**Hopewell Archeology:**

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**1. Weymouth Awarded Fryxell Medal by SAA**

Dr. John Weymouth, Professor Emeritus of Physics, University of Nebraska, Lincoln, was recognized by the Society for American Archeology (SAA) at its 63rd Annual Meeting in Seattle on March 27, 1998. Weymouth was presented the Fryxell Award for Interdisciplinary Research, which was initiated in 1977 to recognize excellence by a distinguished scientist whose research has contributed significantly to American archeology.

Each year the award is based on performance in one of five disciplines: earth sciences, physical sciences, general interdisciplinary studies, zoological sciences, and botanical sciences. The award, which consists of a citation and a medal, was named in memory of Roald Fryxell, whose career exemplified so well the crucial role of interdisciplinary cooperation in archeology.

To further recognize the contributions of Dr. Weymouth, many of his colleagues presented a symposium in his honor on Saturday, March 28, 1998, as part of the SAA Annual Meeting. The paper I presented at the symposium is printed in this issue of Hopewell Archeology to offer some documentation of Dr. Weymouth's important contributions to midwestern archeology.

**2. Geophysical Surveys in the Mid-Continent: John Weymouth and the Midwest Archeological Center By Mark J. Lynott**

A paper presented at the 63rd Annual Meeting of the Society for American Archeology, Seattle, Washington, March 28, 1998.

When I got started in archeology, the skills of archeologists were judged largely by their ability to move dirt and dig a nice square hole. Archeology was highly excavation oriented. As a graduate student in the mid-1970s, I received my first exposure to geophysical survey techniques being developed in Great Britain. I was fascinated with the idea of seeing subsurface features without actual excavation, and the newly developing conservation archeology provided further inspiration for interest in non-destructive research. Unfortunately, the early application of geophysical survey methods were very limited in North America, and I soon gave up hope of having access to a magnetometer or soil resistance meter.

Imagine my surprise in 1978 when I moved to Lincoln, Nebraska, to join the Midwest Archeological Center and discovered that John Weymouth was using magnetometers to map village sites in the Middle Missouri drainage. My delight in discovering a physicist located in the city where I lived, and with an interest in archeology, has subsequently multiplied as I have come to know, respect, and admire the man as much as his work.

I count myself as truly fortunate to have had the opportunity to work and interact with John Weymouth on a regular basis for the last fifteen years. Not only has he taught me the value and importance of geophysical survey methods for archeology, but his energy, interest, and professionalism have served as inspirations for all of us at the Midwest Archeological Center who have had the good fortune to work with him.

During the last twenty years, John Weymouth has worked on geophysical survey projects in National Park Service areas throughout the United States. Although the bulk of his National Park Service work has been done in association with the Midwest Archeological Center in the Midwest Region, his expertise has led to his participation in projects from Ninety Six in South Carolina, to Chaco Canyon and Tumacocori in New Mexico, to Fort Clatsop in Oregon, and Knife River Indian Villages and Fort Union Trading Post in North Dakota.

He has worked on projects relating to at least eighteen parks, on sites that range from Hopewell, Anasazi or Plains Village to frontier forts, fur trade posts, and presidential homes. Time does not permit me to review all of his accomplishments and work with the Midwest Archeological Center. But, I would like to take this opportunity to highlight his contributions in three midwestern areas.

Plains Village Sites

John's work with the Midwest Archeological Center began at the Walth Bay site (Weymouth 1976) on the edge of Oahe Reservoir, south of Mobridge, South Dakota. His work at the Walth Bay site demonstrated that in flat areas with relatively uniform soil conditions which have not been cultivated, it was possible to locate fire basins, cache pits, and house floors up to 0.5 meters below surface. This initial study demonstrated the potential value of magnetic survey for planning excavations at Plains Village sites.

John continued his work in refining the applicability of magnetic survey in this region at Knife River Indian Villages near Stanton, North Dakota (Weymouth 1986, 1988; Weymouth and Nickel 1977). At sites like Sakakawea, Lower Hidatsa, and Big Hidatsa, he was able to identify an earthlodge anomaly pattern. This pattern included a central hearth feature that was recognized as monopole anomaly with typical values of 30 to 40 nT. This anomaly was surrounded by a magnetically lower region associated with the house floor.

