

WENNER-GREN FOUNDATION FOR ANTHROPOLOGICAL RESEARCH, INC.
REGULAR GRANT APPLICATION

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<p>1. Name of applicant (underline surname/family name): Dr. <input checked="" type="checkbox"/> Christopher Carr Ms. <input type="checkbox"/> Mr. <input type="checkbox"/> Address of applicant: Department of Anthropology Arizona State University Tempe, AZ 85287-2402 Telephone:</p>	<p>2. Title, department and institutional affiliation: Professor Department of Anthropology Arizona State University</p>
<p>3. Date and country of birth: 5/10/52, USA Citizenship: USA</p>	
<p>4. Highest academic degree: <u>Ph.D.</u> Year and institution: <u>University of Michigan, 1979</u> Field of degree: <u>Anthropology</u> If Ph.D. is not in hand, date expected: _____ Funding requested for: <input checked="" type="checkbox"/> Research; <input type="checkbox"/> Hunt Fellowship; <input type="checkbox"/> Other (explain)</p>	
<p>5. Title of project: Reconstructing the Cosmology of Prehistoric Ohio Hopewell Peoples, and Its Role in the Development of Supralocal Leadership (50 B.C. - A.D. 350)</p>	<p>6. Total amount requested in U.S. Dollars: \$ <u>14,668</u></p>
<p>7. Summary description of project: The cosmology, basic world view themes, and certain other philosophical-religious beliefs of the prehistoric Hopewell peoples of Ohio (50 B.C. - A.D. 350) will be reconstructed through a survey and study of nearly all of their extant representational art, symbols, and the spatial contexts of these within 16 ceremonial-mortuary, earthwork-mound archaeological sites. Hopewell art is the first recognizable, coherent, multi-media art system of the Eastern Woodlands Indians, and the foundation for later Mississippian and Historic period art. The continuity and similarities between these art traditions makes feasible the reconstruction of past Hopewell beliefs from their art. Beliefs vividly expressed by Hopewell art include the spinning, three-layered universe with eight essential directions; the separation, balancing, and conjoining of things associated with these worlds; two intertwined dualities, represented by light and darkness, and long versus short-beaked raptors; and more specific beliefs about the soul, power, and death. Beyond its culture-descriptive and culture historical value, the project will examine the role of philosophical-religious beliefs in the development of supralocal leadership and the differentiation of leadership positions, in light of contemporary anthropological theory.</p>	
<p>8. Beginning date of phase of project for which support is requested and estimated duration (give dates): July 1, 1996 - June 30, 1997</p>	<p>9. Does project include field work? yes <input checked="" type="checkbox"/> no <input type="checkbox"/> Study of museum collections in 4 locations.</p>
<p>10. Location where project is to be carried out: Columbus, OH; Chicago, IL, Cambridge, MA; Chillicothe, OH.</p>	<p>11. Are special permits/approvals needed for the project? yes <input checked="" type="checkbox"/> no <input type="checkbox"/> Permissions from museum curators Have they been obtained? yes <input checked="" type="checkbox"/> (append) no <input type="checkbox"/></p>
<p>12. Other personnel participating in project: D. Troy Case Department of Anthropology Arizona State University Tempe, AZ 85287-2402</p>	<p>13. Names of References: Prof. Mark Seeman, Dept. of Anthropology, Kent State University, Kent, OH 44242 Prof. James A. Brown, Dept. of Anthropology, Northwestern University, Evanston, IL 60208-</p>

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Name of Applicant: CARR Christopher
SURNAME FIRST MIDDLE

14. Budget itemization: List the major categories of expenses for which funding is requested. If budget justification is required, attach addendum sheet (see Application Procedures).

1. Round-trip airfares, Phoenix, AZ - Columbus, OH.	\$	918.
2. Rent-a-car costs:		2,124.
3. Gasoline:		286.
4. Rooming costs:		3,250.
5. Research Assistant:		6,940.
6. Expendable supplies (esp. film):		1,150.

TOTAL	\$	14,741

15. Other sources of aid received or requested for phase of project covered in this application (see Application Procedures):

none

16. Sources of aid received for other phases of the project:

\$500., College of Liberal Arts and Sciences, Arizona State University, for preliminary study of museum collections to prepare this grant.

