

Career Development and the Influences of Teachers and Colleagues

Woodland Indian Philosophy-Religion from a Native's Eye. The most recent phase of Carr's archaeological and anthropological research, from 2006 to present, has centered on the philosophical-religious knowledge and rituals of postcontact and precontact Woodland Indians and their material expressions, such as Ohio Hopewell mortuary remains, art, and architecture. His aim has been to understand these concepts, ceremonies, and material creations, and the motivations to human actions that they impart, in terms of native cultural categories and logic rather than imposed Western cultural and anthropological-theoretical interpretive frameworks. By necessity of the orientations and emphases of Woodland Indian cultures, this work has involved comprehensive and detailed literature surveys and database compilations of the myths, folklore, and rites of postcontact Woodland and Plains Indian for specific topics, such as the nature of soul-like essences, the nature of the journeys of soul-like essences to afterlives, and the ordinary animals and nonordinary other-than-human beings who the Indians knew to inhabit their cosmoses. The data collection, data management, analyses, and publication of these surveys were a team effort by Carr and four of his colleague-students (Caseldine, Feinberg, Kupsch, Rafidi) over the course of nine years (2010-2018).

The research also has required using a contextual approach to archaeological analysis that delves into details and their relations to find inherent cultural patterns—a method that Carr (2005, 2008, 2021) calls “thick prehistory”. This approach follows Clifford Geertz's (1973) notion of “thick description” as a means to gaining insight into the web of cultural meanings and motivations of a native people and seeing with their eyes, John Tukey's (1977, 1980) strategy of “exploratory data analysis” for revealing inherent structures within data, and Norwood Hanson's (1958) delineation of the gestalt-like logical process of “abduction” for discovering new data patterns and new interpretations in tandem.

The kinds of Ohio Hopewell archaeological data that Carr contextualized and compared to postcontact Indian religious ideas and practices are diverse: mortuary artifact and human skeletal remains; the iconography of ritual paraphernalia and dress; ceremonial center, charnel house, and individual burial layouts; the natural and symbolic qualities of the raw material used to create ritual artifacts; settlement and community patterns; subsistence remains; the natural and symbolic features of the local natural environment; and chronometric and artifactual crosstie information; to name a few major classes of evidence.

The major endproduct of this phase of Carr's work is his and his colleagues' book, *Being Scioto Hopewell* (2021). It has two parts. The first reconstructs 14 “ritual dramas” of death that Hopewellian and other Woodland-period peoples performed in their ceremonial centers to help the soul-like essences of their deceased make the journey to an afterlife. This work was facilitated by defining explicitly and cross-culturally, for the first time, the concept of the “ritual drama” as a genre of social performance. The second part infers the nature of Scioto Hopewell people's concept of “personhood”. Two facets of their ontology were found by Carr to have been instrumental in their creating their intercommunity alliances and cooperation and in gathering the labor required to construct their huge multicomunity ceremonial centers: (a) a relational collective concept of the self defined by the ethical quality of the relationships one has with other beings, and (b) a concept of multiple soul-like essences that compose a human being and can be harnessed strategically to create familial-like ethical bonds of cooperation among individuals and communities. The ontology of Scioto Hopewell peoples was clarified by Carr comparing and contrasting it relative to ten formal cross-cultural models of personhood and the

self that he built and/or critiqued through much reading of ethnographies. Researching both the ritual drama and the personhood aspects of Hopewell peoples' lives relied on the new bioarchaeological-taphonomic method of l'anthropologie de terrain and applying it to the Hopewell mortuary record of human remains. This osteological work was done by Carr's colleague and graduate student, Anna Novotny.

The goal, rationale, and ethnohistorical methods of Carr in this phase of his career derived most directly from three colleagues of his. Dr. Rex Weeks, a culturally tradition Eastern Band Cherokee Indian, rock art archaeologist, and artist, was both Carr's archaeology graduate student and his teacher of Woodland Indian cultural world views from 1995 until 2009 at ASU. Rex helped to awaken Carr from his naïve-realistic, Western lay and anthropological viewpoints and understandings of Woodland Indians through their informal discussions and their co-teaching an undergraduate senior seminar on Woodland Religions in 2007—a course that Carr continued to teach and develop after Week's graduation. The course attended closely to the mythology and folklore of Woodland Indians that reveal their world views, values, and ethics. Also critical to Carr developing a more native-sensitive viewpoint during this period were Professor Kenneth Morrison in ASU's Department of Religious Studies and Professor Elizabeth Brandt in ASU's Department of Anthropology. Morrison was a long-time scholar of postcolonial Woodland Indian philosophy and religion, especially ontology, ethics, and cosmology. Carr audited a course on Native American Religions from Morrison, read many of his works, and discussed essential features of Woodland Indian world views with him through the years. Elizabeth Brandt is a sociocultural linguist who specializes in the relationship between language and world view and in the spiritual traditions of Indians of the American Southwest. Brandt and Carr had innumerable conversations about Woodland and Southwestern Indian world views, ontology, and spiritual ideas and practices during his 30 years of teaching at ASU. Finally, the understandings of postcontact Native American world views that Carr developed over time stem in part from the conversations, ceremonies, and experiences he shared with Cherokee, Potawatomi, Seneca, Mohawk, Cheyenne, and Yavapai medicine and lay persons—some close friends, others formal or informal teachers—and from classes he took from Tom Mails, the ethnographer, close friend, and student of the early 20th century Lakota holy man, Frank Fools Crow.

