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Path Dependency in the Rise and Denouement of a Classic Maya City: The Case of Caracol, Belize

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ABSTRACT

With an anthropomorphic landscape that completely covered over 130 square kilometers with agricultural terraces in antiquity, Caracol, Belize provides an excellent place to review ancient resilience, rigidity, and path dependency. A population center with over 100,000 people in C.E. 700, Caracol subsisted on change and growth for its initial 1000 years of existence. However, Caracol also developed a relatively unique form of adaptation, one focused on establishing stability through social cohesion during its acme. These adaptations helped Caracol endure the changes wrought by climate change and inter-polity strife until the onset of the 10th century. At this point, elite mechanizations removed the well-established social buffers and Caracol succumbed to external political pressures that combined with environmental forces to create an untenable situation. Path dependency left the ancient Maya of Caracol unable to adapt to the ultimate threat posed by external changes beyond their control. [archaeology, Maya, agricultural terracing, path dependency, resilience]

The ancient Maya site of Caracol is located in the Vaca Plateau of west-central Belize in an area of undulating karst limestone covered by semitropical forest cover. With an elevation of over 500 meters, Caracol was one of the few large sites located within the southern Maya Lowland geographic area that is also situated at an elevation substantially above sea level. Its native soils were relatively thin and less well suited for agriculture than soils in the Belize Valley, and surface water was far less readily available than in areas to the north. Nevertheless, Caracol's population size and the physical extent of the city itself far exceeded that of most of its neighbors at the height of its occupation at approximately C.E. 700. Thus, its development and abandonment are of clear interest in considerations of the Maya human–environment interactions.

The development of Caracol was not without its hurdles. There were constraints to establishing a large population in the Vaca Plateau, particularly with regard to a general lack of surface water and the steeply sloped terrain. The Maya of Caracol achieved relative stability in this environment only through substantial investment of human capital in the construction of site infrastructure that included, but was not limited to, agricultural terracing, reservoir construction, and road systems. It can only be assumed that there were benefits for living in this location that reinforced these heavy investments, such as high rainfall; greater fertility with soil and water management through terracing; proximity to the Maya Mountains with natural resources such as granite, slate, and pine; distance from other large population centers; and a relatively defensible location for the site epicenter. The long-term resilience and stability of Caracol was built upon

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cultural adaptations and infrastructure that buffered the population at-large from changing climatic and external forces. These same adaptations reinforced social cohesion at the expense of elite wealth accumulation, encouraging population growth and prosperity. However, the system ultimately failed in the face of internal and external pressures. Without social and economic cohesion and continued investment in landscape management, Caracol could no longer grow or maintain its population; instead, site population declined and the site was abandoned. Thus, Caracol history provides examples of both successful innovation and less successful path dependent adherence to existing practices.

The relationships between environment, climate, society, and change are never clear-cut. However, the variables themselves are linked in ways that sometimes can be explicated through the archaeological record. Modifications made to the built environment at Caracol—particularly the construction of agricultural terracing for agriculture—appears to have set the polity on a trajectory of path dependency (e.g., Berkhout 2002; Kay 2005; Pierson 2000). Once committed to an agricultural strategy that locked the population into continuous landscape modifications and the stabilized placement of residential units, future responses to stress at Caracol became path dependent—largely driven by soil fertility, rainfall, and the spatial constraints of house and field constructions—with variability only in terms of management strategies that could be employed to both placate and integrate the site's population. In such a situation, drought conditions (e.g., Kennett et al. 2012; Luzzadder-Beach et al. 2012; Medina-Elizalde and Rohling 2012) as well as extremely wet or unpredictable conditions would have required a response in the socio-political arena (Turner and Sabloff 2012). The archaeological data from Caracol suggest that periods of drought inspired significant change in elite leaders and leadership strategies at the site. However, rather than causing adversity, elite management of Late Classic period drought conditions appears to have resulted in greater prosperity both in the site core and among its general population—at least in the short term.

Caracol's managerial elite used different strategies for the dispersal of prosperity to the general population at the beginning and at the end of the Late Classic period (C.E. 550–800). We suggest that these distinct strategies—one focused on dispersal of wealth and the other focused on limiting access to key status items—resulted in divergent societal outcomes. Thus, while the subsistence base for the Caracol population made the site extremely path dependent in terms of its possible responses to subsistence and settlement, other managerial elite choices were more open to change, resulting in two very different outcomes to periods of stress. In the earlier period of stress, the managerial elite focused the site on external warfare and then fostered the equitable division of the spoils. In the later period of climatic stress, a new elite also focused on the use of warfare as an integrating strategy for the site, but instead retained the spoils of war and developed greater divisions between the "haves" and the "have-nots." These later decisions further resulted in a lack of attention to the broader site infrastructure, a loss of faith in site leadership, and ultimately in site abandonment.

Path Dependency

The concept of path dependency refers to societal tendencies to continue following a course of action based on tradition and practice or short-term "least cost," even if other alternatives are possible and potentially more desirable in the long-term. Often, there is continued investment in old infrastructure rather than in replacement infrastructure. Once a society makes a specific commitment, it is difficult to change the path or trajectory that is followed, regardless of the outcomes. Path dependency has been defined as occurring under two conditions—contingency and self-reinforcement—and as causing a situational "lock-in in the absence of exogenous shock" (Vergne and Durand 2010:741). It may also be the path of least resistance.