17. What language skills does the project require, and how do you rate your competence? If other special skills are relevant, state what they are and how you rate your competence.

(1) The project requires the PI to have skills in multivariate quantitative analysis, and particularly spatial analysis, as one approach for finding patterning among images in the archaeological record. The PI has been a primary contributor to quantitative archaeology (see vitae). (2) The image-identification task of this project can be facilitated if the PI has a working understanding of the procedures, methods, and theory of visual art, especially theory of composition and form. Hopewell artistic compositions can be complex and difficult to deconstruct, for they can involve only partial representations of wholes, reordering of parts, figure-ground reversal, incomplete image mirroring, border ambiguity, and/or image overlap, in diverse combinations. The PI, beyond his archaeological academic training, received formal art training for 20 years, and practiced in many media (see vitae).

18. How does the project relate to applicant's prior work and/or future plans?

My research over the last 13 years has focused on the archaeology of the Ohio Hopewell, and on developing general archaeological theory and methods that are essential for interpreting their archaeological record. My national-level, theory-and-method publications include a book on interpreting style and art in social and ideological terms, a 100 pp. journal article on interpreting burial practices in social and ideological terms, and four articles on physical and chemical methods for analyzing ceramics in order to reconstruct exchange systems. My publications on Ohio Hopewell include four articles, on the regional exchange of meteoritic iron, the local exchange of ceramics, and the definition of ethnic groups of the Ohio Hopewell with mortuary fabric styles.

19. Have you submitted an application to Wenner-Gren before? no yes, previous application(s) listed below:

Date of application	Was it awarded?	If awarded, provide Grant no.	Have final reports been submitted?
1989	Yes	GR 5124	Yes.

What is relationship of prior application(s) or grant(s) to this project?
Same prehistoric culture, but the topic of alliance development instead of cosmology and leadership.

Aim and Scope of the Project. In the last decade, North American and British archaeologists have widened their interests from the technological, social, and ecological-adaptive organizations of past peoples to their ideological systems (e.g., Earl 1990; Hodder 1982a, 1982b, 1984; McGuire 1992; Miller and Tilley 1984; Pearson 1982, 1984; Austin et al 1991). Many of these studies have limited their focus to those aspects of belief systems that serve as metaphors for social structure (after Firth 1955), that legitimize political authority of leaders (Earl 1990), or that are used in the active socio-political strategies of special interest groups (Hodder 1982b; Miller and Tilley 1984).

In contrast, fewer efforts have been made by North American and British archaeologists to reconstruct whole philosophical-religious systems, world views, and cosmologies, for either social science or humanistic purposes. Some more important exceptions are the studies of the beliefs of the "Hopewell" societies (50 B.C. - A.D. 350), which were widespread over the eastern U.S. (Bacon 1993; Brose 1985; Carr and Case 1995a; Hall 1976, 1977, 1979, in press; Greber and Ruhl 1989; Henry 1994; Otto 1992; Penney 1983, 1985, 1989; Trevelyan 1987).

The Hopewell were semi-mobile horticulturalists and hunter-gatherers. They lived in small farmsteads and camps of a few households each, which were dispersed around earthwork-burial mound sites that held their dead (Brose and Greber 1979; Dancey 1991; Greber 1979; Prufer et al. 1965). The households around each earthwork were organized into a community that was integrated ritually by periodic mortuary ceremonies and feasts within the earthworks (Seaman 1979; Smith 1992), socioeconomically by local utilitarian exchange (Carr and Komorowski 1995), and symbolically by the art and exotic raw materials used and possibly displayed in such ceremonies. Leadership roles in Hopewell society were differentiated and decentralized, as indicated by the distribution of material symbols of them (Carr and Case 1995b), and were both shamanic and secular in nature.

Extant Hopewell art comes largely from the earthwork-burial sites. The art consists primarily of images of animals, humans, humans in ceremonial costume, composite beings, and geometrics. These were often combined into complex compositions using the figure-ground reversal, nesting of images, and ambiguity that typifies shamanic art, which focuses in part on transformation (e.g., Reichel-Dolmatoff 1987; Williams and Dowson 1988). Images were rendered on copper, mica, stone, pottery, shell, and bone, and involved other symbolic, raw materials such as pearls, galena, silver, meteoritic iron, obsidian, sharks teeth, bear canines, and feathers. Many of the images and materials have religious meanings that are interpretable from the ethnographies of historic Native Americans of the Eastern U.S. (see bibliography). Beliefs about the cosmos, soul, and death were expressed most frequently, because the art relates to mortuary ceremonies and burial contexts.