Many of the earthlodges that we examined exhibited evidence of entryways that also appeared as magnetically low regions. The houses were usually surrounded by magnetic highs produced by slumped roof soils and midden deposits. This work demonstrated that magnetic survey could be used to examine the internal composition of house depressions visible on the surface, and magnetometers could also be used to identify subsurface house features that are not visible on the surface. John demonstrated that magnetic survey could be used effectively in cultivated areas, although he recommended that data collection intervals be reduced under these circumstances.

John's work at Knife River Indian Villages reflects methodological themes that he has subsequently applied to research at other sites throughout North America. Of particular importance, he demonstrated that it is possible to mathematically filter data to neutralize the effect of large, modern magnetic disturbances adjacent to prehistoric archeological sites (Weymouth 1986) when he identified prehistoric hearths near a modern courthouse at the Amahami site. He also deduced that under local conditions, pits must be at least 0.1 cubic meter to produce anomalies of at least 1 nT, which led him to suggest that more sensitive magnetometers were needed to detect smaller features.

Eastern Ozarks

The Midwest Archeological Center initiated a long-term study of human adaptations in the Eastern Ozarks in 1981. At that time, little was known about the archeology of that region, and chronology building was a prime consideration of our research. As part of that study, we hoped to use geophysical survey to assist us in identifying subsurface features that would provide materials suitable for dating. John Weymouth assisted us by conducting proton magnetometer surveys and data analysis at both Emergent Mississippian and Mississippian sites in this region (Weymouth 1982), most of which showed considerable promise.

Real progress in our use of geophysical survey techniques during limited archeological testing was realized at the Shawnee Creek site (Lynott and Price 1989). Initial testing at this site revealed the presence of a burned, rectangular wall trench house, characteristic of the later Mississippian stage, but dating to the Emergent Mississippian, twelfth century A.D. Our goal was to identify other houses or features that might provide datable materials and diagnostic material culture relating to the Emergent Mississippian occupation.

We surveyed three 20-m by 20-m blocks adjacent to the burned house. Dr. Weymouth requested two surveys at this site. One was conducted with the magnetometer sensor 60 cm above surface, and the second survey was conducted with the sensor 30 cm above surface. This was done with two Geometric G856 Memory Magnetometers. The two surveys with different instrument heights effectively simulated a gradiometer survey, and they eliminated some broad geological trends present at the site.

In his analysis of the Shawnee Creek data, John identified fourteen anomalies of possible archeological significance (Weymouth 1988). The Center returned to the site a year later and tested five of the identified anomalies. Four of these proved to be features associated with the Emergent Mississippian occupation. No feature was identified at the location of the fifth anomaly, but this may be due to its location on the edge of the survey grid.

It is possible that the feature does indeed exist just outside the magnetic survey grid. Our excavation unit should have been extended to the east. However, the overall results of the magnetic survey were extremely satisfying. We were able to economically and effectively locate subsurface features at the Shawnee Creek site and greatly reduce the amount of time spent in the field trying to locate suitable features.

Ohio Hopewell

John Weymouth's introduction to Ohio Hopewell came in the late 1970s, when a crew from the Midwest Archeological Center collected magnetometer survey data from three 20-m by 20-m blocks at Seip and from a single block at Harness. John analyzed the data and identified anomalies that might be of archeological significance. More recently, John has been working closely with the Center and Dr. N'omi Greber on a variety of geophysical survey projects associated with Hopewell mounds and earthworks in southern Ohio.

In 1994, the National Park Service initiated a five-year study of Hopewell culture in Ross County, Ohio. Ohio Hopewell is best known from the large, geometric earthwork complexes in the Scioto River valley in southern Ohio. Within this region, Ross County contains many impressive earthwork sites, and it is the location of Hopewell Culture National Historical Park. Although many Hopewell sites were carefully documented as early as the middle of the nineteenth century (Squier and Davis 1848), annual cultivation has severely impacted many of these sites.

Consequently, the multi-year study initiated by the National Park Service was designed to document the existing conditions at these sites and to develop techniques that could be used to record and interpret mounds and earthworks without further damage to these features. Geophysical surveys were proposed to relocate earthworks and mounds that are no longer visible today, and to study the extent and structure of mounds visible today.