The extensive investment in agricultural terracing evident in the Caracol environment was an innovation that permitted greater agricultural yields and population. However, it also set the city on a developmental trajectory of path dependency. Once it was established that landscape modification led to increased sustainability, further landscape modification followed. The consequences of this practice meant that settlement at the site became rigidified in its placement and spacing; housing units were constructed at a distance rather than in close proximity to each other, adequately spaced to allow sufficient agriculture land. Coincident benefits of this less crowded, low-density urbanism would have been lessened spread of epidemics. Most reservoirs were also placed close to housing in relatively high locations that would provide usable water suitable for drinking. Population increase led to urban sprawl and more landscape modification for terracing, leading to a form of low density urbanism (e.g., Fletcher 2011). But the reliance on agricultural terracing, combined with rigidity in settlement, also led to agricultural involution (Geertz 1963) in which more and more land and labor was required to keep the soils fertile and to maintain sustainable agricultural yields. At the same time, population growth and the need for household spacing required upkeep, enhancement, or new construction of roads and market locations to sustain the system for transporting

foods and services throughout the site and to the population. Thus, while the system was stable for a long period of time (Murtha 2009), it became more labor intensive and more stressed over time. It also meant that population growth necessarily led to the horizontal expansion of the site into land that was increasingly further from the site epicenter and was less easily manipulated because of topographic features. Management of the spatial area comprising Caracol would have become more complex over time, with Caracol's causeway system serving to integrate the site horizontally and to move necessary resources from the edges to the center. Thus, both climatic and social issues would have placed stresses on Caracol's managerial elite, but only the severest shock to the system would have ended the population's dependence on their long-enduring agricultural technology.

For Caracol, at least initially, the investment in landscape modification would have led to increasing agricultural yields and immediately produced a positive feedback loop. The ever increasing use of agricultural terracing at Caracol, in conjunction with causeway and market systems for distribution of any surplus, generated higher payoffs for the site's population, producing agricultural yields to support growing subsistence needs and elite infrastructure. Arthur (1994:112–113) has noted that when there are increasing returns for a given practice that unpredictability, inflexibility, and path inefficiency often follow. Initially, it is not clear where the adaptation will lead, but "in applications to technology, a given subsidy to a particular technique will be more likely to shift the ultimate outcome . . . and eventually lock in one solution" (Pierson 2000:253). Small events that occur near the beginning of the process will be reflected in future choices and "in the long-run, the outcome that becomes locked in may generate lower pay-offs than a forgone alternative would have" (Pierson 2000:253). As elaborated by Pierson (2000:254), Arthur (1994:112) pointed to four features of a technology and social context as generating increasing returns: (1) "large set-up or fixed costs" that "create a high pay-off for further investments in a given technology;" (2) "learning effects" in which "knowledge gained in the operation of complex systems also leads to higher returns from continuing use;" (3) "coordination efforts" in which "the benefits an individual receives from a particular activity increase as others adopt the same option" leading to "linked infrastructure;" and (4) "adaptive expectations" in which "projections about future aggregate use patterns lead individuals to adapt their actions in ways that help make those expectations come true." As a widespread technological adaptation, Caracol's agricultural terraces provide a ready example of path dependency that can be studied by examining the archaeological record.

Caracol: Site and Polity

In its final Late Classic period form, the continuous residential settlement of Caracol spread over some 200 square kilometers of the Vaca Plateau, and some 130 square kilometers of the site contained almost continuous agricultural terracing that had been constructed in support of a population of over 100,000 people at C.E. 650 (Figure 10.1; see also Figures 10.3 and 10.5). The Late Classic city was administered by means of solar causeways that articulated outlying administrative nodes and market centers directly with the site epicenter (A. Chase and D. Chase 2001a, 2007; Chase et al. 2011; D. Chase and A. Chase 2014). The epicenter itself was dominated by a massive architectural complex, called "Caana," that served as the hub for the royal family (A. Chase and D. Chase 2001b). Larger public architecture was embedded in the landscape and served as the infrastructure to help integrate and manage the site's population. A number of these monumental architectural concentrations or "nodes" occurred at distances of 5 to 8 kilometers from the epicenter. Formerly independent centers, the public architecture at these sites had been linked to the Caracol epicenter by means of causeways at the beginning of the Late Classic period (C.E. 550). When fully assimilated as a part of metropolitan Caracol, administrative-market plazas were appended to each of these nodes. A second concentration of large architectural plazas occurs at a distance of 3 to 3.5 kilometers from Caana. These, too, served as administrative-market plazas and were purposefully constructed at the onset of the Late Classic period, presumably to support the increasing population levels within the metropolitan area.

We have previously suggested that there was an optimal maximum size for lowland Maya polities; the area that can be effectively controlled is generally located within a 3-day march of the city capital (A. Chase and D. Chase 1998a; D. Chase and A. Chase 2003). In the Maya case this would have been an area roughly 60 kilometers in diameter (Figure 10.2). Thus, most strong Maya polities were capable of directly maintaining an area of approximately 7,000 to 9,000 square kilometers (A. Chase and D. Chase 1996a). We believe that hegemonic control could have extended a tribute area to ca. 30,000 square kilometers. However, larger polity sizes would have become increasingly unstable and likely would have been short-lived. Caracol's political history, as written in the hieroglyphic record and as known through survey and excavation, suggests that it was a strong polity that had extended hegemonic control of the southeastern Southern Maya Lowlands for approximately 50 years at the beginning of the Late Classic period.

