

# ENVIRONMENTAL RELATIONS BETWEEN INLAND RICE CULTURE AND THE COOPER AND WANDO RIVER WATERSHEDS, SOUTH CAROLINA

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**Abstract**—This study explains the geographical importance of the Cooper and Wando River watersheds, located east of Charleston (SC), in relation to inland rice cultivation during the colonial and antebellum periods. By focusing on the geological formation of this watershed, this paper will explain the connection between this plantation enterprise and the natural environment. The central South Carolina coastal plain physiography consists of a series of soil deposits during the Pleistocene. This topography provided a foundation for which free and enslaved rice cultivators lived and worked. By examining the spatial patterns of these actors in relation to the topography, this paper intends to show another chapter where the natural environment influences human action. Inland rice cultivation provided a foundation for the South Carolina colonial plantation complex and enabled planters' participation in the Atlantic economy, dependence on enslaved labor, and dramatic alteration of the natural landscape. Also, the growing population of enslaved Africans led to a diversely acculturated landscape unique to the Southeastern Coastal Plain. Unlike previous historical interpretations, which generalize inland rice cultivation in a universal and simplistic manner, this study discusses how agricultural systems varied from plantation to plantation. By explaining the importance of planters' and slaves' creative alterations of the inland topography, this interpretation will emphasize agricultural modes of production as ecological phenomena.

## INTRODUCTION

Reservoir irrigated rice cultivation provided the first successful plantation enterprise in South Carolina. Despite this agriculture mode of production serving as the foundation for the South Carolina colonial economy, Lowcountry inland rice cultivation has had an elusive history. Unlike the visible tidal rice embankments still existing along South Carolina tidal rivers, remnant inland fields are harder to find and many presently lie in overgrown wooded watersheds. Lack of cultivation has transformed the once carefully managed fields into second or third growth forests and wetlands. Few colonial documents remain that describe the cultivation technology. Nineteenth century narratives often confuse the more visible tidal method of producing rice with the earlier inland method. Relating to these incongruities is the understanding that inland, not tidal, rice cultivation initially drove rigorous importation of enslaved Africans to such an extent that South Carolina became a “black majority” by 1739 (Smith 2012).

This paper explains how planters both adapted to and altered the environment by planting rice in inland swamps during the colonial and early antebellum periods. By explaining the importance of planters' and slaves' creative alteration of the inland topography, this interpretation explains how attention to the environment can present

a more accurate understanding of the close relationship between Lowcountry cultivators and the land. By examining environmental relationships, this study can contribute to the broader understanding of African and European technology transfer in the New World and the use of multidisciplinary sources to help answer questions previously unattainable through traditional methods.

## INLAND RICE CULTIVATION

Inland cultivation began as a simple process for growing rice by controlling irrigation schedules on accessible sites. But as demand for the crop and land value increased, planters spent more energy expanding old inland fields and creating new inland rice environments. Planters had to creatively adapt a general cultivation model to the diverse landscape of the South Carolina Coastal Plain. This adaptation to the terrain forced planters to make each plantation unique to the environment in an effort to maximize available land for efficient rice cultivation. Also, cultivators had to work within the limitations of this environment by effectively managing water flow and lessening the impact of natural disasters. Reacting to the opportunities of the global economy, inland planters used enslaved labor to clear more land and maximize the crop's output. This practice encouraged the ever-expanding slave trade in South Carolina and diaspora of Africans through the New World.

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The basic inland rice field consisted of two earthen dams enclosing a low-lying area bordered by subtle ridges. Enslaved people built up the embankments with available fill from adjoining drainage trenches. The dam on higher elevation contained stream or spring fed water to form a reservoir, or a “reserve,” that would provide a water supply to the lower rice fields (Fig. 1). Once cultivators released water from the reservoir, a second dam retained this resource to nourish rice fields. Located between these two earthen structures was a series of smaller embankments and ditches to hold and drain water effectively during the cultivation process (Hilliard 1975).