Central to studies of Hopewell imagery are David Penney's (1983, 1985) seminal analyses of a small sample of artifacts from mounds in Ohio. Penney convincingly argued that some of the images, and the raw materials on which they were rendered, refer to the Upper and Lower Worlds of the three-tiered cosmos, which dominated the mythologies of historic Eastern Woodlands and Plains Indians (see bibliography). Moreover, Penney posited that the Hopewell peoples' combining of certain kinds of images and raw materials in artifacts, and the placing of such items in association with each other in burial contexts, are revealing. These practices are thought to mark the attempts made by Hopewellian peoples to combine and balance certain forces of the Upper and Lower Worlds within this Middle, mediating World, and in so doing, to obtain or transform supernatural power. The most common kind of evidence that Penney cites is the association of images of birds and snakes/serpents. These may represent the Thunderers of the Upper World and the Horned Serpent of the Lower World, who battled one another in historic Woodlands Indian lore (Hudson 1975:138).

This project has two aims. The primary and immediate goal is to extend Penney's

pioneering work in order to reconstruct the cosmology and other philosophical-religious beliefs of the Ohio Hopewell in much greater breadth and detail, and as part of an integrated belief system and world view. A much larger corpus of specimens will be used. The feasibility of this goal has been demonstrated in two ways. First is a recent inventory and analysis (Carr and Case 1995a) of all published images (350+) of humans, animals, composite creatures, and geometric forms and, where known, their contexts of deposition and spatial associations with each other, in 11 Ohio Hopewell earthwork-burial mound sites. Second is my hands-on inventory and general examination, last summer, of ca. 70% of extant Ohio Hopewell imagery, much of which is unpublished, from 16 sites at their four national repositories: the Chicago Field Museum, Harvard University's Peabody Museum, the Ohio Historical Center (Columbus), and Hopewell Culture National Historical Park.

These two kinds of work have revealed images, associations among images and raw materials, and spatial arrangements of them (e.g., Figure 1) that clearly suggest philosophical-religious beliefs similar to those known for the historic Eastern Woodlands Indians. These beliefs include: (1) the three-tiered cosmos described above, but with the bear more often than the snake representing the Lower World, as in Algonquian myths; (2) the characterization of the Lower World as disorderly, the Upper World perhaps as orderly, and this Middle World as mediating and transformative; (3) the association of certain animals with each world, e.g., falcons, eagles, and vultures with the Upper World, the turtle as a primary symbol of the Middle World, known historically as "Turtle Island," and the bear and the snake with the Lower World; (4,5) concerns for separating (i.e., keeping "pure") and balancing the Upper and Lower Worlds and things associated with them; (6) conjoining of things associated with the Upper and Lower Worlds, perhaps to create power; (7) a solid sky "vault;" (8) the spinning universe, perhaps with the Upper and Lower worlds spinning in different directions; (9) the concept of the eight cardinal and semicardinal directions of the universe, though not their elaborate layering with multiple meanings found historically; (10) the importance of separating the living from the deceased, and the use of symbolic water barriers and circles to do so; (11) representation of one's soul or vital essence by one or more birds; (12) death involving a flight of the soul with the help of a large raptor; (13) the shamanic trance flight to other realities; (14) beliefs associated with certain roles of the shaman, including healer, diviner, and war leader, but not yet the guider of souls to the land(s) of the dead; (15) personal animal-spirit guardians of great diversity; (16) clan totemic animals of limited numbers; and (17) the eye, hand, and joints as locations of vital energy or portals to vital energy, in humans and animals. Many of these concepts are represented by multiple images and multiple lines of evidence. It should be realized that asking about and reconstructing past beliefs in this detail is uncommon in contemporary North American archaeology.