Reaching the point where Carr could integrate elements of the fields of art, mortuary analysis, cross-cultural analysis, and postcontact Woodland Indian religions with the Hopewell material record in order to understand Hopewell peoples' meaningful lives and their motivations to action was a lifelong journey. The phases of his research bulleted on the home page of this website provide only part of the story.

Early Foundations and Influences. Carr was brought up in a multicultural family and neighborhood in Chicago, Illinois. His paternal grandmother was a Croatian subsistence farmer and shepherd near Zagreb, his paternal grandfather a Croatian fisherman on the Sava river, also near Zagreb. His father was bilingual Croatian and English. His mother was from old English and Scotch-Irish stock with Quaker ways. Differences in cultural views and values were a perennial part of discussions and decisions at home and gave Carr his cross-cultural and anthropological bent. So, too, did the neighborhood in which he grew up, which was a mix of Irish Catholics, Swedes, Lithuanians, Germans, Poles, Czechs, and Croatians, all close to their immigration roots. Carr was made aware at an early age of the concept of culture and the impacts of culture on human experience and actions.

In addition, his father was a research chemist, his mother an English literature teacher and writer of novels and poetry. Carr was raised in seeing value of and in learning through the means

of both the sciences and the humanities, and in using both to understand life. He wedded comfortably (and explicitly) scientific and humanist viewpoints and methods in all three of his books (2005, 2008, 2021) on ancient Hopewell peoples and life. His pre-graduate education was heavy on art, mathematics, the natural sciences, archaeology, and cultural anthropology. Carr took courses in mathematics, statistics, or quantitative spatial and image analysis most semesters through high school, college, and his master's program. He took weekly art lessons during the academic year from the ages of 6 through 27. He was trained at the John H. Vanderpoel School of Art in Chicago, The Art Institute of Chicago, and Art Worlds in Ann Arbor, MI, some years on scholarship for the quality of his creations. He worked in many media, but came to specialize in pastels and watercolors, in which he rendered things of nature and landscapes.

Given the life trajectory that Carr was to follow, Chicago was an ideal place of birth, upbringing, and education. The University of Chicago was the academic home of one of the major branches of development of modern archaeological excavation techniques (Fay Cooper-Cole, archaeologist and founder of its Anthropology Department). The U of C was also the birthplace of the New Archaeology (Binford, Flannery, Struever, Whallon, Winters, Longacre, Hole, etc.) and the anthropological subfield of Bioarchaeology (Buikstra). Field techniques, the theories and methods of the New Archaeology, and the mortuary analytic dimension of bioarchaeology were all core elements of Carr's early, pre-graduate school work and thinking in archaeology and were readily available to him through his teachers at the University of Illinois-Chicago, the Northwestern University Archaeological Program, and the Chicago Field Museum of Natural History. These institutions which had rich faculty interconnections with one another and the University of Chicago.

At 16, Carr took a summer NSF course in anthropology at the Chicago Field Museum (1968), which included a week of archaeological excavation. For the next nine years, he excavated or made surface surveys every summer for three months. He took a formal field school with Jesse D. Jennings in Utah; supervised excavations and stratigraphic mapping at the Koster site in Illinois directed by Stuart Struever, James A. Brown, and R. Bruce MacMillan; and worked with the Northwestern University Archaeological Program in Kampsville, Illinois, for five seasons. He considered becoming equally a professional artist, mathematician, or archaeologist through much of high school and the first two years of college. It is no wonder, then, that his early post-doctoral career in archaeology focused on quantitative methods and material style analysis.

Carr's interests in archaeology and anthropology during high school and college were largely three-pronged: in archaeological field technique, in the theory and quantitative methods of the New Archaeology, and in cross-cultural variation.

