

SAS NEWSLETTER

Spring/Summer 2006

A publication of the Southern Anthropological Society

Volume E1; Numbers 1 & 2

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President's Remarks

Hector Qirko
Department of Anthropology
University of Tennessee

It is both an honor and a pleasure to serve as President of the Southern Anthropological Society for 2006-2008. While I have participated in SAS meetings and other activities in the past, I am presently enjoying the opportunity to learn more about our organization and its values. It's clear to me that, as individuals working (and often living) in the South, we all appreciate as one of the society's strengths the opportunity it provides for regional professional and social communication. I realize that we are, above all, a **community** of academic and practicing anthropologists and students who come together through our annual meetings, peer-reviewed journal, annual proceedings volumes, and electronic list-serve and newsletter. Maintaining and strengthening this community, then, has been and remains our overarching goal.

As you know, we have a dedicated group of Officers and longtime members who are committed to building on the forty-plus year tradition of the SAS.

(cont'd p. 2)



(Photo courtesy Margaret Bender)

Incoming President Hector Qirko awards Past President Lisa Lefler with a clock commemorating her service to the Southern Anthropological Society.



ANNUAL MEETING 2007:
Oxford, Mississippi
(see inside for details)

**2006 TREASURER'S
REPORT**
(p. 3)

2006 MEETING PHOTOS
(p. 5)

**STUDENT PAPER
COMPETITION 2004
WINNERS**
(p. 6 and 11)

**SOUTHERN
ANTHROPOLOGIST:**
Call for Submissions (p.17)

NEW WEB ADDRESS:
www.southernanthro.org

*Please send member news to
haltman@georgiasouthern.edu*

(cont'd from p. 1) Under Immediate Past President Lisa Lefler, a variety of new initiatives have been developed, including a membership database, a new service award, and others (these are outlined in more detail in her remarks in this newsletter). This year's annual meeting in Pensacola, organized by Terry Prewitt, was a success on all fronts. Plans are well under way for the annual meeting in Oxford, Mississippi next spring, with Robbie Ethridge as local arrangements chair and Lisa Lefler as program coordinator. Both the theme ("Southern Cuisine, Southern Foodways") and location promise another very productive and enjoyable event.

My primary responsibility as president is to facilitate communication among all of us as we work to meet our goals, and I will do all I can to help insure that members are kept informed and have the opportunity to contribute their skills and ideas. In this vein, we will be using the quarterly bulletin to provide updates on the status of our various initiatives and committees. While the list-serve will provide a forum for discussion and feedback, I also hope that all members will feel free to contact me directly with any comments or suggestions about any aspect of the Society (hqirko@utk.edu).

Again, it is a privilege to work with and for the SAS, and I look forward to seeing all of you in Oxford.

Past President's Remarks

Lisa Lefler

Department of Anthropology and Sociology

Western Carolina University

As the Immediate Past President, I wanted to take one last opportunity to address SAS. The past year has been an honor and privilege to serve a very talented, caring, and collegial group of professionals. This organization has a wonderful, rich heritage with so many founding members who are icons in our field. We owe much to their continued support and work as Southern Anthropologists. I would also like to congratulate Dr. Hector Qirko (UT-K), Incoming President who has started his tenure by "hitting the ground running," organizing many new and exciting initiatives for SAS in the 21st Century. I also want to thank Dr. Heidi Altman (GSU) the Society's Secretary/Treasurer, for helping to make the transition of office and the simultaneous new projects move ahead seamlessly.

As many of you have already noted, the new website will provide a great opportunity for old and new members to find out what's happening among our membership. We also would like to announce a new service award, the Zora Neale Hurston Award that will be implemented this year, providing \$500.00 to an anthropologist who has shown service and scholarship within formerly underserved populations. More information about criteria for this award will be forthcoming and posted on our website in weeks to come. You'll be able to read about new committees and initiatives to solicit membership and get students involved in our organization as well as highlighting the work of our diversified, creative, and dedicated colleagues.