Inland rice cultivation depended upon the simple flow of water from high to low ground, as water distributed from rainstorms and springs flowed down hill while watersheds pulled this resource into creeks and streams. Land level enough for rice cultivation, yet with sufficient angle to allow proper drainage, took shape throughout the South

Carolina Coastal Plain. Terrain in this region provided ideal situations for inland rice cultivation, for the Atlantic Ocean’s rise and fall during the Pleistocene (~2 million to ~ten thousand years ago) created fingers of small streams and creeks that spanned out from higher elevations, and merged into larger rivers flowing into the nearby ocean (Colquhoun 1969).

As the Atlantic Ocean’s shoreline slowly encroached and retreated, barrier island chains and corresponding tidal flats formed over the millennia to create scarps and terraces. Prehistoric terraces consisted of sand and shells, while the backside of these ridgelines consisted of clay loam from former tidal marshes and lagoons. Scarps serve as physical lines of demarcation between the terraces, forming from either erosion of the receding coastline or during the depositional stage of former barrier islands. Water’s movement through these facies coincidentally shaped the land, forming knolls, ridges, and troughs,

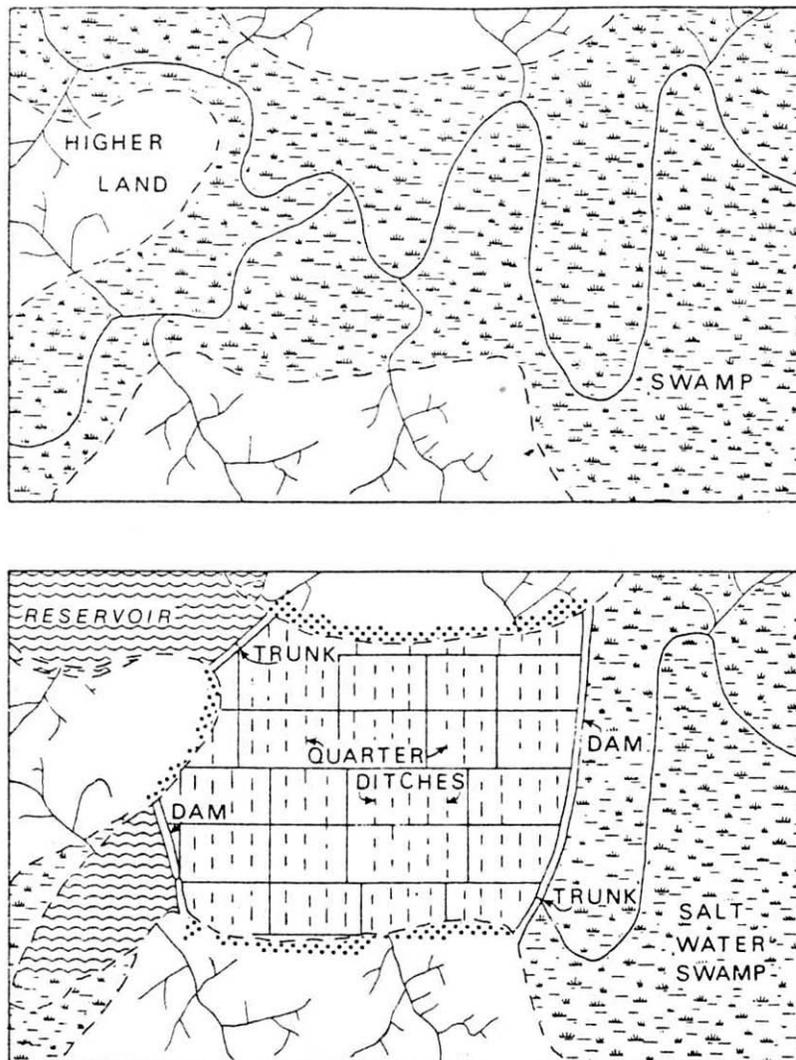


Figure 1—Basic inland rice field

which became critical features to rice plantations and the people who lived on them. Islands of high pine-lands lying within and around the plantations' swamps enabled planters to establish buildings and grazing fields on *terra firma* while creeks flowing around these landforms provided the water source and floodplain needed for inland rice cultivation. The early agricultural practices were necessarily ecologically diverse, as planters had to adapt their economic activities with the various microenvironments located on their property (Kovacik and Winberry 1989).