Archaeological Field Techniques, Soils, and Resistivity Surveying. His excavation experiences resulted in his fascination with soils as a physical and chemical material and his idea that differences in these properties of natural versus anthropogenic soils, and their relative electrical conductivities, might make it possible to electrically map buried earthen architecture, features, activity areas, and other disturbances remotely from the surface without the heavy labor and economic costs of excavation. He formalized the approach as part of a high school advanced physics class project and then consulted with European archaeologists and American civil engineers who already had developed the approach considerably. By the time he entered graduate school (1974), he had already collected from a Havana Hopewell homestead site (Crane site, Illinois) most of the electrical resistivity survey data and correlating soil chemical and physical data necessary for his doctoral dissertation. He directed this research through the

Northwestern University Archaeological Program and the Center for American Archaeology in Kampsville, which funded the project for two summers. The corresponding archaeological excavation data from the site, for testing the resistivity survey predictions, were provided to him by its excavator, Kenneth Farnsworth. The research results were published as the book, *Soil Resistivity Surveying: Interpretation of Data from Earthen Archaeological Sites*. It spans the subjects of soil chemistry and physics, their varying alterations by different kinds of human activities, electrical responses to these pedological alterations, and quantitative methods for spatial filtering and analyzing resistivity data and intrasite artifact distributional data.

Among his key creative intellectual contributions to resistivity surveying methodology are: focusing on broad activity areas rather than smaller individual features as the target units to be mapped in situations of low feature-matrix contrast and high matrix variability; defining activity areas by their overall statistical signatures and spatial-filtered qualities rather than defining individual features by their consistent absolute contrasts from their matrices; and employing the Barnes Layer method (modeled on parallel-hooked resistors) to map disturbances in a pinpointed specific depth range or stratum rather than in the whole volume of earth between the surface and a particular depth. Carr's learning of spatial statistical and filtering methods as a part of the resistivity survey methodology he innovated served him well two decades later (1996) when he began harnessing digital photographic image enhancement algorithms to clarify artworks on Hopewellian copper artifacts (see below). Spatial filtering mathematical operators and digital image enhancement algorithms share the same general mathematical approach to analyzing two-dimensional gridded/pixel data and some of the same specific operators.

Archaeological Theory and Quantitative Methods. The Northwestern University Archaeological Program was a hotbed of concepts and practices of the New Archaeology through it having been led by archaeologists Stuart Struiver, and James A. Brown and bioarchaeologist Jane Buikstra, and through the caravan of core New Archaeologists who they brought in to teach students. There, in 1972, Carr became very interested in archaeological theory and culture theory, and broadened his interests in archaeological methods—themes that played out in the rest of his career. He also listened carefully to and observed Jane Buikstra in the process of thinking out conceptually and applying the new subdiscipline of bioarchaeology, which he began integrating into his own research ten years later (1982).

The University of Illinois at Chicago and the University of Michigan—Carr's undergraduate and graduate educational institutions (1970-1979)—were also nexuses of New Archaeologists who further formed his early theoretical world view (ecology, systems, quantification). At Michigan, Robert Whallon's course on quantitative methods structured and spurred on Carr's interest in and work on new quantitative techniques and the philosophy and logic of quantitative analysis within the scientific process. Carr's research efforts on these topics led to their becoming the primary themes of his edited book, *For Concordance in Archaeology: Bridging Data Structure, Quantitative Technique, and Theory* (1985) and his extensive article in the *Journal of Archaeological Method and Theory* (1984). The latter modeled the nature of organization and formation of tool kits, activity areas, and intrasite artifact distributions. It reviewed and critiqued 17 quantitative techniques of spatial analysis for their logical concordances (and not) with the characteristics of tool kits, activity areas, and artifact distributions.

Carr's research in quantitative methods after graduate school was supported in innumerable ways by his colleagues and the administration at the University of Arkansas-Fayetteville, his first academic post (1979-1985). UA was a national focus of research

in quantitative methods in archaeology at the time. W. Fredrick Limp and Sandra Parker wedded economic anthropological theories with the new statistical technique of logistical regression to model precontact settlement decision making processes. They also were among the pioneers of relational database structures in archaeology, advancing the work that Parker and Robert Chenhall had made earlier in archaeological data base management at UA. Limp and Carr also had continuous discussions on the issue of logical concordance between data structure, technique, and theory in quantitative analysis. These projects and ideas became core parts of Carr's book, *For Concordance in Archaeology*. Also, with the support of the UA administration, Carr founded and served as Director of the Institute of Quantitative Archaeology. The Institute regularly brought to the campus key researchers who lectured on cutting-edge techniques and concepts in the field as part of the Institute's Albert C. Spaulding Lecture Series. The Institute also helped with co-publishing *For Concordance in Archaeology*. Carr taught a graduate-level course on multivariate statistics for archaeologists yearly for ten years at UA and ASU.