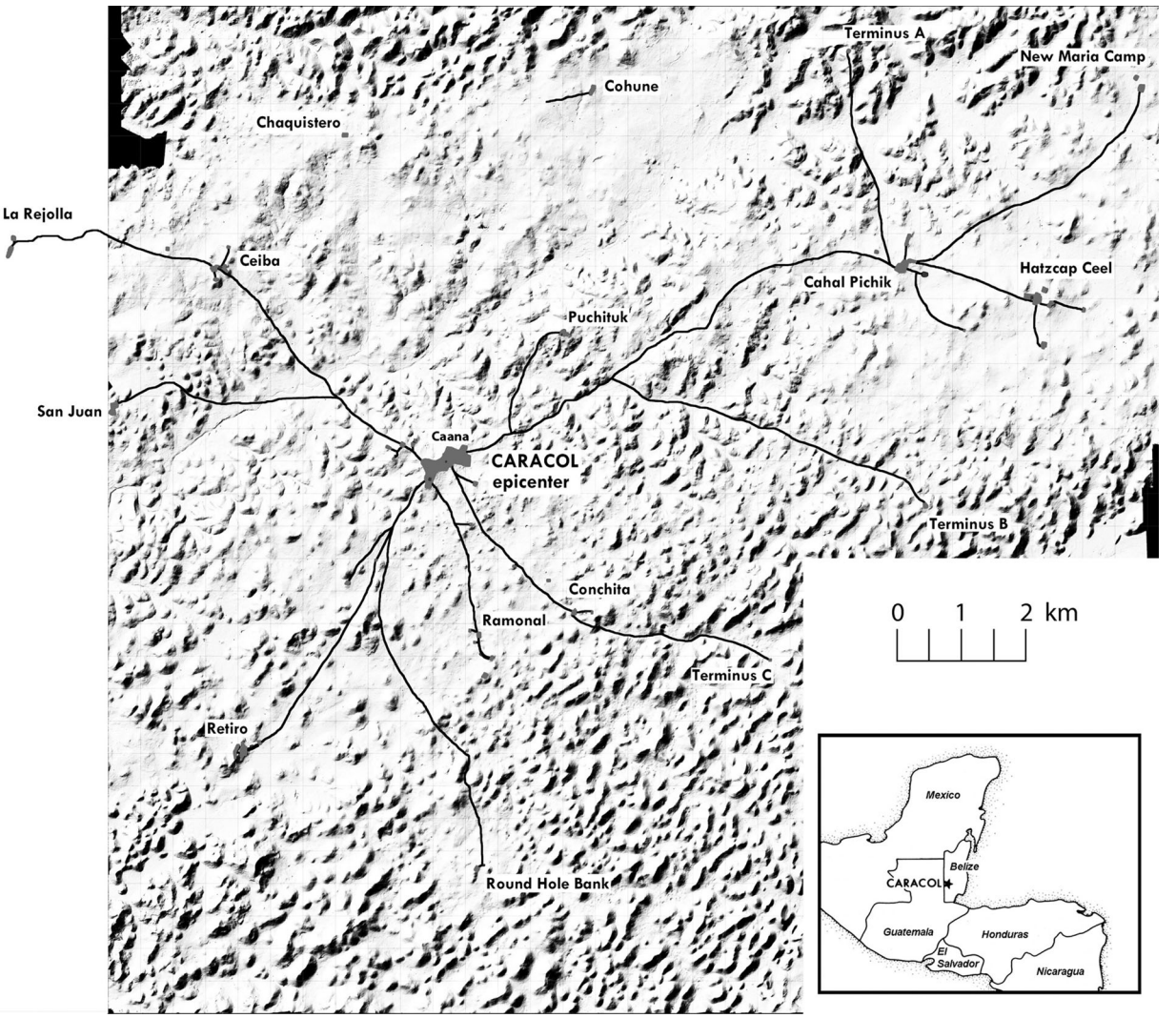

Figure 10.1. Caracol settlement area showing the locations of causeways, market termini plazas, and the epicentral construction of Caana.

Caracol: Site Development and Trajectory

Caracol was first occupied ca. 600 B.C.E. The site continued to be occupied to the onset of the 10th century, when the site epicenter was largely abandoned and burned. Major growth of the Caracol population took place in the first century C.E. Caracol was precocious in some of its developments. Radiocarbon dates indicate that architectural configurations called E Groups (also known as Commemorative Astronomical Complexes; see Laporte and Fialko 1995), as well as elaborate ritual caching and burials, predate their occurrence in what is typically considered the Maya heartland area in the Peten of Guatemala by some 300 years (A. Chase and D. Chase 1995). The last version of the Caracol E Group appears to have been constructed ca. C.E. 41 in celebration of the beginning of the 8th Baktun (A. Chase and D. Chase 2006). Caana reached a height of 38 meters around this same time. The emphasis on this complex suggests that Caracol was already important and had possibly expanded to incorporate the centers of Cahal Pichik and Hatzcap Ceel, both of which contain E Groups, into its borders by the end of the Preclassic era. The causeways linking these two outlying nodes to the Caracol epicenter are presumably among the earliest in the region.