The surveys of published and museum-preserved specimens also strongly suggests some beliefs that are different from those of historic Woodland Indians. These are (1) two intertwined dualities, represented by light and darkness, and long versus short-beaked raptors, (2) a spherical cosmos having opposing halves formed by the two dualities, (3,4) a cosmos' spin, human vitality, and power in general emerging from the interplay of the two sets of opposites, (5) four identical raptor "messengers" from, or representations of, the four cardinal directions, rather than different animals representing different directions, and (6) the primacy of two of the cardinal directions, rather than the equality of all four, at least in mortuary contexts, possibly referencing directions of paths leading to Land(s) of the Dead.

A second, longer-term goal of this project, is to identify the leadership roles in Hopewell society, the degree of differentiation and segregation of those roles, and the political use of the inferred cosmological beliefs by Hopewell leaders (see Item 22). Last summer's survey of museum collections uncovered previously unrecognized images of several distinct kinds of apparently "shamanic" leaders, including humans costumed as bears, birds, deer, bird-deer, and snakes.

Methodology. Five tasks will be undertaken to clearly demonstrate the Ohio Hopewell's philosophical-religious beliefs, their interrelationships as part of a coherent world view, and their political use by leaders. The key strategies to be used can be summarized as: (1) comprehensive inventory, (2) multiple media coverage, in order to reveal fundamental world view themes that crosscut the art system (Roe 1995), (3) art-historical methods that include developing a dictionary of motifs and their meanings, and focusing on clear, benchmark representations of beliefs, and (4) archaeological methods focusing on context, associations, spatial distributions, and statistical tendencies.

(1) The search of museum shelves for items bearing telling imagery, begun last summer, will be completed for the approximately 30% of U.S. museum collections of Hopewell artifacts yet remaining unexamined. The artifacts come from five major mound-earthwork centers: Hopewell, Liberty, Seip, Mound City, and Turner.

(2) More detailed examinations will be made of all extant copper, mica, fabric, and shell items in the museum collections (16 sites). Many of these items bear complex compositions of light and dark raptors, long and short-beaked raptors three less common bird varieties, and humans in animal costumes. These items require a careful study of their patterning to be decoded. Schematic drawings, and photographs with Ektachrome tungsten 160 film, will be made of each nonredundant item not documented last summer (ca. 200 items). Finished, publishable line drawings will be made of a large and representative sample of the most telling artifacts (ca. 150 items).

(3) Field excavation notes and published site reports will be used to determine the horizontal and vertical locations of symbolic artifacts and raw materials within each site, their placement within graves, and their locations relative to each other, to the extent recorded. Interrelationships among items are essential to reconstructing philosophical-religious themes such as the balance, separation, or conjoining of things associated with the Upper and Lower Worlds, light and darkness, long-beaked and short-beaked raptors, the cardinal and semicardinal directions, and other unsuspected dimensions of relationship/opposition.

(4) Archaeological, quantitative methods of intrasite spatial analysis (e.g., Carr 1984) will be used to search for repeatedly associating sets of symbols that represent leadership roles of different kinds, "medicine" bundles of "shamans" of the several kinds listed above, personal and community sacred bundles, horizontal social groups (e.g., lineages, totemic clans, moieties, phratries, sodalities), or the philosophical-religious beliefs associated with leaders, social divisions, and communities. To make these identifications, sets of one or more kinds of symbols will be analyzed for whether their distribution among persons within a site depends on the person's age, sex, intrasite "burial cluster," or mound. The analysis will also help to define whether social groups were ranked, the expanse of leadership domains, and whether leadership was ascribed. The strategies of Braun (1979), Brown (1981), Carr (1995), Goldstein (1981), O'Shea (1981), and Peebles (1971) will be followed. Unpublished age-sex data recently found or collected by P. Sculli, L. Konigsberg, C. Johnston, R. B. Pickering and M. Geisen will be used to supplement the meager, published data (Reichs 1975). This step is essential to reconstructing the leadership positions within Hopewell society, their nature, their degree of differentiation, and their use of beliefs to facilitate leadership.

(5) Clear, repeated, benchmark images, associations of images, associations of images with raw materials, and cross-media patterns that evidence philosophical-religious beliefs and world view themes known ethnographically for Algonquian, Muskogean, and Eastern Siouan speakers (see bibliography) will be sought deductively. Unexpected images and associations will be sought inductively and interpreted, to the extent possible, in light of historic Eastern Woodlands beliefs.