I'm very excited about the future of our organization and our journal the *Southern Anthropologist*, and hope that you will share what is happening in SAS with many others. If you haven't already, please suggest to your library the subscription to our journal. The *Southern Anthropologist* is a very high-quality and extremely reasonably priced peer-reviewed journal.

Finally, I would like to thank the Executive Board and those past members of the Board for their support and generosity of time and energy during this past year. Your kindness will always be remembered.

I hope that they as well as new members will join me next spring for the 42nd Annual Meeting of SAS in beautiful Oxford, Mississippi at the campus of the University of Mississippi. Dr. Robbie Ethridge (UM) will be Local Arrangements Chair for the meeting. We will soon issue a "Call for Papers" with the theme, "Southern Cuisine, Southern Foodways." Stay tuned to the SAS website for details emerging in the next couple of weeks.

Thanks again for allowing me to serve the membership and please encourage your colleagues to re-think and join this grand old professional organization of Southern Anthropologists.

We also would like to announce a new service award, the Zora Neale Hurston Award that will be implemented this

2006 SAS Treasurer's Report
 Southern Anthropological Society
 Secretary-Treasurer, Heidi Altman
 Georgia Southern University

Current Balance as of June 8, 2006:

Checking	6746.31	
Savings	0.00	(not established yet)
Endowment	18,778.18	

Year's Activity:

Starting Balance:	4919.11	4919.11
(transferred from past S/T)		
Total Deposits:		
Membership renewals, royalties, advance registrations, reimbursements for gifts for outgoing officers	2280.55	
ANNUAL MEETING:		
Registrations, Dues and Book sales collected by program chair	7317.00	
Meeting Costs	5941.11	
Annual Meeting Net Revenue	1375.89	
Transfer from Program Chair (75.89 left in Pensacola local account until all checks clear)	1300.00	
TOTAL		3580.55
Expenditures:		
Southern Anthropologist	1216.00	
Student Paper Prize	200.00	
Gifts for outgoing officers	253.00	
Checks	48.50	
Web Hosting Service	11.95	
	11.95	
	11.95	
TOTAL		1753.35

114 participants registrants participated in the 2006 meeting.

SAS Secretary's Report

Heidi Altman
Department of Sociology and Anthropology
Georgia Southern University

First, let me say that it has been a busy year for me as SAS Secretary/Treasurer. Our current and past presidents set ambitious agendas for SAS and it has been all I can do to keep up! It's an exciting time to be involved with this organization and I look forward to bringing old projects to completion and launching new ones.

This is the inaugural issue of our electronic newsletter and I hope that you enjoy the new format. When the old newsletter was converted to a peer-reviewed journal, there was a need for an avenue of communication among members. An e-newsletter was envisioned by a number of members and I am happy to present it to the membership with the institutional support of Georgia Southern.

In the coming months we hope to present an issue of the newsletter every 3-6 months. The newsletters will contain student paper contest winners, information about the annual meeting, minutes from the past meeting, board member's reports, members' news, and other news as it present itself. Please do not hesitate to contact me if you have news or small articles that you would like to see included in the newsletter. If you know of someone who might be interested in SAS and is not on the list-serve, please forward the notification email to him or her. Also, if you have a webpage of your own, please link it to www.southernanthro.org to help us improve our ranking with the internet search engines.

If you have any questions, comments or concerns about the newsletter, please do not hesitate to contact me at haltman@georgiasouthern.edu.