The end of the Preclassic period, in a time sometimes called the "Protoclassic" time frame, ca. C.E. 0–250, was a time of transitions and population movements throughout the Maya Lowlands. Analysis of a speleothem collected from a cave 15 kilometers north of Caracol indicates that there was a drought peak throughout the Maya Lowlands at

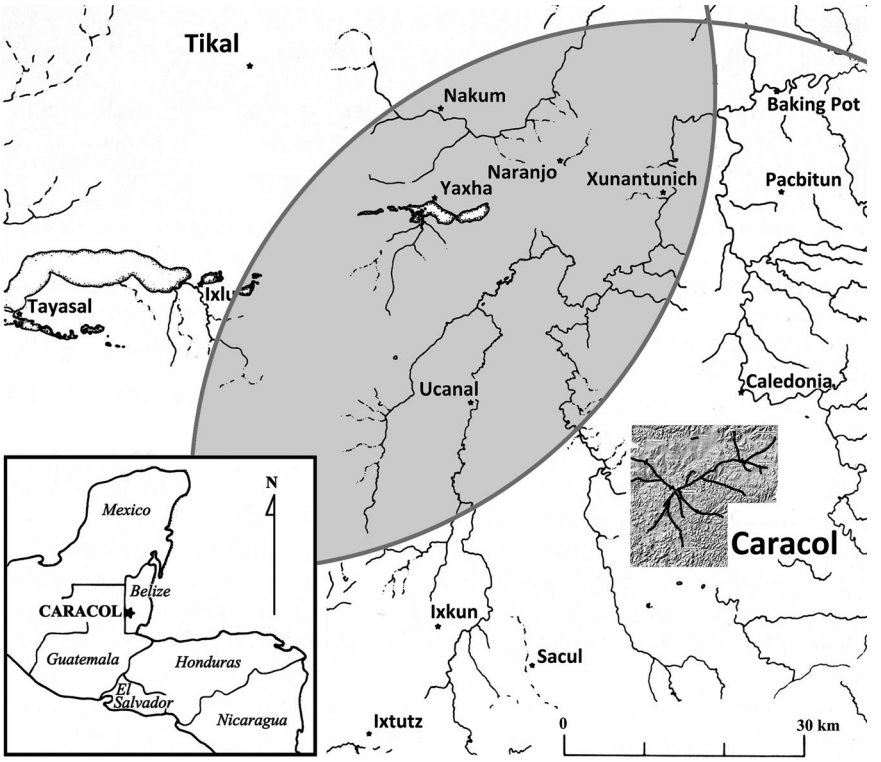

Figure 10.2. Southern Maya Lowlands showing the spatial relationship between Tikal and Caracol and the area of potential territorial overlap, which includes the contested Guatemalan sites of Naranjo and Ucanal. The causeway system of Caracol is indicated within the 2009 LiDAR DEM.

approximately C.E. 141 (Webster et al. 2007). If this drought were severe enough, it might have been responsible for some of the population movement that occurred within the Maya Lowlands during this era. The site of Mirador was essentially abandoned at about this time (Wahl et al. 2007:817) and Caracol may have been the beneficiary of population moving away from areas like the Mirador Basin. At least as early as 100 B.C.E. the occupants of Caracol had begun investments not only in monumental architecture, but also in the construction of agricultural terraces to maintain the soils and moisture necessary for intensive cultivation of inter-household fields (A. Chase and D. Chase 1998b). These agricultural fields were, for the most part, dependent on rainfall and the terraces served not only to redirect and control water flow over the landscape, but also to retain and store water that could be used by plants. The proliferation of constructed reservoirs within the broader settlement region likely also began at this time; there is no natural surface water within this portion of the Vaca Plateau. All of the early architectural concentrations within the Caracol region contain sizeable reservoir constructions that still hold water today, and constructed reservoirs were attached to dispersed residential groups as well (see Crandall 2009 and Chase 2012). While many of the mapped residential reservoirs are associated with Late Classic groups, it can be inferred that much of the earlier buried construction activities were also associated with reservoirs. The landscape manipulation and continuous rebuilding efforts that occurred at Caracol are, to some degree, mirrored in the lack of quarries at Caracol; these features surely existed, but are all now completely obscured beneath agricultural fields and other construction efforts. This early—and massive—labor investment in the built landscape may have helped protect Caracol's populations from fluctuations in rainfall, both through water capture and storage in reservoirs and through managed waterflow and retained moisture in the terraces.

From the end of the Late Preclassic period through the Early Classic period, Caracol was similar to many other lowland Maya sites in that there was stratification and a clear distinction between the elite and other members of Caracol society. Only the elite buried their dead in tombs and used long distance trade items that included imported pottery and jadeite. By the end of the Early Classic period, population levels at Caracol exceeded 30,000 individuals. However, there was sufficient space between household groups or at the edges of settlement to provide basic foodstuffs for the