By focusing on specific examples located in the Cooper and Wando River watersheds, this paper will discuss how topography helped define irrigation patterns, field design, and settlement patterns. This spatial setting consists of the Eastern and Western branches of the Cooper River, converging with the Wando River to form the eastern half of the Charleston Harbor. Both rivers originate in the Lower Coastal Plain and flow relatively short distance compared to the neighboring Santee River, where headwaters begin approximately four hundred forty miles away from the coast. Including land covered by a 20<sup>th</sup> century hydro-electric dam project, the Cooper River flows approximately sixty miles and traverses four of the five Lower Coastal Plain terraces. The Wando River flows approximately twenty miles through just one terrace. Establishing inland rice cultivation systems in these terraces, planters and their enslaved laborers worked within the boundaries of these landscapes to create agricultural modes of production. At the same time, these topographical boundaries influenced settlement patterns and provided a pallet for inhabitants to construct a unique cultural identity.

Enslaved Africans' close connection to Lowcountry wetlands and small-stream floodplains provided access for individuals to express their cultural identity through subsistence agriculture. The close proximity of plantation settlement highlands and low-lying wetlands enabled seventeenth century slaves to construct nearby rice fields "on the plantation periphery" (Carney and Rosomoff 2009, Price 1991). Early plantation settlement patterns consisted of the plantation owner and enslaved houses within close proximity on highland knolls or ridgelines. The Lowcountry topography's highland swells caused by Pleistocene deposits and resulting erosion, created a landscape surrounded by bays, streams, creeks, and rivers. Slaves' necessity to grow crops for survival challenged them to use available land. For select West Africans transplanted in this New World environment, nearby wetlands provided similar spatial zones for growing rice. Relying on cultural memory, these enslaved cultivators constructed embankments for where they could grow patches of rice in similar fashion to their homeland. Also enslaved laborers' presence cutting cypress or herding

cattle in swamps enabled them to become more familiar with wetland hydrology. As Peter Wood (1974) notes, these "black pioneers" were a mobile population that negotiated through Euro-American void swamps by tending to their enslaved duties. As part of the "numerous aspects of their varied African experience" that took place in the Lowcountry, rice became one of many subsistence crops grown upon the unwanted land.

Early eighteenth century planters relied on small tributaries' definable floodplains to experiment with modes of irrigation control found in dams, embankments, ditches, and drains. By 1716, René Ravenel used a limestone spring, formed from a downdip in the Floridian aquifer system, to irrigate his Pooshee Plantation rice fields. Occurring more frequently in the Penholoway Terrace, these artesian springs, or fountains by the local residents, provided consistent water flow for rice plantations throughout the Biggin Swamp community. Pooshee Springs was one of six notable fountains bordering the basin that established this area as one of the central rice zones in colonial South Carolina (Smith 2012). In turn, as Max Edelson described, enslaved labor "made comparatively simple alterations to the land that took advantage of the existing contours of its topography" (Edelson 2006). Slaves dug into Pooshee's gray, sticky sandy clay loam and threw a dam between the higher fine sandy loam to form a reservoir. Up to seventeen slaves then constructed a second dam to impound spring fed water and maintained the modest twelve-acre enclave.

Towards the coast, the Princess Anne Terrace's brackish tidal rivers presented new challenges for early rice cultivators. Because the terrace complex's close proximity to the ocean, Princess Anne began at sea level with a gently inclined slope up to twenty feet (Willoughby and Doar 2006). The ocean's incoming tide pushed a salt wedge of brackish water against the downward flowing rivers. While freshwater hydrology became a critical component for tidal irrigation on the Cooper River, the Wando River's limited watershed did not generate enough flow to initiate this hydraulic machine. Millennia of the Wando's ebb and flow through the maritime floodplains created an interwoven chain of creeks and tributaries. To utilize this environment, planters had to construct earthen barriers to prevent the brackish tidewater from flowing into these low-lying watercourses.