2007 Annual Meeting Announcement
CALL FOR PAPERS
AND REGISTRATION INFORMATION
THE SOUTHERN ANTHROPOLOGICAL SOCIETY
42nd Annual Meeting (2007) – February 15-19th, 2007
Oxford, Mississippi,
University of Mississippi

Local Arrangements Chair: Dr. Robbie Ethridge (University of Mississippi)
Program Chair: Dr. Lisa J. Lefler (Western Carolina University)

We are pleased to invite your participation at the 42nd Annual Meeting of the Southern Anthropological Society. The keynote theme for the conference is “Southern Cuisines and Southern Foodways.” The theme reflects an essential element of what Southerners identify as being “Southern,” their food and use of food in hospitality. The four-fields of anthropology encourage participation inviting multiple perspectives of food, food preparation, procurement, and process. Of course, we also encourage papers and sessions on any topic relating to research, application, or teaching in anthropology and allied scholarly pursuits. Organized panels are welcome. Volunteered papers will also be incorporated into thematic sessions, with the conference organizers providing a session abstract linking the grouped papers.

Hotel accommodations have been arranged with the Inn at Ole Miss, Triplett Alumni Center, Alumni Drive, University, Mississippi 38677. Rates are \$75 single and \$85 double occupancy per night. For reservations call 662- 234-2331 or go to www.theinnatolemiss.com. Be sure to mention that you are attending the conference.

The general proposal guidelines as well as abstract, registration and membership forms are all available on the www.southernanthro.org website. Information regarding the Annual Student Paper competition is available on the website as well.

Membership and Registration Fees: All participants at the Southern Anthropological Society Annual Meeting must be members of the SAS. Dues are set at: **Individual** membership, \$60.00; **Student** membership, \$30.00; **Couples** (two persons, each enjoying full voting rights), \$90.00. SAS dues are additional to the conference registration fees, but may be included in a single check (in US Dollars, payable to **Southern Anthropological Society**; for forms go to <http://www.southernanthro.org>) and should be sent directly to Dr. Altman at Georgia Southern University. Enrollment for special events will be available by email and payable upon arrival at the meeting.

If you have questions concerning the meeting, registration, or the program, either contact the program chair, Dr. Lisa Lefler at llefler@email.wcu.edu or (828) 227-2302 or the local arrangements chair, Dr. Robbie Ethridge at rethridg@olemiss.edu or 662-915-7317. We will post information on the meeting, transportation/shuttle service from the airport in Memphis, TN, and travel conditions in the region at: www.southernanthro.org

DON'T FORGET TO MARK YOUR CALENDARS FOR THIS GREAT OPPORTUNITY TO NETWORK, SHARE YOUR SCHOLARSHIP, AND HAVE FUN WITH YOUR FRIENDS AND COLLEAGUES.

2006 Meeting Photos



Meeting Photos Courtesy of David Johnson

Southern Anthropological Society -- Undergraduate Student Paper Award

Decatur, GA - March, 2004

Through the Eyes of Little Ones: Child Agency in the Urban Environment

--Caroline Ellender (University of Kentucky)

Abstract

There is an emerging approach in anthropology that investigates children, not just as additions to adult-centered studies, but as active social actors who experience, react to, change, and create the worlds around them. In this paper, I report on research that utilized a child-centered focus to understand how children in an inner-city Southern community view the world around them. I examine children's particular modes of thought and actions which help them move through the urban world within and beyond the confines of their families.

My neighborhood is kinda good because we play. We play kickball and chase with each other. There are two apartments, some abandoned houses on our street, two stop signs. We play in the field next to the apartments and in the parking lot.

TaReek 2003

The above quote is from a ten-year-old boy named TaReek who attended the Good Street Community Service's 2003 Summer Program located in a neighborhood called The Heights. I took the opportunity to interview TaReek several times while I simultaneously conducted my thesis research and worked in the Summer Camp. In this ethnographic project, I interviewed children like TaReek about their neighborhoods in an effort to investigate how inner-city children perceive and negotiate their urban environment beyond adult worlds.