Our five-year s United States Court of AppealsFOR THE SECOND CIRCUITDocket No. 00-6066------------------FELIX BLONDIN,Petitioner-Appellant,- v. -MARTHE DUBOIS,Defendant-Appellee.---------------------BRIEF FOR AMICUS CURIAE UNITED STATES OF AMERICASUPPORTING PETITIONER-APPELLANT AND SUPPORTING REVERSAL---------------------Preliminary StatementPursuant to 28 U.S.C. § 517 and Rule 29 of the Federal Rules of Appellate Procedure, the United States submits this brief as amicus curiae to express its views on the Hague Convention on the Civil Aspects of International Child Abduction (the "Hague Convention" or the "Convention"), Oct. 25, 1980, T.I.A.S. No. 11670, implemented by the International Child Abduction Remedies Act (the "ICARA"), 42 U.S.C. §§ 11601-11610.INTEREST OF THE UNITED STATESThe Hague Convention is designed to “protect children internationally from the harmful effects of their wrongful removal or retention and to establish procedures to ensure their prompt return to the State of their habitual residence.” Hague Convention Preamble. The Department of State has long been involved in the difficult human, legal, and diplomatic problems surrounding international parental child abduction. The Department of State represented the United States at the negotiation of the Convention, and was instrumental in proposing its implementing legislation to Congress. (A237). The Department of State has also attended periodic international meetings to review the operation of the Convention. (A237-38).The Hague Convention requires each party State to designate a "Central Authority" to cooperate with its counterparts in other party States to "secure the prompt return of children and to achieve the other objects of this Convention." Hague Convention, arts. 6, 7. The Department of States' Office of Children's Issues is the designated Central Authority in this country. 22 C.F.R. § 94.2.\* To facilitate the proper functioning of the Convention, the Office of Children's Issues carries out an active program of communications with private applicants, other Central Authorities, and, where appropriate, courts in the United States and abroad. (A238). The Department of State has a strong interest in promoting the proper operation of the Convention to ensure that the United States complies with international treaty obligations. (Id.). To the extent that other party States consider erroneous the United States courts’ application of exceptions to return under the Convention, the United States may find its views on questions of Convention interpretation accorded less weight. Blondin v. Dubois, 189 F.3d 240, 248 & n.7 (2d Cir. 1999) ("Blondin II"). As succinctly stated by the Hague Convention's official reporter, in language adopted by this Court, any "'systematic invocation of [these] exceptions, substituting the forum chosen by the abductor for that of the child's residence, would lead to the collapse of the Convention by depriving it of the spirit of mutual confidence which is its inspiration.'" Id. at 246 (quoting Elisa Perez-Vera, Explanatory Report: Hague Conference on Private International Law, in 3 Acts and Documents of the Fourteenth Session 426 (1980) ("Perez-Vera Report")). The standards applied in United States courts will thus inevitably influence the standards we can demand from other countries with respect to returning children to the United States.\* (A238). In sum, the United States Department of State has a substantial interest in ensuring that the Convention is interpreted correctly in the courts of this country. Moreover, in light of the Department of State's involvement in the negotiation and operation of the Convention, the Department's interpretation is entitled to substantial deference. See Sumitomo Shoji Am., Inc. v. Avagliano, 457 U.S. 176, 184-85 (1982).Issues Presented for ReviewThe United States will address the following:1.Whether, in refusing to return two abducted children to France, the district court misconstrued the exception to return under Article 13(b) of the Hague Convention.2.Whether the district court erred in taking into account the views of one of the children, who is eight years old.STATEMENT OF THE CASEA. The Hague ConventionThe Hague Convention was adopted to deter parents from abducting children across international boundaries in the hope of securing a court sympathetic to their position regarding custody. H.R. Rep. No. 525, 100th Cong., 2d Sess. 1-2 (1988), reprinted in 1988 U.S.C.C.A.N. 386, 386-87; see also Blondin II, 189 F.3d at 246. The Convention applies to all children under sixteen habitually resident in any of the party States. Hague Convention, art. 4. Both the United States and France are parties to the Convention. Blondin II, 189 F.3d at 244.Under the Convention framework, "'a United States District Court has the authority to determine the merits of an abduction claim, but not the merits of the underlying custody claim.'" Blondin II, 189 F.3d at 245 (quoting Friedrich v. Friedrich, 983 F.2d 1396 (6th Cir. 1993) ("Friedrich I"), and citing Hague Convention, arts. 16 and 19); see also 42 U.S.C. § 11602(b)(4). To obtain return of a child to its country of habitual residence, the person seeking return must prove only that the abduction was "wrongful" within the meaning of the Convention. Blondin II, 189 F.3d at 245 (citing 42 U.S.C. § 11603(e)(1)(A)). Once wrongful removal is established, the child must be promptly returned unless one of four narrow exceptions set forth in the Convention applies. Id. (citing Friedrich v. Friedrich, 78 F.3d 1060, 1067 (6th Cir. 1996) ("Friedrich II"), and 42 U.S.C. § 11601(a)(4)).Of the four narrow exceptions to return, the exception relevant to this action permits a court to refuse return where the abductor demonstrates by clear and convincing evidence that "'there is a grave risk that [the child's] return would expose the child to physical or psychological harm or otherwise place the child in an intolerable situation.'" Blondin II, 189 F.3d at 245 (quoting Hague Convention, art. 13(b), and citing 42 U.S.C. § 11603(e)(2)(A) for "clear and convincing" standard). In addition to the four stated exceptions, the Convention also permits a Court to "'refuse to order the return of the child if it finds that the child objects to being returned and has attained an age and degree of maturity at which it is appropriate to take account of its views.'" Id. at 246 n.3 (quoting Hague Convention, art. 13). Each of the four exceptions to return, as well as the provision for taking account of an older child's objection, must be construed narrowly to avoid frustration of the Convention's purpose. Id. Thus, even if an action falls within an exception to return, the court may nonetheless order return if return is consistent