Earlier, at Michigan, Ph.D. candidates and friends David Braun and Jerome Voss, three years ahead of Carr in their studies, taught him with excitement their and other New Archaeologist's theories of how to use the styles of artifacts and mortuary practices to reconstruct the social organizations of ancient peoples and interactions among them. These intellectual opportunities were the roots of Carr's bent toward "social archaeology", which resulted in three books: *Style, Society, and Person: Archaeological and Ethnological Perspectives*; *Gathering Hopewell: Society, Ritual, and Ritual Interaction*; and *The Scioto Hopewell and Their Neighbors: Bioarchaeological Documentation and Cultural Understanding*.

Archaeology and Anthropology of Religion. At the same time, UIC, Michigan, and Arkansas also planted in Carr the seeds of his later growth into the archaeology and anthropology of religion. Robert Hall, the father of the archaeology of religion and spirituality of North American Indians, was Carr's undergraduate advisor in anthropology at UIC. Hall shared some of his then pioneering ideas and writings on precontact and postcontact Woodland and Plains Indian religions with Carr and others in the Department in real time as he was creating them. Carr learned early on that an archaeology of religion is often possible, despite the disinterest and frequent outcries of most materialist colleagues, and that such studies require a detailed, contextualized, native-sensitive approach. At Michigan, assigned writings of Roy Rappaport and a course from him and Richard I. Ford cemented in Carr the view that religious ideas and rites are as essential as the natural environment and technology-subsistence in motivating the decisions and actions of peoples and in structuring their social and cultural lives. At Arkansas, Michael P. Hoffman impacted Carr strongly in the archaeology and anthropology of religion by introducing him to the works of ethnohistorian Charles Hudson and his synthesis of postcontact Southeastern Woodland Indian cosmology and its Mississippian precursors.

Culture and Cross-Cultural Variation. Carr's interests in culture and in cross-cultural variation and comparison, rooted in his multiethnic upbringing, were nurtured and formalized at UIC by ethnographers Laura Bohannon, Merwyn Garbarino, and Elizabeth Brandt, from whom he took courses on social anthropology, economic anthropology, culture theory, and linguistics. Their personal ethnographic descriptions of life in Nigerian, Florida Seminole, and Apache societies made him think hard about what is humanly "natural" and constant culturally and what is variable, setting the foundation for the teachings of Weeks, Morrison, and Brandt on cultural relativism and naïve realism that would impact Carr later (see above). Carr's understandings of nonwestern cultures and cultural relativity were sharpened further when he taught more than a dozen offerings of the course "Introduction to Cultural Anthropology" at his first academic job at

the University of Arkansas, cotaught the course “Shamanism” with comparative cultural anthropologist Michael Winkelman twice at Arizona State University, and created and taught the course “Death and Dying in Cross-Cultural Perspective” (essentially global comparative eschatology and sociology of death) yearly for 27 years at the University of Arkansas and ASU. The cross-cultural course on death and dying was the first of its kind nationally, at the time. Carr developed his skills in systematic cross-cultural comparison at ASU when he taught undergraduate and graduate students how to use and analyze ethnographic data from Yale’s Human Relations Area Files in his many offerings of courses on “Mortuary Practices and Cultural Analysis”, on “Woodland Indian Religions”, and on “The Archaeology of Religion”. Carr moved from the University of Arkansas to Arizona State University (1985) in part for the opportunity to interact with and learn from a larger number and broader spectrum of sociocultural anthropologists.

Mortuary Practices and Bioarchaeology. The archaeology and ethnology of mortuary practices and bioarchaeology, and their uses in reconstructing the social organizations and religions of past peoples, were continually a part of Carr’s research and teaching from 1982 onward at the UA and ASU. Buikstra had earlier made him aware of the potentials that mortuary analysis and bioarchaeology offered for studying ancient societies and some of the osteological methods involved (see above). Bioarchaeologist and colleague Jerome Rose at UA affirmed these understandings of Carr’s through their periodic discussions, his sharing his syllabus for his graduate course in bioarchaeology (primarily biological anthropological methods), and his encouraging Carr to teach a parallel graduate course on mortuary analysis focusing on archaeological methods. In the summer of 1982, Carr read the newly published *Archaeology of Death* (Chapman et al.), *Approaches to the Social Dimensions of Mortuary Practices* (Brown et al.), and primary references in them, and created his first offering of his course, “Mortuary Practices and Cultural Analysis”. He taught the course every other year from 1982 through 2014. The course became a core vehicle for Carr to explore the possibilities of mortuary analysis applied to Ohio Hopewell mortuary records and, at ASU, to interest and engage graduate students in various Hopewell mortuary studies. From these teaching-research efforts, in part, emerged his research collaboration with the then graduate student in bioarchaeology, D. Troy Case; their book, *Gathering Hopewell: Society, Ritual, and Ritual Interaction* (2005); and Carr’s extensive middle-range theoretical article, “Determinants of Mortuary Practices: Social Organization, Ideation, and Physical Constraints” (*Journal of Archaeological Method and Theory* 1995).