Two theoretical literatures inform the intersection between children and the urban environment. First, in Anthropology, a body of literature has recently emerged that recognizes TaReek and other children as active social actors and not just small receptacles of adult knowledge. Researchers such as Nancy Scheper-Hughes (1998), Carolyn Sargent (1998), Lawrence Hirschfeld (2002), and Allison James (1998) all argue that no longer should children's own actions and ideas be left undocumented, nor be examined solely from adult perspectives, rather, children must be *asked* about their physical and cultural environments; in other words, children must become our key informants. Second, numerous urban studies within anthropology and other disciplines examine the effects of urbanism on children. In this body of literature, a pattern emerges that presents the urban world as holding hardship and terror for children. Ethnographers such as Jagna Sharff (1998) and Philippe Bourgois (1995) find inner-city life to be difficult for children and families. Likewise, child developmentalist James Garbarino (1991) describes US inner-cities as "war zones" and explores how mothers and children struggle to survive in urban settings.

Although the urban environment is at times difficult and dangerous, I found in my research other times when children happily enjoyed their neighborhoods.

I found in the midst of these "war zones" (Garbarino 1991) barbecues, impromptu porch parties, football games in the street, and bike riding. Like Jonathan Kozol (1996), I found that urban children do not always perceive their worlds as chaotic and fearful, but that urban communities hold both risks *and* enjoyment.

In order to explore how inner-city children think about and move through their worlds, I utilized a variety of data gathering techniques including a map drawing exercise which allowed children to concretely draw their neighborhood conceptualizations. I gave six children cameras to capture images they found important. I also took neighborhood walks with participating children during

which they pointed out where they played, who their neighbors were, and explained what they thought about their environment. Utilizing participant observation, I watched children both during Summer Camp activities and while I hung out with them in the neighborhood. I employed unstructured and semi-structured interviews in an effort to ask children more direct questions about their community. During a three-month research period, I interviewed nineteen children ages 8 to 13 with six of these children acting as my "key informants."

From the data, children's concern for the physical environment emerged as a key theme as did their ability to make sense of this concern in realistic, everyday ways. For example, children manifested this concern and negotiated it as they watched and talked about abandoned houses—note that abandoned houses litter almost every street in the Heights. While on a neighborhood walk with TaReek and his sisters, I counted *ten* abandoned houses on a street only three blocks long. Even on Ruby's street where the majority of the homes are rehabilitated, abandoned buildings are still much in evidence. Many of the children involved in my study knew detailed histories of several derelict houses and also recognized the current real-life events that went on in them. For example, Mary watched the people who squatted in the abandoned houses on her street:

From the data, children's concern for the physical environment emerged as a key theme as did their ability to make sense of this concern in realistic, everyday ways.

Some people, some people live in the and sleep in the little abandoned houses because they might not have nowhere to stay. They sleep there and sometimes they might hang out there. (C: And what do they do when they hang out?) Um, they have their friends come over and play cards. Mary, although she does not play outside much, observed the abandoned houses and knew details of the squatters' activities. Chanise surveyed the abandoned houses around her and spoke about them in this way: "Houses with holes in the side of them, cats and dogs go in them. The cats and dogs fight and keep me up at night." As noted, children observe the activities enacted in abandoned buildings, and they also know past histories as well. On a neighborhood walk with Chakeeta, she exhibited detailed knowledge about a group of burned houses. In my field notes, I wrote:

The houses had been burnt and they (Chakeeta, TaReek, and Little Bit) knew who burned them. Three boys burned them. They said the boys put gasoline tanks inside and lit them. They didn't know why the boys did it. They said it took the fire trucks awhile to get there. By that time the fire was so great that it took a lot of trucks to put it out.

Alisha also pointed out in an interview that the house next door was vacant because "a woman died in that house, got old."

Although several children exhibited fear about the abandoned houses, they also recognized the need for change in their neighborhoods and talked about ways change could happen. Christopher said: "I'd change all the abandoned houses and make them into better houses. When you hear about people raping little people, they take them to abandoned houses. I'd make them nice so they won't have a place to take them, make the world a better place." TaReek took a picture of two abandoned houses that stand directly across from his apartment building. He worried that his neighborhood looked bad because of the numerous vacant buildings located on his small street. In turn, he recognized that change needed to occur to eliminate his neighborhood's stigma as "the projects." He told me that the houses on his street "look raggly, burnt-up, bad" and if he had the chance, he would "fix them up and rent them or sell them so people would want to come over here."