Significance. The proposed project is significant to both Eastern U.S. prehistory and general anthropological theory. Regarding prehistory, Hopewell art is the first recognizable, coherent, multi-media art system of the Eastern Woodlands Indians (Penney 1983; Brose et al 1985). Some unintegrated elements of the system can be projected back to Late Archaic - Early Woodland times (3000 - 500 B.C.; Brose 1985; Hall 1983; Penney 1980), but it was the Hopewell who wove these elements and others into a complex mortuary art genre, which vividly expresses key dimensions of Woodland cosmology and beliefs (see Item 20). In turn, Hopewell art and its themes provided the foundations for later Mississippian and Historic period art, which rendered political statements in cosmological metaphores (Benn 1987; Brown 1985).

Despite the holistic integrity of Hopewell art and its fundamental position in the development of Woodland ideology, only small parts of it have been described and studied, sometimes in isolation and with focus on one medium and singular beliefs (Hall 1979 1983, 1989; Otto 1992; Penney 1980; Trevelyan 1987). This project is more encompassing; it considers all preserved, symbolic media of the Ohio Hopewell, image-themes that crosscut the art system as a whole, a wide range of beliefs, and their integration into a coherent world view. It is through such holistic and contextual analysis that the beliefs represented by images can be reconstructed convincingly.

The proposed project also speaks to more general anthropological interests in the nature of evolution of leadership roles. Although the demographic, ecological, informational, and socio-political stresses/conditions that encourage the rise of supralocal leadership are well understood (e.g., Flannery 1972; Kottak 1974; Sahlins 1968; Service 1962), there is less agreement on the actual processes by which supralocal leadership develops, and especially the role of religious beliefs in them. For example, Earle (1990:81), following older arguments, sees beliefs as legitimizing supralocal leadership already based on economic differentials among social groups and individuals, and on "calculated generosity" (Sahlins 1968, 1972). Alternatively, Netting (1972) and Peebles and Kus (1977:424-427) illustrate how the sacred is used to gain acceptance, leverage, and authority over social groups beyond those in which one has membership. Supporting this latter view, Winkelman's (1992) HRAF crosscultural survey suggests that the priest-chief position in complex societies ultimately evolved by diversification from shamans and shamanic healers in simpler societies.

The Ohio Hopewell, as a society immediately preceding the rise of chiefdoms in the Eastern Woodlands (Brown 1981), is a critical case study for understanding leadership development and the role of philosophical-religious beliefs in it. Empirical evidence also shows the productivity of the Hopewell case. Last summer's survey revealed images of diverse kinds of "shamanic leaders" (bear, bird, deer, bird-deer, snake impersonators) -- a possible segregation of shamanic roles that corresponds to the crosscultural pattern found by Winkelman (1992). Also, a preliminary analysis of artifact distributions at each of six Hopewell sites shows the nearly complete segregation of artifacts potentially used in different shamanic roles (e.g., diviner, healing, spiritual war leader), and of these from valued items apparently symbolizing other leadership roles of unknown identity. These data evoke some significant questions that bear on general anthropological inquiry into leadership development. (1) Did all Hopewell positions of leadership involve the use of sacred concepts and symbols, in line with Netting and Peebles and Kus' arguments, or were some of the now uninterpreted positions and their symbols secular in nature, in line with Earle's stance? (2) Which cosmological and philosophical-religious beliefs and symbols were most commonly associated with leaders and used by them to establish power and authority and which were not? For example, was the theme of creating power by combining things associated with different Worlds or dualistic dimensions basic to leadership symbols and roles? (3) What range of socio-political issues did Hopewell leaders address with cosmological beliefs and symbols: primarily internal matters of social organization and well being (cf. Huntington and Metcalf 1979), as it would appear, or also external matters of intersocietal competition, warfare, and political agendas, as is the case for later Mississippian societies (Phillips and Brown 1978, 1984)?