Carr’s integration of mortuary analysis and bioarchaeology into his research program was supported in critical ways by two other aspects of his career. First, he was asked by his Chair at ASU in 1986 to pull together a new Masters’ curriculum in bioarchaeology and a supporting faculty. Designing the program’s content provided Carr the good fortune to work closely with biological anthropologists Charles Merbs, Christy Turner, Donald Morris, and Mary Marske, and to learn in concept the biological anthropological components of bioarchaeology. So, too, did designing and coteaching with Merbs and Turner the Bioarchaeology Program’s core course on “Method and Theory in Bioarchaeology”, which Carr cotaught multiple times. Significantly, both Charles Merbs and Christy Turner were among the earliest biological anthropologists whose research spanned bioarchaeology’s social, cultural, religious, demographic, health, and other dimensions before the subdiscipline crystallized. Merbs taught the approach to Jane Buikstra, who later coined the term “bioarchaeology”. Carr served as Head of the Bioarchaeology

Program at ASU for 12 years from 1986 to 2002 and mentored or co-mentored many bioarchaeology Masters' and doctoral students.

Carr's research in mortuary analysis and bioarchaeology was also supported by his designing and offering for 27 years an undergraduate course on "Death and Dying in Cross-Cultural Perspective". The course explored how a wide spectrum of cultural domains, including health and healing, aging, preparing to die, the orchestration of the moment of death, funeral and burial practices, and grief, mourning, and bereavement were systematically related to, on the one hand, cultural ideas (world view assumptions, beliefs about the soul and self and about illness and death, including relationships of the living to the deceased) and on the other hand, local ecology, demography, sociopolitical events, and technology. The course encompassed cultures from around the globe, from the Middle Paleolithic onward, and from small-scale societies to empires. Carr's understandings of global patterns in these cultural domains and the correlations (or not) among their elements were invaluable to him in coarsely sorting out reasonable from unlikely interpretations of mortuary patterning in Hopewellian Woodland Indian mortuary remains.

Carr's studies of precolonial Woodland Indian (especially Hopewellian) art and artifacts have followed six paths: stylistic, ritual-functional, iconographic, museum collections survey, digital photographic, and materials compositional analysis.

Material Style Theory and Methods. The unified middle-range theory of artifact style that he constructed (1995) allows the assignment of a hierarchy of different meanings and processes of different kinds and scales (the regional and local natural environment, society, operative society, intimate society, family and interacting artisans, persona, ego, physical self, and unconscious) to a hierarchy of artifactual attributes that differ in their physical and contextual visibilities, positions in a manufacturing decision sequence, and geographic scales of spread (e.g., very visible color and texture, design field shapes, obscure attributes such as incision line contours). The theory resulted in part from Carr's own experiences in working with multiple kinds of additive and subtractive art forms (oil painting, water color painting, clay sculpture, wood carving, weaving, metal embossing, etc.) and his familiarity with the artist's sequences of decisions and the amount of preplanning of them necessary for each medium. It also stemmed from Carr's education at the University of Michigan, where he was taught Wobst's (1977) social hierarchical theory of style and learned from Jerome Voss the refinement's he had made to Wobst's theory. Carr's middle-range theory makes it possible to integrate multiple competing theories of the causes of style and stylistic variations (e.g., information exchange, enculturation and social interaction, technological processes, isochrestic variation), which were greatly debated at the time, into one theory by placing appropriate boundary condition on each theory—their applicability to differing ranges of artifact attributes in a hierarchy of attributes. The theory tested out well in multiple ethnographic and archaeological cases for a broad array of media, including basketry, cordage, fabrics, carving, architecture, and pottery design, leading to Carr and Neitzel's (1995) edited book, *Style, Society, and Person*. Among the media that Carr explored stylistically during this period were Hopewell textiles (with Kathleen Hinkle) and Woodland Period cordage (with Robert Maslowski), which bore information on intercommunity sharing of styles and technologies through intermarriage, intercommunity artifact exchange or gifting, and/or intercommunity joint burial ceremonies.