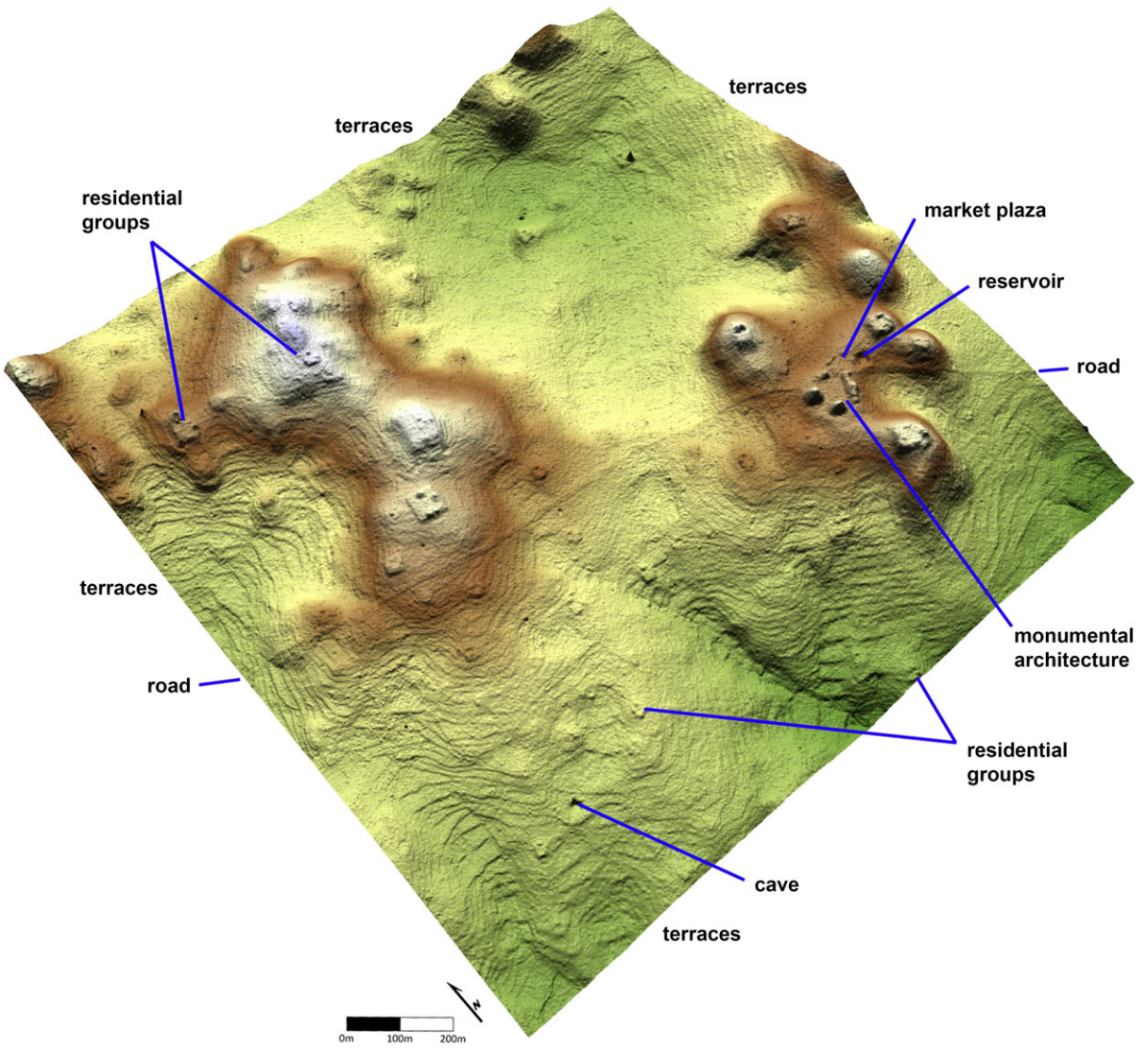

Figure 10.3. Caracol's modified landscape: the area in the vicinity of the Ceiba Terminus showing almost continuous terracing and settlement.

population. Social ties, trade, and migration also existed between Caracol and sites in the Maya heartland in the Peten of Guatemala as well as in the Guatemalan Highlands. Connections are evident in hieroglyphic texts and tradewares (A. Chase and D. Chase 2005). One interment suggests that prior to C.E. 350 there were at least limited ties to the central Mexican site of Teotihuacan (A. Chase and D. Chase 2011).

Caracol began to assert itself into the politics of the Maya lowlands in the 5th century and during the 6th and 7th centuries the balance of power in the eastern portion of the southern Maya Lowlands shifted. The rulers at Caracol established their authority and external control over this region through a series of wars with neighboring polities. The site was important enough to have provided the site of Copan, Honduras, with its founding ruler in C.E. 426/427 (A. Chase and D. Chase 2011; Price et al. 2010). Sometime after this, however, Caracol came under the sway of Tikal, Guatemala (Martin and Grube 2008). Drought conditions are recorded for the southern Lowlands between C.E. 490–580 with a peak at C.E. 517. Caracol appears to have used this climatic stress to strengthen itself politically. The city gained its political independence from Tikal, some 76 kilometers distant, through successful warfare in C.E. 562 and the population materially benefitted from this event (D. Chase and A. Chase 2003). From C.E. 631 through 680—despite periods of continued drought (Kennett et al. 2012)—Caracol maintained Naranjo, Guatemala, 42 kilometers distant, as