Overall, many of the children who participated in my research watched abandoned houses and understood their realities. They knew who went in them, how they became abandoned, recognized the potential for change, and knew how to make sense of them in their world. There is no doubt that vacant buildings are numerous in the Heights. It follows from the sheer numbers and the children's comments above that abandoned houses stand as physical landmarks marking not only the terrain, but also children's minds, minds that in turn interpret them in realistic ways.

Given the reality of the physical landscape, children translated their awareness of the environment into specific concrete boundaries for play. Within their neighborhoods, children designated certain areas for play, regardless of whether their guardians watched them during playtime or not. Several children's guardians worked during their times of play or took care of younger siblings in the home. In these cases, conceivably a child could travel much farther because of their guardians' lack of knowledge. However, many children, regardless of this fact, adhered to their own set of boundaries located near their homes. Despite living on a very busy street, Aneesa went outside and played where she wished even while her mother slept. She defined her play area as her side yard, and sometimes at the liquor store next door. Similarly, Ruby explained while on a neighborhood walk that she only played on one end of her street even though she had cousins on the opposite end. In this photo, she depicts the side of the street on which she plays. She did not usually walk on the other side because too many men hung around and that side of the street wasn't "fun." Hyacinth also created boundaries for her play when she stated: "We stay in our yard or in front of the street or we'll just stay in front of our house pretty much, that's all." Likewise, Chakeeta played only around her house and in the vacant lot next door. She did not walk around or play in the first or third blocks of her street. She ameliorated the limitations of these self-set boundaries by navigating her neighborhood with pathways located directly around her home.

The six children who took pictures all captured their play areas on film. Abrianna snapped her backyard, her main play area, and the corner store which she frequents with her sister. Chanise and Alisha took pictures of their front yard and the open lot across the street where they sometimes play. However, the majority of their pictures showed the inside of their home and the Good Street Summer Camp facilities, because they feel safest playing inside. TaReek's play area pictures are exclusively of the parking lot in front of his apartment building. In fact, his pictures are all taken from the vantage point of the parking lot, suggesting that he did not leave this bounded space while taking photos. Finally, Christopher took pictures of his front yard and the open lot by the Good Street garden, all of which extends the space directly in front of his home. Each child, in their own way, captured their close-to-home play areas.

The majority of their pictures showed the inside of their home and the Good Street Summer Camp facilities, because they feel safest playing inside.

Christopher and Alisha give us insight into two reasons why children create such boundaries. Alisha pragmatically realized that to play a certain game, the boundaries must be close. She described her play with the following comment: "We ride bikes, play hide and seek, but not too far away because the seeker would never find you." She explained that she only played these games in her front

yard or in her next door neighbor's yard in order to keep the game's boundaries small. Alisha gives a practical reason for not straying too far. Christopher, on the other hand, when asked a similar question about where he played, replied: "We have fun. We play in the big field by the garden and in the backyard and front yard. We play catch with a little ball, stay around the house because Momma's cousin's son almost got grabbed in the District (another part of town similar to The Heights)."

The boundaries children created only limited play areas, not the instances for fun and games enacted within them. Regardless of how big or small these spaces were, children still played

games and hung out with their friends within their self-imposed boundaries. Hyacinth plays "basketball, kickball, [and] dodge ball" in her designated playground. When speaking about her front yard, she stated: "When we play games, we have fun." As noted above, Ruby only hangs out on one side of her street, but this does not limit her activities: "We have water fights on our street when all these people come down to the end that I stay on and we just have water fights and then sometimes everybody just comes outside and plays." Chanise's neighborhood makes her happy because sometimes on Sundays, her neighbors would all come outside and play. Even though she usually plays inside, Chanise loved these Sundays. Mary limits her play area to her carport and front yard, but within this space she hula hoops and plays UNO. Although several of the children I spoke with designated specific areas as playgrounds, their opportunities for play within these spaces were largely unhampered.