Ritual Functions and Religious Meanings of Hopewellian Artifacts. Carr's identifications of the shamanistic and other ritual functions and religious meanings of many classes of flamboyant Ohio Hopewellian ceremonial paraphernalia (e.g., large obsidian spears, mica

mirrors, cones and hemispheres, barracuda jaws) and of the meanings of the dark-light transforming raw materials from which many were crafted, had a long maturation period. When he first opened drawers of these materials in the curation facility of the Ohio Historical Society in 1981, he was fascinated by them but realized immediately that the keys to identifying their functions and meanings lay in the realm of shamanism and Woodland Indian religion, of which he knew little then. He instead began his Ohio Hopewellian archaeological research with technological, material compositional, and radiocarbon dating studies of ceramics to improve the local chronometric framework and to explore intercommunity exchange and social interactions (see below). Carr sought to correct his inadequate knowledge of shamanism when, in 1988, Michael Winkelman joined the faculty at ASU, where Carr taught. Winkelman was then the leading authority on cross-cultural variation in shamanistic and other magico-religious practitioners, having just completed a rich HRAF study of such variation worldwide for his doctoral dissertation at University of California-Irvine. Carr joined with Winkelman to design an undergraduate course on “Shamanism, Healing, and Consciousness”, co-taught it with him twice, and solo taught it thereafter most years until 1998. The course allowed Carr the opportunity to read about the diverse ecological, social, political, medical, social-psychological, and other functions and methods of shamanistic and shaman-like practitioners and to consider the possible uses and meanings of Ohio Hopewell ceremonial paraphernalia by such practitioners. It was during this period that Carr met and learned from Potawatomi, Mohawk, Cheyenne, and Yavapai medicine persons and Tom Mails, whose teachings also provided insights into Hopewell ritual items. Especially important was Potawatomi 4th Degree Midé, Gary R. Bibb, who with Carr combed through many hundreds of photographs of Ohio Hopewell ceremonial artifacts and artworks and suggested their possible functions and meanings. At the same time, Carr, Rex Weeks, and a cultural anthropology graduate student, Mark Bahti, conducted a large-scale survey of HRAF sources and select Woodland Indian ethnographies to gain postcontact Woodland Indian information on the classes of Hopewell paraphernalia. All these studies, along with mortuary analyses of the Hopewellian burial contexts and associations of the paraphernalia, directly fed into Carr and Case’s (2005) chapter, “The Nature of Leadership in Ohio Hopewellian Societies: Role Segregation and the Transformation from Shamanism”, other chapters on the symbolic significance of Hopewellian ritual items in the book *Gathering Hopewell* (2005), and chapters on “Natural Symbols”, “Social and Ritual Organization”, “World View and the Dynamics of Change”, and “The Functions and Meanings of Ohio Hopewell Ceremonial Artifacts in Ethnohistorical Perspective” in the book *The Scioto Hopewell and Their Neighbors* (2008).

Iconography. Carr’s iconographic studies of the religious meanings of precolonial Woodland Indian art that decorated and/or served as ritual paraphernalia, featured in his three books on Hopewell Indians (2005, 2008, 2021), were made possible by three lines of effort. First was his familiarizing himself with the published myths and lore of historic-period Woodland and Plains Indians, in part through the guidance of his Cherokee student, Rex Weeks and their coteaching a seminar on Woodland Religions (see above). Second was the knowledge Carr gained from the contemporary Indian medicine and laypersons he came to know, just mentioned. Third was his participation in three iconography roundtable meetings of the Southeastern Ceremonial Complex Study Group held at the University of Texas-Austin and Texas State University-San Marcos from 1994 to 1996 and directed by F. Kent Reilly and James F. Garber. These meetings allowed Carr to learn more about Mississippian art, icons, paraphernalia, and their meanings and compare them to earlier Hopewell and Adena designs and

items. The roundtable participants, as well as Phillips and Brown's (1978, 1984) monographs on shell engravings from the Caddo Mississippian site of Spiro, also taught Carr some essential methods for analyzing iconography.

Museum Collections Survey. Carr's command of the ceremonial artifact corpus of Ohio Hopewellian and Adena peoples was accrued through his surveying, inventorying, and examining these items in museum and private collections for two to four months each year from 1996 through 2000. A Wenner-Gren Foundation grant to search for unpublished pieces of Ohio Hopewell artworks and to examine them and published ones in order to reconstruct the cosmologies of Ohio Hopewell peoples allowed him to open every drawer and search every shelf of Hopewellian and Adena artifacts from Ohio mound and ceremonial sites at the Ohio Historical Society, Hopewell Culture National Historical Park, the Field Museum of Natural History, the Harvard Peabody Museum of Archaeology and Ethnology, the Ross County Historical Society, and the Johnson Humrickhouse Museum, and to selectively view published and unpublished Hopewell items in 8 other museums and private collections. The survey lasted 37 work weeks. Over 7000 photographs of artifacts were taken. Many minor and fragmentary pieces of known forms of Ohio Hopewellian art and decoration and a few spectacular ones that had not been published were brought to light.

