporary viewers could be confused as to how Isis is related to Osiris as both sister and wife.

As with proportions, we should consider lighting and shadow in relation to Egyptian belief. In Pharonic religion, a person's *shadow* was part of their personhood.[xvi] It was a reflection of divine power and always drawn as a silhouette. I would like us to reconsider our Western methods of creating shadow, derived from Renaissance perspective, and work with this idea as a conceptual challenge. Again we should incorporate gesture interfaces here. A gesture toward the shadow could offer an explanation of this belief. Or, for a more playful and visual way to convey this, a gesture toward a shadow could trigger a response from the shadow to engage with the viewer. The shadow could follow him, for example, or point back. Perhaps Nephthys' shadow could do this, since she plays a lesser role and would otherwise be spending time out of range of the spotlight. Alternately, Osiris' shadow could engage while he is pieces. If we consider children as part of our audience, this playfulness might distract them from

the fear they might feel from Osiris being killed. A clownish shadow would *foreshadow* that everything was going to be "o.k."

Conversely, I question whether we should remain true to Pharonic sense of narrative structure. What are standard spatial arrangements between anthropomorphic images, plants, animals, and objects? This is a field of study to which an art historian could lend a lifetime. If we pay heed to it, we must do so in close consultation with our Egyptologists. However, I believe to do so would lock us into rigid compositions and movement patterns.

We will also need to do further research to create scenery for our myth. What did the temple at Byblos look like? Do any drawings or VR models exist? Will Osiris' coffin be imaginary, depicted in a 19th Dynasty style since we are dealing with Ramses II, or in a style specific to the time in which the myth originated? How will we depict the scene in which Isis has Seth tried? Will this include surrealistic, imagination-based judges looming larger than life as the word of the law, or do our archaeologists know of documents that describe ancient trials, including costuming?

FUTURE WORK

When we finish this animation to our satisfaction, I recommend using it as a lead-in to visualizations of funerary processions and rites. In mortuary ritual, two female figures always symbolically assumed the role of Isis and Nephthys in the procession to the deceased's grave as "the wailing woman" and "the small wailing woman."[xvii] Their lamentations were expressions of grief, but they were also evocations. They contained the power to call Osiris back to life. Lamenting the god was a great service to him, an honor and offering, an act of care-taking.

When a king died, and crossed from being associated with Horus to being associated with Osiris, ritual ceremonies were performed in a procession from his temple to his tomb in the Valley of the Kings. Priests and priestesses, masked and costumed, assumed the roles of Anubis, Isis and Nephthys. The body, in a coffin, would be pulled on a sledge by oxen. The canoptic chest would follow on a second sledge. At the tomb final rituals were performed to restore physical senses to the deceased king for use in the afterlife. It is important to realize that these processions were full of pageantry. Herodotus said that Egyptians were the first to institute such large-scale

public festivals, and the Greeks learned from them (Witt, 165). Narrative accounts of these pageants do not seem to exist in the tomb wall paintings, which instead depict instructions on how to gain safe passage to the next life. If we choose to animate these, we will need to rely on text, the expertise of our archaeologists, and our imaginations. We do, at least, have documentation about ritual structure and steps.

CARRY ON

As we strive towards these ends, I must again stress that this project can only be realized as a collaborative effort. We have many people on our team, some staying two weeks, some staying over three, and several are committed to devoting countless hours beyond those spent in the field. Only by honoring the voices, insights, and skills of all of the people involved—Egyptologists, new media researchers, artists, animators, an architect, set and costume designers, photographers and videographers, computer programmers, a haptics engineer, even a professional dancer to interpret movement and weight shifts from the paintings—can we create this vision in its entirety. What do we choose to animate? What do we need to remember to consider from a historical and literary perspective in so doing? How do we present it visually? What data documentation must we generate as a starting point? How do we realize artistic aims technically? These are questions we need to pose to each other, and questions we need to be prepared to defend to funders as we convince them that digital visualizations are important, cutting edge tools for researchers and educational sites in the twenty-first century.

ENDNOTES

[i] *Several years have already been invested in the development of a relationship between Insight and the French Mission. The Mission, under the direction of Louvre Egyptologist Dr. Christian Leblanc, has held a research concession to sites pertaining to Ramses II (KV7, which is Ramses tomb in the Valley of the Kings, and his mortuary temple on the West Bank of the Nile) since 1995. Computer graphics expert and filmmaker Kevin Cain, founder and Director of Insight, began working with CNRS when he took 20 computer graphics graduate students to Egypt to practice 3-D laser scanning of sites and monuments. I met Cain in 2000 through my work at the Center for Middle Eastern Studies, UC Berkeley, and began volunteering for Insight. During our 2001 season, we created a 3-D "jigsaw puzzle" of the Colossus of Ramses II, which is lying on its back and in hundreds of pieces at the mortuary temple, to see how it might fit together (and if it is even structurally feasible to do so) as per Madame Mubarak's request. We also began to document the interior of the tomb, which is still being cleared by Leblanc, through traditional epigraphic drawings and through laser scanning. We presented last season's work at the Ramesseum Association conference in Paris last April and to local researchers in Oakland last July. This work will provide a foundation for the work we will do this season.*

[ii] *Barceló et al.*

[iii] *Barceló et al.*

[iv] www.anthro.mankato.msus.edu/archaeology/archtechnology/virtual_reconstructions.htm

[v] *In a case like this, it is important to remember that page scanners are not so precise; they are using this technique for purposes of arrangement/positioning, not to study the individual fragments'*

color, line, et cetera.

[vi] *Ian Hodder leads this international team. Zentrum für Kunst-und Medientechnologie Karlsruhé produced the 3-D animations. The web site is at* http://catal.arch.cam.ac.uk/catal/Newsletter1/media.html.

[vii] *Kadobasyashi et al.*

[viii] *Martinez.*

[ix] *Bleeker, 34.*

[x] *Hassan, 100.*

[xi] *Bleeker 29-31.*

[xii] *Caputi, 425.*

[xiii] *Goodison, Morris, 14.*

[xiv] *Seventy-two days was the length of the mummification process.*

[xv] *Tomb paintings do reflect religious and magic beliefs, but they also served as "manuals." The tomb was thought of as a "machine" to produce a specific result, achieving safe passage to the afterlife. The wall paintings were instructions on how to operate the machine. Initialized through sympathetic magic, the images became virtual or eventual resting places for the living energy of that which they represented (Martinez).*

[xvi] *Other parts of personhood were the body, the heart (the seat of true nature, essence, intellect and emotion), the name, the akh (action speech, physical integrity), the ba (one's manifestation in the afterlife), and the ka (inherited life force, which was not incarnation-specific).*

[xvii] *The women who recited the lamentations had to follow stringent guidelines. They were to be pure of body (virgin), and completely shaven. They wore their hair in plaited braids and held tambourines. These women were called dr.tj, meaning "soaring bird of prey," perhaps because of the high pitch of their lamentations were like the shrill cries of birds (Bleeker, 34).*

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