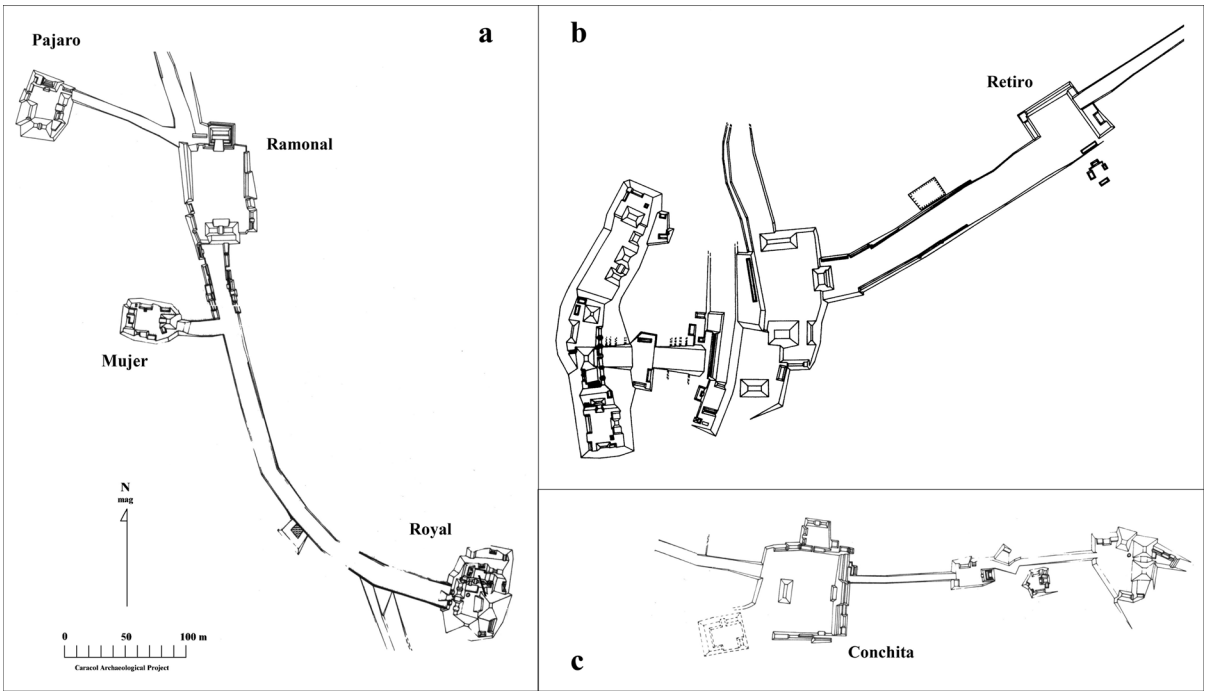

Figure 10.4. Examples of Caracol's market termini (plazas labeled "Ramonal," "Retiro," and "Conchita"); the large termini plazas functioned as markets for the distribution of goods and services to the site's urban population.

a second capitol (see Figure 10.1). As a smaller polity intermediate between Caracol and Tikal, Naranjo provided Caracol with the ability to expand its area of control beyond its own immediate 60 kilometer-radius—at least for a period of time. However, the integration of this larger territory into a broader Caracol polity was not sustainable, given the difficult and time-consuming nature of travel and communication by foot, especially given the hilly terrain and lack of inter-site causeways beyond Caracol-proper.

Immediately following this period of successful warfare, during the early part of the Late Classic period, a different socio-cultural adaption was created by Caracol's elite that did three things: promoted a self-sufficient environment; buffered the population from fluctuating external and internal forces; and served as a magnet for neighboring Maya. Caracol's population grew in numbers and prosperity. There appears to have been a substantial influx of population to Caracol; the site tripled in size to over 100,000 inhabitants by C.E. 700, likely drawn by Caracol's shared prosperity. The human capital that moved into the site was employed in the creation of additional agricultural terracing. Eventually, this terracing covered all areas with fields and completely modified the landscape (Figure 10.3). The system of causeways was extended, easing intra-site mobility and tying the epicentral and core populations together through a system of markets (Figure 10.4; D. Chase and A. Chase 2014). The Caracol urban system was self-supporting and infrastructure grew to meet demand. Spacing between households ensured both health and sufficient agricultural land for kitchen gardens and crops (Figure 10.5). As new population moved into the site, more agricultural terracing was added, and unpopulated areas were filled in with settlement. Water control features were also distributed throughout the landscape (Chase 2012). The result was a landesque-capital landscape (Fisher et al. 2009:10).

Practicing something we have termed "symbolic egalitarianism" (A. Chase and D. Chase 2009), the elite utilized labor to support their own lifestyle, but also re-invested capital in public works and in the inhabitants at-large. A large middle-status level developed in the population (A. Chase and D. Chase 1996b; D. Chase and A. Chase 1992). Caracol's inhabitants had access to basic commodities and luxuries from distant sites, including obsidian, polychrome pottery, jadeite, or spondylus adornments. Common ritual activity, whether the burial of the dead in tombs in eastern mortuary shrines or the interment of caches, was present throughout the urban community (D. Chase and A. Chase 1998, 2010, 2011). Other indicators of what appears to have been an intentionally constructed shared identity included a large percentage of the population with inlaid teeth (22%) and the household use of incense burners (D. Chase and A. Chase 2004). Thus, Caracol was a prime end-destination for