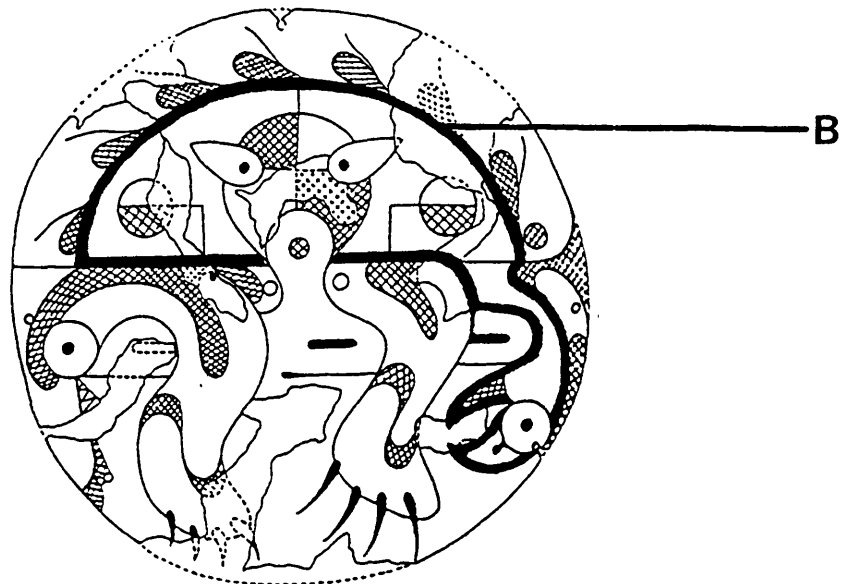
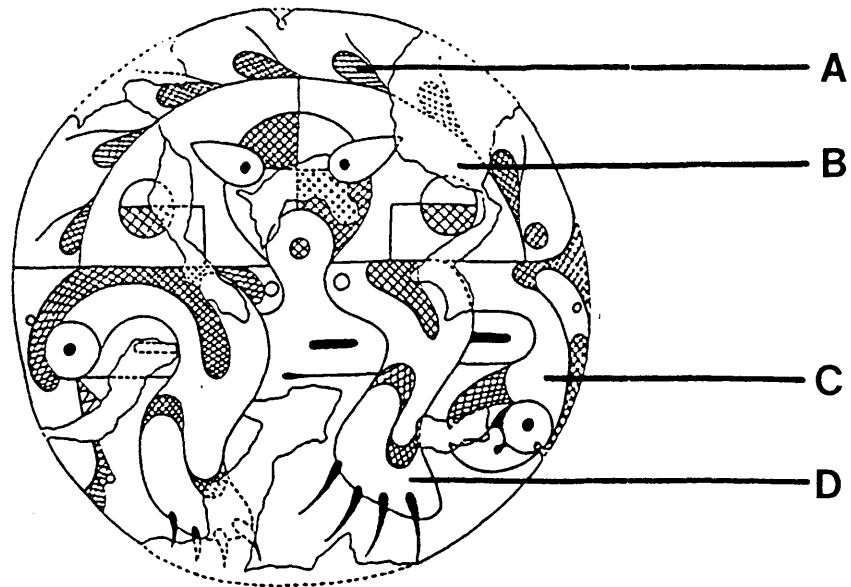


Figure 1. A complex Hopewell image including, among other things, a representation of the three-tiered universe. (A) The Upper World is symbolized by stylized feathers in an arc that may represent the sky vault of historic Eastern U.S. Indian mythology. (B) Above the horizontal midline is a turtle carapace in profile, representing this Middle World, "Turtle Island," of historic Indian lore. The outline of the turtle is emphasized in bold line in the bottom rendition of the image. (C) The turtle's stylized head extends below the midline. (D) Stylized legs, combining the form of a bear's leg and the four nails of a feline, extend below the horizontal midline. The bear is associated in Eastern U.S. Indian mythology with the Lower World, where it hibernates; the feline may be a reference to the Underwater Panther of the Lower World. The images are engraved on a human parietal. Humans of the Middle World were thought to have the plight of having to balance and separate the Upper and Lower Worlds. From the Turner Site, Mound 4, Crematory Basin. After Willoughby (1922).

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Budget Justification.

Overview. Research will involve one round-trip airfare to Columbus, Ohio, for both the Principle Investigator and the Research Assistant, in Summer, 1996. From Columbus, trips by car will be made to (OH), Chicago (IL), Cambridge (MA), and Chillicothe (OH) by the PI and RA, to examine museum collections there. The total duration of work in Summer, 1996 will be 2 months for the PI and RA (July 1 - August 30). The PI and RA will then work throughout the Fall and Spring semesters on the project. The PI will make a second round trip by plane to Columbus (May 15 - June 30 1997) to finalize work with museum collections.