with the interests represented by that exception, and the court should look for ways to order return. Id. at 246 n.4, 249-50.B.Prior Proceedings1.FactsAs initially found by the district court, the facts regarding the children's lives in France are in substance as follows: Marthe Dubois and Felix Blondin, French nationals who have never married, began living together in France after 1990. Blondin v. Dubois, 19 F. Supp. 2d 123, 124 (S.D.N.Y. 1998) ("Blondin I"). Marie-Eline was born to them in 1991, id., and Francois in 1995, id. at 125. Both children were born in France and resided in France with Dubois, her older son, Crispin, and Blondin, until Dubois brought them to the United States in August 1997 without the knowledge or consent of Blondin. Id. at 124-25.From 1991 through 1993, Blondin beat Dubois on various occasions, including when she was holding Marie-Eline, and at one point wrapped an electrical cord around Marie-Eline’s neck and threatened to kill Marie-Eline and Dubois. Id. at 124. During 1992 and 1993, Dubois and Marie-Eline periodically lived in a series of battered women’s shelters. Id. at 124-25. In 1993, apparently during a separation from Dubois, Blondin applied for custody of Marie-Eline in a French court. Id. at 125. In December 1993, Blondin and Dubois reconciled, and the French court terminated the custody case with an order giving custody rights to both parents, and indicating that the principal residence of the child would be with the father, while the mother would have visiting and sheltering rights. Id.After the reconciliation, Dubois started living with Blondin again, the physical abuse resumed, and Francois was born. Id. Dubois once threatened to throw Francois out the window and often threatened to "kill everyone." Id. In August 1997, Dubois forged Blondin’s signature on passport applications for the children and brought the children to the United States without informing Blondin. Id.2.Court ProceedingsOn June 19, 1998, Blondin filed a petition under the Convention seeking the children's return to France. Blondin I, 19 F. Supp. 2d at 126. On August 17, 1998, the district court dismissed Blondin’s petition, denying return of the children to France under Article 13(b) of the Convention. Id. at 127-29. The holding denying return was based primarily on a "grave risk of harm" of abuse by Blondin. Id. at 127-28. In addition, the district court noted that the children appeared to be well-settled in the United States. Id. at 123. Without making a finding whether Marie-Eline had reached a sufficient age and maturity to have her views considered, see Hague Convention, art. 13, the district court also noted that the child expressed a preference for remaining in the United States, id. at 128-29.On August 17, 1999, this Court vacated the district court's judgment and remanded the action with the direction that, in applying the Article 13(b) exception to return based on grave risk of harm, the district court consider "the range of remedies that might allow both the return of the children to their home country and their protection from harm, pending a custody award in due course by a French court with proper jurisdiction." Blondin II, 189 F.3d at 249. This conclusion was premised on the Court's review of the Hague Convention's purposes, and, in particular, the Convention's goal of having children returned to their place of habitual residence for custody determinations. This Court thus held that, in cases under the Hague Convention, courts should make every effort to explore ways to protect children from harm "while still honoring the important treaty commitment to allow custodial determinations to be made -- if at all possible -- by the court of the child's home country." Id. at 248. This Court did not disturb the factual findings regarding Blondin's abuse, and acknowledged the district court's conclusion that returning Marie-Eline and Francois to Blondin's custody would expose the children to a "grave risk of harm" under the Convention. Id. However, this Court made clear that the "other two ancillary considerations" articulated by the district court, namely, that Marie-Eline expressed a preference to remain here, and that both children appeared well-settled, were not appropriately relied upon under Article 13(b). Id. at 247. With respect to Marie-Eline's views, this Court held that consideration of a child's views on return was a separate matter that was not part of a "grave risk" analysis, and stated that, before considering such views, a court would have to make a finding that the child had obtained an appropriate degree of age and maturity. Id. Similarly, this Court found that a child's becoming "well-settled" was a separate exception, governed by Article 12 of the Convention and requiring as a predicate that the children be in the receiving State more than one year before the filing of a petition for return. Id. The Court commented that it would not rule out the possibility that a child could become so deeply rooted in the United States that return would then pose a "grave risk" of harm within the meaning of Article 13. Id. However, the Court also noted that the record before it did not present such a case. Id.The case was then remanded to the district court with instructions to explore ways in which the children could be returned to France yet still be protected from abuse. Id. at 250. In its concluding paragraph, this Court made plain that the district court should deny the petition for return of the children to France only if there were no reasonable means of repatriation that would not effectively place the children in Blondin's immediate custody. Id.Following remand, the district court sought information on available options in France if the children were returned there. (A60-61). In addition, the district court determined that it would receive evidence on whether the children in this case had now become so "deeply rooted" in the United States that return would subject them to a "grave risk of harm" under Article 13(b), and on whether Marie-Eline had now obtained an age and degree of maturity such that it would be appropriate to take account of her views. (A69-71). On December 20, 1999, the district court held a hearing during which it received evidence as to all of these issues. (A270-409). On January 12, 2000, the district court issued its opinion. Blondin v. Dubois, 78 F. Supp. 2d 283 (S.D.N.Y. 2000) ("Blondin III"). The district court acknowledged that Blondin, in enforceable undertakings, had agreed not to enforce his right to custody pending new proceedings in France (which could take between one and three months), and had offered to pay for the return of the children and their mother. Blondin III, 78 F. Supp. 2d at 288-89. In