Children created boundaries for play and general movement through their neighborhood, and usually kept these boundaries close to home, only playing in their front or backyards. For many who did venture off their home properties, an invisible line cut across their street, leaving one half familiar and the other unknown. However, within these self-imposed boundaries, children were not limited in opportunities for fun. The only exception to this boundary-making pattern was bike riding. While riding a bike, children did not adhere to their designated spaces, but traveled to parts of the street that were not familiar.

The map exercise I conducted during one of the weekly art sessions of Summer Camp also gave me insight into how children perceive and negotiate their physical urban communities. During this activity, I asked children to draw a map of their neighborhoods in order to see how they construct their environments. I gave no visual examples (to avoid copying) and asked that they only rely on their general knowledge of maps. Almost 75% of the children's maps had multiple houses drawn close together. Houses were located in clusters and streets separated groups of buildings. The houses of The Heights are often very close together with little yard space and the maps realistically depict this. The drawings do not portray a fanciful or idealized version of the housing condition that some might assume children would create, but show the reality of urban life.

Also, 50% of the map drawers sketched stop signs and/or stop lights. Several of these pictures in fact had multiple stop signs or stop lights. Children often talked about cars in interviews and observations. I also witnessed cars constantly flying up and down the streets of the Heights. In areas such as these where children do not have much space to play (many play in the street because they have no yard) and cars are a hazard, issues with safe street play may be a primary worry for children. In turn, the stop sign drawings may be a manifestation of this concern.

The children I interviewed not only watched and acted in their physical environment, but navigated the social as well. One particular way children moved through their social terrain was by judging their neighbors on the basis of being quiet or loud. Over and over again when I asked children to describe their neighbors, they distinguished the loud from the quiet. These descriptions, however, were not simply based on noise level, but were loaded with associations to other behaviors. Children associated loudness with shooting guns, popping fireworks, revving engines at night, fussing or arguing in public, and other negatively perceived behaviors. Children connected quietness with peacefulness, calmness, fun, and security. Children used both loud and quiet distinctions to categorize their neighbors and neighborhoods. For example, I asked Alisha what she liked about her neighborhood and she replied: "It's not very good. People be shooting at night. I hear people give whoopin's and it sounds like it hurts. The trains are too loud, music's up too loud." Mark mentioned that if he had the chance to change one

Where children do not have much space to play (many play in the street because they have no yard) and cars are a hazard, issues with safe street play may be a primary worry for children.

thing in his neighborhood he would alleviate all the noises in his apartment building. His loud neighbors made him angry when they bounced their "ball on (his) door" early in the morning and it made him "wanna come out there, Oooo, just knock 'um out." Again, for Ruby loudness is associated with negative behaviors: "the people over there drinking and stuff and all the time all they did was partying and stuff and they be loud, they be shooting."

On the other hand, quiet is associated with positive characteristics of both neighbors and neighborhoods. Ruby likes her neighborhood because: "It's fun. Sometimes quiet." When I asked Hyacinth what she liked about her street, she replied similarly: "It's quiet. It's not loud noises on our street."

They are not passive reactors to their urban community, but are acutely aware of their environment and make daily decisions on how to move through and interpret it.

Seena also made these associations when I asked: "If you could change something, what would you change?" She replied: "That I lived on the street by myself. There'd be peace and quiet." Abrianna indicated that she liked the people in her neighborhood, even the neighbors who acted in undesirable ways, because: "People be shooting, but the neighborhood is good if people do bad things, they don't do it in front of the children. They don't do it outside their homes, handle their business inside their home. They're good people, good neighborhood, good personalities around me."