Richard Beresford's use of a circumventer shaped network of tidal creeks on Charleywood Plantation represents how planters initially attempted to cultivate this environment. Charleywood rice fields contained the basic structure as discussed at Pooshee, yet the lack of elevation change on the Wando River floodplains created different aesthetic. Whereas Pooshee Swamp consisted of a relatively straight watercourse from the spring, Charleywood's

tidal creeks came from multiple directions, wrapping around subtle highland knolls, and converging in Guerin Creek. Pooshee's rice field consisted of a single system of two dams bordering the rice. Charleywood, however, relied on dams to partition seventy-five acres into seven field divisions that allowed improved irrigation control compared to flooding a single unit. Five divisions average five acres apiece, while the remaining two garaged twenty-five acres apiece. Because early inland fields were limited to narrow watercourses, their acreage did not compare to later tidal systems sprawling across broad floodplains. However, early inland cultivators still had to pay attention to subtleties of the land, realizing when an impounded field was too big to effectively draw water on and off the fields. By subdividing the fields, even in situations where water directly flowed from one field to the next, cultivators could manage the amount of water volume on individual plots flooding the entire crop more consistently in shorter distances with a low elevation run compared to one elongated field with a greater elevation change. However, irrigation problems resulted from people having to flood each division in order from the lowest elevation to the highest elevation. This process offered little flexibility in flooding individual sections as lower fields had to rely on water impounded upstream (Smith 2012).

By the mid-1700s, planters and their enslaved laborers began settling into new inland environments and expanding previously unaltered terrain. New agricultural methods emphasized that rice cultivators take command of water to secure flooding and draining of fields. Planters sought solutions to pressure of freshets breaching reservoir dams, plus enable systematic flooding and draining of fields. Flanking canals, dredged waterways that abutted exterior field embankments, optimistically provided an answer to this problem. These canals allowed cultivators to irrigate fields unilaterally through trunks without having to flow each division. Planters' ability to control water was essential when rice fields were on different cultivation schedules, either by a few days to over a month. Also, trunk minders could add or remove water as they saw fit without having to disrupt flood stages on adjoining fields. Staggering flood schedules avoided possible depletion of impounded water, as springs and creeks could recharge the reservoirs before the next flood cycle. During freshets, trunk minders could release excess water through the flanking canals, bypassing the rice fields, and relieving pressure on the back dam.

Planters understanding of water control coinciding with their motivation to increase rice acreage led to new methods to drawing water onto and off the rice fields. Windsor Plantation represented how flanking canals took shape. Windsor's fields fit within the tight boundary of the Nicholson Creek floodplain. The elevation

difference between pineland communities and the cypress hardwood forest varied between thirty to forty feet within one thousand feet, as the Bethera Scarp's geological "unconformities" allowed Nicholson Creek to gorge out steeper "landscape gradients" compared to the Penholoway and Queen Anne Terraces. (Colquhoun 1965) The watershed's has a dramatic elevation change compared to the five to ten foot elevation decline in the same one thousand foot increment along the Cooper River tidal floodplains. Through the eighteenth century the Roches optimistically surveyed four divisions within the confines of the scarp to the northwest and the Talbot plain's highlands to the southeast. Yet they has one division of forty-five acres developed for rice cultivation with twenty-four "mostly country born" people under their control. (Anon. 1784) The Roches relied on the predominant knoll forming Nicholson Creek's southern boundary to contain the inland rice fields. Forming a crescent shape around a forty-foot bluff, Nicholson Creek connected with Turkey Creek to form the Huger Creek and serve as the headwaters of the Eastern Branch of the Cooper River. This bluff served as an optimal site for the Windsor house, slave settlement, and outbuildings.

By 1725, Patrick Roche of Windsor Plantation ordered twelve enslaved labors to sculpt fields out of the Nicholson Creek cypress bottomlands. Fishbrook Field, named after the neighboring plantation on Turkey Creek, was the result of cutting trees, removing cypress stumps, and shaping forty-five acres of land. Nicholson Creek's meandering channel passed the Fishbrook Field's western border, separated by an earthen embankment. The Roches then diverted the creek away from the middle of the floodplain by embanking a fifty-five acre division and channeling water into a flanking canal (Fig. 2). Unlike Fishbrook Field, the second field division impeded the natural watercourse with an earthen dam and then redirected the creek around the western perimeter (Windsor Plantation [Plat]. 1790). A variation of this system consisted of two canals flanking the fields on each side. Dual canals increased efficiency of moving water around fields during freshets and also providing additional flexibility flooding and draining individual divisions. Slightly higher elevation enabled planters to cultivated corn, peas, and indigo at additional provisional an economic crops.