addition, Blondin undertook to absorb the cost of temporary lodgings while the mother and children applied to the French government for more permanent housing, financial support, and other social services, and for free legal assistance (all of which Dubois is eligible for). Id. The district court also found that, if there were immediate danger to the children, Dubois could seek an immediate protective order from a juvenile justice in France, granting her temporary custody. Id. at 288 n.5. In addition, the district court noted an agreement by the French government that, if Dubois returns to France, she will not be criminally prosecuted for the abduction. Id. Based on these facts, the district court stated that it had "every confidence in the ability of the French administrative and judicial systems to protect and support [the children] pending the adjudication of the custody case." Id. at 299. Nonetheless, the district court again refused return based on the "grave risk" exception in Article 13(b). The district court openly questioned the wisdom of the narrow reading given to the "grave risk" provision in this Court's prior opinion. Id. at 297-98. The district court then concluded that, even if it were to apply that narrow interpretation, the standard would be satisfied here because "any repatriation arrangements, including even the return of the children in their mother's temporary custody with financial support by Blondin and French social services, would expose Marie-Eline and Francois to a 'grave risk' of psychological harm." Id. at 285. This conclusion was based on the testimony and report of psychiatrist Dr. Albert Solnit -- accepted by the court in full, id. at 290 -- that separation from their new home and extended family, and return to a country where they were abused, amidst the uncertainties of custody proceedings, would exacerbate the trauma suffered by the children due to the abuse, and would interfere with their psychological healing. Id. at 291-92, 295-96. In addition, "as one of the several reasons why I am invoking Article 13(b)," id. at 296, the district court found that Marie-Eline, at age eight, "'has attained an appropriate age and degree of maturity at which it is appropriate to take account of her views,'" id. at 296 (quoting Article 13 of the Convention). The court added that, "[a]lthough her views are by no means dispositive," Marie-Eline did not want to return to France "because she does not want to be subjected to further physical and emotional abuse at the hands of her father," id. Summary of ArgumentThe standard of review to be applied on this appeal should be plenary, as the issues present mixed questions of fact and law, and there is no dispute with regard to the district court's findings of historical and narrative fact. Moreover, appellate clarification not only of the legal standards, but also of their application to the facts, is appropriate. See Point I.A., infra. However, regardless of whether the Court considers the issues to be pure questions of law or mixed questions of fact and law, the result should be reversal of the district court's decision, as it contravenes the purposes of the Hague Convention and the specific direction of this Court. Instead of following this Court's mandate to seek to facilitate return, and in contravention of its own finding that the French authorities could protect the children from future abuse upon their return, the district court adopted testimony to the effect that the children's "best interests" and long-term psychological well-being counseled against their return to the country of France (as distinguished from return to the custody of their father). On that basis, the district court again incorrectly applied Article 13(b) and refused to order the children returned to France. See Point I.B., infra. Moreover, the district court included in its Article 13(b) analysis an erroneous interpretation of the separate Convention provision allowing a court to refuse return based on an explicit objection to return by a child of "appropriate age and maturity." That provision does not make a child's objection part of a "grave risk" analysis, but provides a separate basis to deny return if the requirements of the "objection" provision are met. Those requirements were not met here, as the child did not state an objection to return to France distinct from return to her father's custody. Moreover, the child was not of sufficient age and maturity independently to interpret her own interests and make the sort of determinative decision to which a court might give conclusive effect under Article 13. See Point I.C., infra.ARGUMENTTHE DISTRICT COURT’S FINDINGS REGARDING THEFRENCH SYSTEM'S ABILITY TO PROTECT THE CHILDREN FROM FUTURE ABUSE SHOULD HAVE LED TO AN ORDER OF RETURNA.Standard of Review In Blondin II, this Court did not address the standard of review to be applied in a case such as this, brought under the Hague Convention. In the United States' view, the appropriate standard of review is that applied by the Third Circuit in such cases: "plenary review of the [district] court's choice of legal precepts and its application of those precepts to the facts," with the clearly erroneous standard applied only to "the district court's historical or narrative facts." Feder, 63 F.3d at 222 n.9. Application of this standard would comport with this Circuit's practice in other types of cases raising mixed questions of fact and law.Ordinarily, this Court reviews the factual findings of the district court under the "clearly erroneous" standard, see Fed. R. Civ. P. 52(a), while legal conclusions are reviewed de novo, see United States v. McCombs, 30 F.3d 310, 316-17 (2d Cir. 1994). This has been the approach of all the courts of appeals to address the standard of review in Hague Convention cases, other than the Third Circuit. See Shalit v. Coppe, 182 F.3d 1124, 1127 (9th Cir. 1999); Lops v. Lops, 140 F.3d 927, 935 n.6 (11th Cir. 1998); Friedrich II, 78 F.3d at 1064.\* However, "[i]n a bench trial, . . . 'where the functions of fact-finding and exposition of law are performed by the same person, the line between the functions is not always distinct.'" McCombs, 30 F.3d at 317 (quoting American Societudy was also aimed at identifying possible settlements or habitation sites associated with the larger earthwork sites in Ross County. Although the earthworks and mounds have received considerable archeological attention, they did not appear to be used for day-to-day settlement, and very little was known about habitation sites associated with Hopewell culture. Therefore, we intended to identify, study, and interpret habitation sites and features **(Figure 1)** associated with the use and construction of earthwork complexes.