Explanations of the major categories listed in Item 14 are as follows:

1. Two round-trip airfares from Phoenix, AZ to Columbus, OH, for the PI and one round-trip airfare from Phoenix to Columbus for the RA:
3 fares @ \$306/fare = \$ 918.
2. Rent-a-car for 3.6 months, July 1 - August 30, 1996, May 15- June 30, 1997. For travel to the Ohio Historical Center within Columbus, and to the Field Museum of Natural History (Chicago), Peabody Museum of Archaeology and Ethnology, (Cambridge), and Hopewell Culture National Historical Park (Chillicothe, OH).
3.6 months @ \$590/mo = \$2124.
The PI does not have a highway-dependable car.
3. Gasoline: 5500 mi / 25 mi/gal x 1.30/gal = \$ 286.
The mileage estimate is based on Summer 1995 research travel costs to and within the same four locations. The estimate assumes one trip each to Chicago, Cambridge, and Chillicothe.
4. Room, July - Aug 1996:
Chicago, 20 days @ \$71/da for 2 persons (Field Museum Institutional rate at Blackstone Hotel) = \$1420.
Cambridge, 2 weeks @ \$200/wk x 2 persons = \$ 800.
Motels on road, Columbus - Cambridge round trip, 2 da @ \$40/da for 2 persons = \$ 80.
Columbus, 3 weeks @ \$500 for 2 persons \$ 500.
Room, May 15 - June 30, 1997, 1.5 month @ \$300/mo for 1 person = \$ 450.
5. Research Assistant, D. Troy Case, paid at the hourly rate for Arizona State University for an MA level student:
July 1 - Aug 30, 1996: 8 weeks x 40 hrs/wk x \$11.42/hr = \$3654.40
Sept. 2 - Dec 30, 1996: 18 weeks x 15 hrs/wk x \$11.42/hr = \$3083.40

Fringe benefits for RA, required by Arizona State University:
\$6738 x 3% = \$ 202.00

During summer 1995, the RA will examine field excavation notes housed in the visited museums, in order to determine the horizontal and vertical locations of symbolic artifacts and raw materials, their placement in graves, and their locations relative to one another. He will use data collected by other investigators (see Item 21) to establish the age and sex of individuals with which the items are buried. He will also help to photograph items. The PI will search the museum shelves for items bearing imagery, and make schematic sketches, photographs, and publishable line drawings of these. He will also compare the compositions of items with one another to find any telling patterns and associations of images.

From Sept. 2 to Dec. 30, 1996, the RA and PI will use quantitative, computerized archaeological methods of intrasite spatial analysis to define sets of spatially associated symbols that represent leadership roles of different kinds, "medicine" bundles of "shamans" of the several kinds listed in Item 20, personal and community sacred bundles, horizontal social groups, or the philosophical-religious beliefs associated with leaders, social divisions, and communities. The RA will do the data entry, and both the PI and RA will work on the data display, and analysis. The PI will do library research to augment and refine the relevant ethnographic analogies of which he is already aware, in order to interpret the symbolic items and their associations. This work will be continued by the PI, alone, from Jan 15 - May 15, 1997.

Approximately one-third of the above museum work (save the completed search for items) will still remain to be finished at this juncture, based on the PI's experience with the collections in summer 1995. It will be especially necessary to complete photography and finished line drawings at this time. This unfinished work, as well as any refining of documentation and analyses that is suggested to be necessary by the results obtained from July 1996 to May 1997, will be completed by the PI from May 15 to July 1, 1997.

6. Expendible supplies:

Ektachrome tungsten 160 slide film, 50 rolls @ \$10.00/roll =	\$ 500.
Film development, 50 rolls @ \$7.00/roll =	\$ 350.
Film costs are estimated from Summer 1995 research expenses and the ca. 200 items to be photographed, with multiple exposures and views.	
Paper, acetate tracing paper, markers, etc.,	\$ 100.
Xeroxing of museum records (field excavation notes, maps),	\$ 200.