As the mid-century Lowcountry plantation enterprise became firmly entrenched with Atlantic markets, inland planters began to initiate more aggressive irrigation practices from a combination from increased enslaved labor, acquired agricultural knowledge, improved canal networks, and suitable cultivated landscapes. As a result, developing inland field systems took on a new aesthetic moving away from small acreage with naturally fluid boundaries to larger field divisions with geometrically

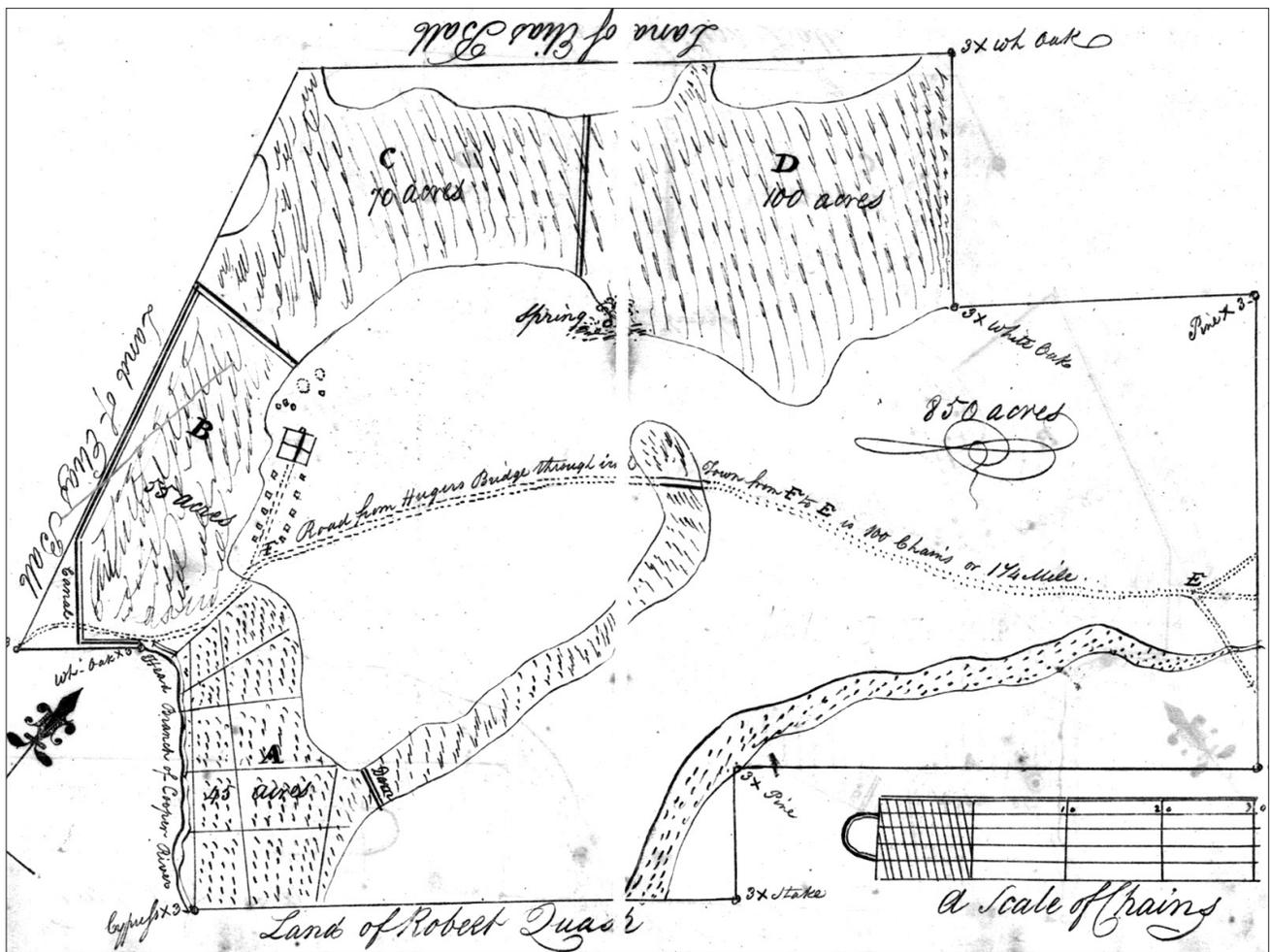


Figure 2—Windsor Plantation, with rice fields in division “A” and flanking canal wrapping around division “B”

rigid embankments. The changing aesthetic correlated with emerging tidal irrigation. By the latter half of the eighteenth century, Richard Beresford, Jr. depended upon upwards of two hundred fifty-three enslaved laborers to expand his Charleywood Plantation fields.