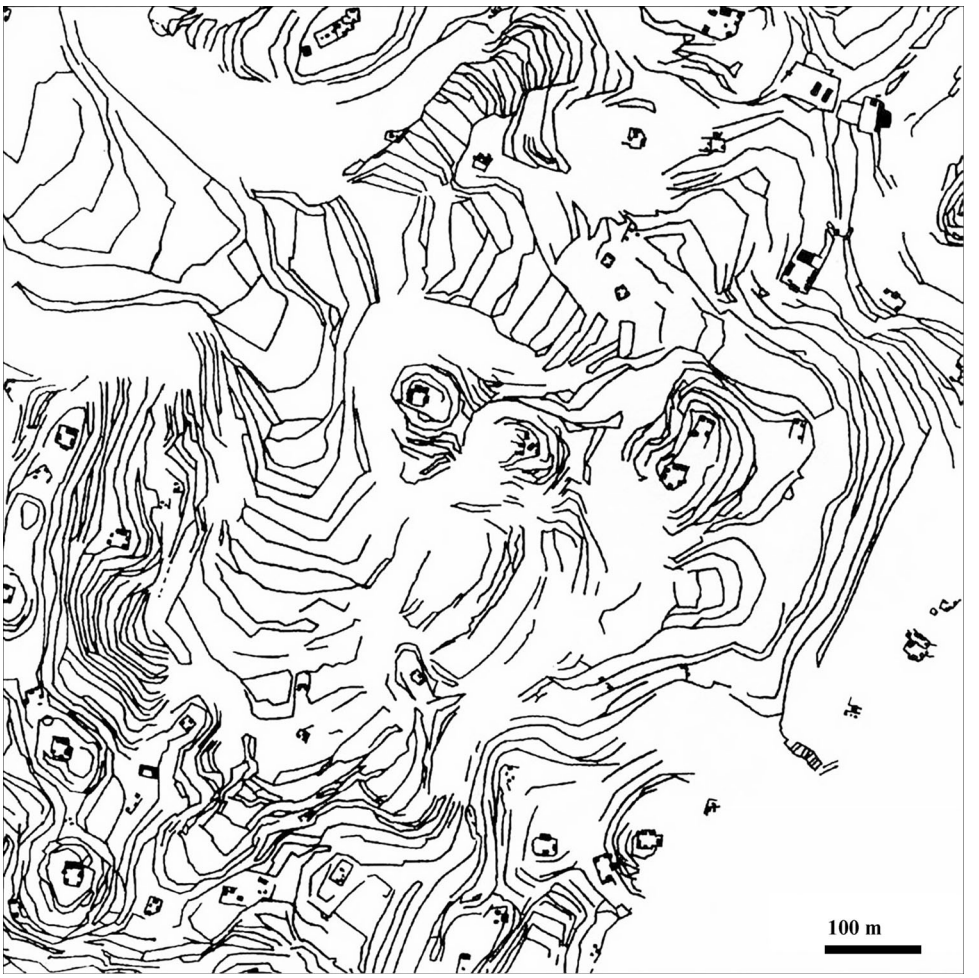

Figure 10.5. Caracol's urban settlement was both dense and fairly evenly distributed over the landscape in response to both health and agricultural needs; this is evident in the square kilometer of terraces and residential groups mapped some 5 kilometers northeast of the Caracol epicenter (after A. Chase and D. Chase 1998:figure 7).

population migration (e.g., Wright 2005), especially as the bulk of the people had access to items not available in other Maya polities. The influx of inhabitants further served te needs of the elite in building fields, roads, and constructions—and, also, through military service. These cultural adaptations, in conjunction with Caracol's built environment, provided resilience for almost two hundred years. However, maintaining Caracol's infrastructure and ensuring the prosperity of the population at-large came at the expense of the elite who, by C.E. 700, no longer monopolized wealth and trade items. Monument erection almost came to a halt in the early part of the 8th century and did not fully resume until C.E. 798. It is likely that a new form of government—one not focused on divine kingship—was instituted at Caracol after the death of K'an II in C.E. 680 (D. Chase and A. Chase 2003).

By the end of the 7th century, the site had pushed the boundaries of its polity size to beyond its "ideal" 60 kilometer radius. In C.E. 680, Naranjo regained its independence from Caracol, at which point it appears that Caracol subsequently focused on internal infrastructure rather than external control. Construction and remodeling of public buildings appears to have continued throughout the 8th century. The summit of Caana was raised over 4 meters and all of its buildings were remodeled sometime in the mid-8th century, but prior to the onset of the Terminal Classic period.

Drought has been noted as occurring in the southern Lowlands between C.E. 754 and 798,with a peak at C.E. 780 (Haug et al. 2003; Hodell et al. 2001; Hodell et al. 2005; Webster et al. 2007; Yaeger and Hodell 2008). Intriguingly, two important events may be correlated with this timespan. First, it is during this era that Late Classic royal

tombs at the base of the northern temple of Caana were ritually desecrated and then resealed. Second, Caracol's elite began re-erecting stone monuments in C.E. 798 with a new focus on dynasty and situating the new rulership within a broader Maya worldview (A. Chase and D. Chase 2007). Both of these events imply significant political change at the site. From the epigraphic record, we also know that successful warfare was waged against sites outside of Caracol's sphere, harkening to memories of an earlier era of profitable conflict at the beginning of the Late Classic period. While Terminal Classic monuments were erected from C.E. 798 through 859, rulers appear to have shifted on a regular basis, possibly reflecting a different organizational structure consistent with a non-dynastic *batabil* form of government known from the Postclassic northern Lowlands (Chase et al. 2009).