More important was Carr's discovery that many of the some 320 extant Ohio Hopewell copper breastplates, headplates, and celts, as well as some copper earspools, were patinated (and occasionally painted) with figurative art of primarily social leaders: humans with headdresses of various heights and geometric shapes, and human impersonators of animals—both partially and almost completely transformed, and sometimes combining multiple animal species. Fully animal representations also are common, the most frequent being raptorial and nonraptorial birds, bear, deer, canines, and felines—categories that commonly served as clan guardian animals and the names of clans or phratries among postcontact northern Woodland Indians. These subjects are not unexpected given the shamanistic orientation of Ohio Hopewellian societies and their prior known art corpus. Examples of the copper patinated and painted artworks have been published in two of Carr's books (2008, 2021) and a textbook (Milner 2004). Inventorying these images of Ohio Hopewellian social leaders dovetailed with Carr's identifications of the shamanistic and other ritual functions of the leaders' ceremonial paraphernalia (see above) and his and D. T. Case's (2005) social role analyses of the leaders through the mortuary analysis of the burial contexts and associations of their paraphernalia.

Digital Photography and Image Enhancement of Hopewell Copper Artworks. Delineating the figures on the copper artifacts was sometimes possible by visual inspection but more fully realized through color, near-infrared, and midrange-infrared digital photography as is done in Western art restoration work. Also employed were image contrast enhancement procedures and creating hybrid images in which Red, Green, and/or Blue image channels were replaced by NIR and/or MIR signals. The color images were captured by staff from Archaeological Services Consultants, Columbus, and the NIR and MIR images by staff at Battelle International Laboratories, Columbus. Image hybridizing was done by staff of the Center for Advanced Spatial Technologies at the University of Arkansas. The project was funded by the National Park Service's National Center for Preservation Technology and Training (2000). Designing the post-image-processing work was conceptually relatively easy for Carr because the mathematical and pixel-based techniques it involved were related to some he had used earlier in spatial filtering soil resistivity data and in spatial analyzing artifact distributions.

Materials Compositional Analysis of Hopewell Copper Artworks. Determining that the artworks were made by primarily copper patination, just as in modern copper jewelry and artwork, and rarely by painting was accomplished in several ways: by chemically identifying the materials of different colors that composed the images using energy dispersive electron microprobe analysis, x-ray diffraction, and Raman spectroscopy; microscopy and SEM microphotography of the materials features that identified their mineralogy; mathematical-chemical modeling with Pourbaix phase diagrams of the equilibrium thermodynamics of copper-aqueous systems; and experimental reproduction of the patination process. These specialty natural science studies were made by two geologists, two analytical chemists, a corrosion analyst, and a professor of art, metals, and jewelry at Ohio State University, Battelle International Laboratories, and Arizona State University. Carr's employing these methods of material analysis aligned well with his earlier interests and training in the natural sciences and their laboratory methods.

Ohio Hopewell Bioarchaeology. The period of 1996 through 2000, when Carr surveyed museum and private collections for unpublished Ohio Hopewell artworks, gave him and his student-colleague, D. Troy Case, the opportunity to consult and collect copies of unpublished excavation notes, field photographs, and museum catalogs in order to document and/or verify the details of the Hopewellian mortuary record throughout Ohio. This museum work resulted in the HOPEBIOARCH database available in this website and Springer Publisher's online site of supplemental materials/appendices for the book, *The Scioto Hopewell and Their Neighbors* (2008). The database describes the tomb characteristics, artifact inclusions, artifact positions relative to the body, and age and sex estimates for 936 burials representing 1483+ individuals from 112 mounds and burial areas in 50 excavated Ohio Hopewell sites. It also describes the contents of 77 artifact ceremonial deposits from 47 mounds or areas in 19 sites. The total number of sites and mounds with burials and/or artifact ceremonial deposits are 52 and 126, respectively. Student-colleagues Beau Goldstein and Ashley Evans Bush also played key roles in assembling the database.

The Beginnings of Carr's Interest in Ohio Hopewell. Carr's interest in Ohio Hopewell culture and life was captivated when he attended the Chillicothe Conference on Hopewell archaeology in Ohio in 1975, heard the major researchers of the day discuss what they knew and what yet had to be learned about Hopewellian peoples, and visited the Scioto valley earthworks for the first time. He vowed to himself then that as soon as he completed his Ph.D. and research on soil resistivity surveying, he would start a project in Ohio on the Hopewell archaeological record. He did precisely that in summer, 1982, when he traveled to Ohio, met a dozen leaders in Ohio Hopewell archaeology, discussed with them the feasibility of implementing a project on ceramic dating and exchange, and visited Hopewellian ceremonial centers throughout southern Ohio.