Beresford’s massive enslaved labor force carved an intricate grid-like formation of canals, ditches, embankments, and dikes over three hundred fifty acres, forming twenty-three field divisions that averaged fifteen acres apiece (Fig. 3). The new field system was built on older Pleistocene deposits, which consisted of more clay and shell to retain water compared to the plantation’s lower sandy loam field system. To irrigate Charleywood’s larger rice fields, enslaved cultivators relied on two reservoirs located on the Cainho Scarp. With a larger watershed of scale compared to earlier examples, the reservoirs impounded over forty acres of water flowing from meandering creeks and bays common to the Lower Coastal Plain’s scarps, where canals channeled the water in a linear downward motion.

Charleywood spatial patterns also shifted in relation to the plantation’s rice cultivation. Early Charleywood inhabitants lived on slightly elevated land located approximately one-tenth mile west and only four to five feet above the original rice fields, however the settlement was abandoned by 1772. According to one eighteenth century resident, planters built their homes on the “Edge of Swamps, in a damp moist Situation” because they wanted “to view from their Rooms, their Negroes at Work in the Rice Fields.” By overlooking developed agricultural spaces, planters’ views of progress, order, and labor management reflected the romantic perception of the inland landscape. However, early eighteenth century colonists did not understand the connections between malaria-carrying anopheles mosquitoes and low-lying habitats. What resulted from this ill perceived settlement pattern resulted in significant mortality rates. Approximately thirty-seven percent of white males and forty-five percent of white females born between 1721 and 1760 and surviving into adulthood in St. John’s Parish died before their fiftieth birthday. Charleywood’s



Figure 3—Charleywood Plantation, with new rice fields on top and old rice fields on bottom

Christ Church Parish offered more dire statistics, where eighty-five percent of all white males born between 1721 and 1760 and surviving into adulthood died before their fiftieth birthday (Merrens and Terry 1984).

By the 1770s, two new settlements appeared on the Charleywood landscape. The upper settlement, built in the Cainhoys Scarp's sandy pine flatwoods community, was more than likely relocated for healthier living conditions. Because Beresford was an absentee planter, the upper Charleywood settlement housed the plantation overseer and slaves. The other half of Charleywood's enslaved population also had to endure exposed and sickly conditions at the second settlement located in the middle of the new rice fields. The centrally located Bay

Hill settlement consisted of four houses, a corn house, a mite pen, and a sick house. Bay Hill residents lived on an isolated stretch of high land approximately one hundred feet wide and four hundred sixty feet wide nestled between the Fairlawn Canal and surrounding rice fields.

## CONCLUSION

Combining increasing water control projects and ever-expanding enslaved labor population with an established Lowcountry rice market economy and emerging tidal irrigation technology, inland rice field practices changed dramatically by the antebellum period. Where planters in these environments were limited by water control on and off their fields, the increasing network of canals and

drains made expanding field divisions more economically accessible. Yet enslaved African-Americans were forced to dam more streams for reserve water, dig up soil for earthen embankments, and cultivate more acres of rice. Studying places like Pooshee, Windsor, and Charleywood reveal the ecological complexity of these plantation systems. This form of rice cultivation not only required that cultivators maintain a critical understanding of how to grow rice, but also how to utilize the surrounding landscape to the best of their ability. Planters and slaves had to control water through floodplains, yet not fall victim to natural disasters, such as freshets or droughts. To see how these people dealt with water control provides a broader picture in understanding specific cultivation methods. This story moves beyond how people planted the crop, but also how they shaped the land within geographical limitations to effectively irrigate rice and develop settlement patterns. By connecting the larger environment with these specific micro-topographies, one may further understand how the Lowcountry topography played a role in shaping culture and society as a whole.

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