By C.E. 800, while there remained areas where terracing and housing could be built in the city's core area, these were mostly in less desirable steeply-sloped locations at some distance from the epicenter. At this point, the socio-cultural adaptation appears to have changed. As has been previously noted by van der Leeuw (2009:58), one characteristic of resilient systems is that they make mistakes from which they may not always recover; this seems to be the case at Caracol. One major change was that symbolic egalitarianism was no longer practiced. While elites continued to live in the epicenter palaces and to engage in long-distance trade with other parts of Mesoamerica, trade items were no longer evenly distributed. Two different types of pottery were in use at the site at the same time: one set used by the elite, and another by the rest of the population (A. Chase and D. Chase 2004). Construction efforts appear to have focused on rebuilding the downtown epicenter rather than site-wide infrastructure. Various construction projects were completed or set in progress. During the Terminal Classic period, the Northeast Acropolis was substantially raised and a host of minor building projects were carried out in the epicenter and particularly in the elite residential complex of Caana. Other, clearly unfinished, projects were archaeologically recorded in several locations. For example, just south of the epicenter was a huge agglomeration of Terminal Classic garbage—fill for what would have been a massive platform. Piles of building stones were stockpiled in front of Structure A7 and another stone stockpile was recovered in the Northwest Palace. Thus, a series of large-scale construction efforts were taking place in the site epicenter.

Ultimately, the situation was no longer adaptive. Importantly, however, the situation worsened over a period of nearly 100 years. The lack of infrastructure upkeep, of uneven access to trade items, and of a shared identity no longer provided the incentive for populations to remain invested in the workings of the polity. Without a readily available labor force, projects went unfinished. Other natural and human factors further set what had been a balanced system into disequilibrium. What was once a sustainable adaptation moved out of equilibrium. External forces had an impact on the site and polity. Increased warfare is evident. Stone monuments show both alliances with foreigners and acts of aggression against neighboring peoples. Sites within the 60 kilometer radius of Caracol were no longer directly under its sway, but instead became independent (e.g., Minanha—see Chapter 11 this volume and Iannone 2005). In spite of these pressures, the elite maintained their separation from the rest of society in diet and material remains. We suggest that they ultimately consumed more capital than the system could produce. Climate change, whether to wetter or to drier conditions, would have exacerbated an already fragile human–nature coupling. By the end of 9th century, the "downtown" epicentral area of Caracol was burned (D. Chase and A Chase 2000).

Much of the population abandoned Caracol at the transition from the 9th to the 10th centuries (D. Chase and A Chase 2000). Transformative relocation, described elsewhere in this volume by Nelson and his colleagues, was a factor. However, not all people moved—and, as at other sites, multiple factors likely weakened Caracol's infrastructure (Turner and Sabloff 2012). No substantial Postclassic period settlement exists in the immediate vicinity of Caracol. Rather, there appears to be movement away from the Caracol upland location to lowland coastal or riverine areas. The new settlement locations were both practical—in that they provided transportation and trade access—and symbolic—in that these locations were associated with the watery underworld (D. Chase and A. Chase 1989).

Conclusions

In sum, Caracol provides compelling lessons about the applicability of the past to the present and future. The story of this ancient polity is both uplifting and tragic. Late Classic Caracol is perhaps the best Maya example of positive human–environment interaction; at that time, the population of the city exceeded 100,000. The successful adaptation placed an emphasis on infrastructure and the creation of roads, on agricultural terraces, and on regular settlement distribution as part of a landesque capital landscape (Blaikie and Brookfield 1987:9; Fisher et al. 2009:10) —a landscape anthropogenically modified over the course of centuries to meet Caracol's varied social, economic, political, and ritual needs. The economic system, based on household production and market distribution, utilized labor for city and

polity-wide construction investments, and resulted in material well-being for all occupants at the site (even if there were differences between elite and commoners). The city and polity projected shared identity and symbolic egalitarianism, encouraging population movement from other areas. However, the failure of Caracol was also human-induced. Even if climate change was substantial, human actions—decisions to halt public service-oriented infrastructure construction and maintenance in favor of maintaining elite epicentral constructions and lifestyle—in direct contraposition to earlier strategies (as indicated above) set the stage for a downward spiral that needed very little to push things over the edge. The agricultural system placed the site on a trajectory of path dependence on a landscape that was maintained through social practices. While these human adaptations provided a buffer to external circumstances for some two centuries, the Terminal Classic changes that were instituted—changes that took place over the course of a 100 year time-span—left Caracol unstable and exceedingly vulnerable to collapse.

In closing, we would like to take the liberty of quoting from an article written by Costanza, Graumlich, and Steffen (2007:10) and apply it to the Classic Maya. Even though they were writing about the Great Acceleration that occurred at the end of the 20th century, their comments apply equally to the 9th century Maya of Caracol. We quote directly from their text, changing only the dates and tense (marked in italics).

> Towards the end of the *9th* century, there *were* signs that the Great Acceleration could not continue in its present form without increasing the risk of crossing thresholds and triggering abrupt changes. Transitions to new energy systems *were* required. There *was* a growing disparity between wealthy and poor, and, through modern communication, a growing awareness by the poor of this gap, which . . . created a potentially explosive situation. Many of the ecosystem services upon which human well-being *depended were* degrading, with the possible rapid changes when thresholds *were* crossed . . . .

An integrated history of the past can indeed provide us with lessons for the future.

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