Radiometric, Technological, and Material Compositional Studies of Ohio Hopewellian Ceramics. The initial forays Carr made into Ohio Hopewell archaeology, between 1984 and 1996, and before he had strengthened his knowledge of Woodland Indian social and religious life, were radiometric, technological, and material compositional studies of ceramics. These studies he undertook to bring finer resolution to Ohio Hopewell chronometry and to trace and measure the exchange of ceramic vessels, ceramic manufacturing information, and/or mates among Scioto Hopewell and broader communities. He modeled his work closely on projects that David Braun had undertaken on Illinois Hopewell. This work, too, stemmed naturally from Carr's early education in the natural sciences and their laboratory methods. The project involved

an extensive suite of AMS and beta-count radiocarbon analyses of primarily annual plant remains and carbonized food deposits on vessel interiors from mainly domestic contexts ranging from 1300 B.C. to 1200 A.D. uncalibrated radiocarbon time (Carr and Haas 1996). The dating of carbonized food deposits was a very new field at the time, pioneered by Dr. William Lovis. The extraction methods used to process the carbonized food deposits were innovative and worked out by colleague Herbert Haas at Southern Methodist University (Carr and Haas 1996).

The ceramic technological and compositional components of the project entailed several significant technological and methodological innovations that have been reported: refined methods for x-radiographing ceramics for their temper densities, sizes, and compositions, including an analog to backscatter electron microscopy for mineral identification; x-radiographic methods for distinguishing sherds from different vessels; instrumental neutron activation analysis that assayed ceramic pastes separate from their temper particles via prior sonic disaggregation of these components, which avoids mixing their INAA signatures; and electron microprobe chemical compositional analysis of ceramic pastes separate from their temper particles, which required new sample preparation techniques (Carr 1993, Carr et al. 1992, Carr and Komorowski 1995). The refinement of x-radiographic methods was done in collaboration with staff at Battelle International Laboratories of Columbus and a medical radiographer in Fayetteville, Arkansas (Carr 1989, 1990, Carr and Riddick 1990).

Most of the project's culture-historical results and sociological studies of intercommunity interaction and their changes over time have been presented in meeting papers but not published. An exception is the discovery that uncolored slips were commonly applied to Scioto Hopewell utilitarian ceramics and that they also were employed throughout the prehistoric sequence of southern Ohio from the earliest of Early Woodland ceramics through at least early Fort Ancient ceramics (Carr et al. 1999). The slips were documented using standard geological petrographic methods on a very large sample of 386 vessels from 23 dated site components. Another analytical method that Carr used in a standard way was energy-dispersive x-ray spectroscopy of meteoric iron foils used to cover some earpools, and scanning electron microscopy of the foils. Carr and Sears (1985) were able to conclude that the meteoric iron used to make three earpools from the Tunacunnhee and Mandeville sites, Georgia, was gotten most likely from the Eastern Woodlands and that more than one source of iron was exploited.

Social Archaeology and Ethnography of Ohio Hopewell Life. Once Carr and/or colleagues had completed their large museum searches and inventories of Ohio Hopewellian iconography, ritual paraphernalia, human remains, and mortuary contexts, a broad "social archaeology" study of Ohio Hopewell social and ritual organizations and interactions was possible and was undertaken following the methods of "thick prehistory" (see above). Using all these classes of information plus chronometric data, Carr and 20 of his graduate-student and degreed colleagues together went about inferring and describing very fine-grained features of the social and religious lives of Scioto Hopewellian and other Ohio Hopewellian peoples. The ultimate goal was to produce an ethnographic-like synthesis of Scioto Hopewell social and ritual life, culture, and practice, enriched by comparisons with the ways of other Ohio and Midwestern Hopewellian groups. These studies appear in the two books, *Gathering Hopewell* (Carr and Case 2005) and *The Scioto Hopewell and Their Neighbors* (Case and Carr 2008). The aspects of Scioto Hopewellian social and ritual life that the books present are: the people's clan organization; kinship structure; sodalities; community organization of tri-scalar residential, local symbolic, and regional demographic forms; leadership, including its sacred and secular power bases, recruitment from multiple crosscutting social groups, and formalization over time;

systems of ranking and prestige; gender-based roles, prestige, workloads, and health; intercommunity alliances, their religious basis, and changes in their strategies and expanses over time; and interregional travels for power questing, pilgrimage, healing, tutelage, and acquiring rituals, paraphernalia, and raw materials for ceremonial uses. Immediately after the publication of these studies, in 2008, Carr began his research on Scioto Hopewell people's ritual dramas of death that they enacted in charnel houses within their earthwork ceremonial centers, and their notions and expressions of personhood (see above).