**Figure 1. Pit filled with fire-cracked rock, charcoal, and lithic debris at the Hopeton Earthworks, excavated in 1994.**

Geophysical surveys were an integral part of the project design, and John Weymouth was extremely helpful in developing a plan to incorporate geophysical surveys into this project. The first large-scale attempt at geophysical survey associated with this five-year study was undertaken at the Hopeton Earthworks, where two parallel walls have been obliterated by cultivation. In 1994, we established a grid near the edge of the terrace upon which the earthwork is constructed. John Weymouth directed field data collection for eight 20-m by 20-m blocks with a resistance system and three blocks with magnetometers **(Figure 2)**. About that time, John also worked with our colleague N'omi Greber on using both of these techniques at the High Banks site.

**Figure 2. Forest Frost conducting a resistivity survey**

**at Hopeton Earthworks, 1994.**

These surveys were somewhat successful in relocating one wall of the two parallel walls. Although no conclusive evidence was detected from the magnetometer data, the resistance data did indicate a linear area of low resistance angling about 55 degrees east of north across the study area (Weymouth 1995). This is consistent with the location and bearing of these features as mapped by Squier and Davis (1848). Although the area of survey coverage was not large enough to have identified both of the parallel walls, it would appear that the feature, roughly 9 to 12 meters wide, is the remains of one of the walls.

John provided additional support and direction for geophysical study of mounds and earthworks in 1996, when he and Bruce Bevan and N'omi Greber joined us for multi-instrument studies of two mound sites at Wright-Patterson Air Force Base near Dayton, Ohio. The study was funded by the U.S. Air Force and the National Park Service and was intended to determine whether geophysical survey methods could be used to investigate the structure, content, and condition of mounds and earthworks (Lynott 1997). John Weymouth's role in this study was to advise on the design, scheduling, and implementation of the study, and to direct the collection of gradiometer and soil resistance data.

The Wright-Patterson study is important because it represents one of the few studies where geophysicists and archeologists have collaborated to deal with the problems associated with topographic variability in the study of mounds and earthworks. The importance of developing non-destructive methods of studying mounds and earthworks has been recognized by archeologists for many years, and that need has been reinforced by the passage of the Native American Graves Protection and Repatriation Act.

Identification of habitation features from geophysical surveys has been a signficant theme in John Weymouth's research with the National Park Service for more than 20 years. Unfortunately, the nature of these features in Ross County Hopewell sites is poorly understood. Consequently, John's work to identify features at the Overly site has been quite important. The Overly site geophysical surveys were accomplished with two GEM GSM-19 Overhauser magnetomers and a Geoscan RM-15 resistance meter with twin probe configuration. The survey areas were identified by surface remains recorded during pedestrian surveys by Ohio State University.

Results of the geophysical survey of the Overly site were reported after an Ohio State University field school (Dancey 1997) stripped the plowzone from a 15 by 40 meter area and excavated 22 cultural features. John's analysis of this data (Weymouth 1996) focused on the size (as indicated by volume and quantity of fire-cracked rock) of features that were positively identified as geophysical anomalies.

Of particular importance from this study was John's recognition that smaller features did not produce sufficient magnetic signal to be recognized by surveys conducted at one-meter intervals. Consequently, John recommended that future surveys in this area be conducted at smaller intervals, thereby allowing identification of smaller archeological features. This led to our current project, which required a return to the area of the parallel walls at the Hopeton Earthworks that we investigated in 1994.

**Figure 3. Geophysical survey team at the Hopeton Earthworks. Left to right, front row: N'omi Greber, John Weymouth, and Steve De Vore; back row: Debra Wood, Bret Ruby, Phil Wanyerka, and Forest Frost. Not shown: Mark Lynott.**

In September 1997, John Weymouth, Steve DeVore, Bret Ruby, and N'omi Greber joined a Midwest Archeological Center field team **(Figure 3)** in collecting gradiometer and soil resistance data from twenty-seven 20-m by 20-m blocks along the edge of the terrace at the Hopeton Earthworks. Although the results of this survey are not yet available, it is worth noting that this represents one of the largest geophysical survey data sets collected from the eastern United States.

The study also incorporated John's concern for smaller data collection intervals, with a commensurate increase in data points, thereby making recognition of smaller features more likely.

The study also demonstrates the importance of using multiple instruments. While the RM-15 resistance system did produce some evidence of a large feature that appears to represents remnants of one of the parallel earthen walls, the two gradiometers used at the site did not produce evidence of these larger features. On the other hand, the gradiometers did appear to be more productive in collecting evidence of possible habitation features than was the resistance meter. It is our intent to return to this area in July 1998 to conduct excavations and to evaluate the data and interpretations resulting from continued geophysical surveys.

Conclusions

Those of us in the National Park Service who have had the good fortune to have worked with John Weymouth have learned a great deal about geophysical survey and its application to archeological research. We recognize the advances that John has made in refining methods and interpretations, thereby allowing us to derive more and better interpretations from geophysical data. However, it is likely that the real impact of John's work is yet to be fully understood. As geophysical survey techniques become an ever increasing component of archeology's research arsenal, it is likely that we will develop an even greater appreciation for what John Weymouth has done for archeology. His pioneering efforts have brought geophysical survey to the attention of the North American archeological community.

The staff of the Midwest Archeological Center is honored to have had the opportunity to work with John Weymouth over the last twenty years, and we look forward to another twenty years of participating in his productive and interesting geophysical study of archeological sites.

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