Child agency theory espouses that children can act upon, not just react to, their environment. It also supposes that children create and recreate the worlds around them in particular ways separate from adults. The inner-city children who participated in my research live in a neighborhood with housing problems, insufficient medical care, poor education, rampant drug use, and changing family structures. Many would assume that children are powerless in the midst of these conditions. However, as seen in the above examples, these children are far more aware and savvy in their environment than many would give them credit for. The ability to observe physical and social landscapes and make judgments about those observations enables the children involved to create boundaries, construct their neighborhoods in concrete ways, and categorize their neighbors. Awareness and agency are vital tools of any child, especially those from the inner-city. It only follows that children can navigate their environment in such particular and concrete ways because they are constantly creating, watching, recreating, reacting to, experiencing and changing the worlds around them.

The children who participated in my research told their stories in frank and colorful ways; their voices and their pictures speak to how inner-city children understand and move through urban communities. The current realities of urban life are also detailed through the eyes of these children. Overall, stories like TaReek's, Christopher's, Alisha's and Ruby's should be told. They all have acute perspectives on the world and creative ways to navigate the buildings, streets, and people that make up the Heights. Their stories and their words are worth paying attention to.

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Winner – Graduate Student Prize Paper
2004 Southern Anthropological Society Annual Meeting Decatur, GA,
Biological Adaptations in a Cultural Framework: The Customary
Consumption of Coca Leaves in Contexts of Chronic Hypoxic Stress

Julia Dobervich
Emory University

Abstract

In the words of Dr. Robert Winslow "...the human animal does not seem to be naturally selected for high altitudes." One reason for the success of certain high-altitude Andean populations may lie in the long-term utilization of the coca leaf, a native resource that contains cocaine and other active alkaloid substances. According to one hypothesis, the chemicals of coca may act on pathways in the posterior hypothalamus to blunt a polycythemic response to hypoxia. AIf true, this may explain the low incidence of polycythemic-induced diseases in these populations. A highly specified cultural framework for the consumption of this plant may protect the users from the detrimental effects of ingesting cocaine.

The Andean Highlands of South America have been occupied by human settlements for millennia. The earliest site dates to around 11,000 years ago (Bean 2001) and these same regions are still inhabited by indigenous populations today. This is testimony to the incredible adaptive ability of the human species, when one considers the remarkable environmental stressors of living at altitudes of up to 4000 m. In addition to physiological challenges presented to humans by low levels of atmospheric oxygen, high background radiation, and low temperatures with the possibility of year-round frosts, one must also adapt to marginal availability of nutrients, the harsh reality of limited productivity, and relative isolation in mountainous terrain. Populations in these inhospitable microclimates have evolved numerous biological adaptations that improve their fitness. Many of these adaptations are a specific response to the stress of living and working under chronically hypoxic conditions. These physiological changes, in comparison to sea-level populations, include a larger lung volume in proportion to body weight, improved pulmonary blood flow and higher arterial pressure for improved perfusion, higher resting ventilation rate, and a higher hemoglobin concentration to maximize oxygen saturation. However, as observed by Dr. Robert Winslow (1987), "...adaptation to hypoxia is not complete ...the human animal does not seem to be naturally selected for high altitudes. The normal hemoglobin O₂ affinity and marked polycythemia of humans are shared with other animals that do not do well at high altitudes" (pp. 211-212).

Populations in these inhospitable microclimates have evolved numerous biological adaptations that improve their fitness.

Due to the apparent limitations of physiological adaptations, coupled with the uniqueness of the environment, high-altitude populations would appear to be vulnerable to a variety of deleterious conditions. Among these is polycythemia (unchecked red blood cell multiplication), an acute response to hypoxia that improves oxygen saturation in the short run, but is considered to be maladaptive under chronic hypoxic conditions due to the possibility of increased blood viscosity and the cardiovascular complications that follow. Paradoxically, Andean populations show a very low incidence of arteriosclerosis and systemic hypertension, both of which would be expected secondary to a polycythemic response to chronic hypoxia (Winslow 1987).

A possible explanation for these statistics may lie in certain cultural evolutions that have contributed to high-altitude acclimatization of natives. One of the most debated (but perhaps not the most objectively studied) cultural practices of Andean highland populations is the "chewing" (a term which will be more properly defined later) of coca leaves. Despite a recent outcry concerning the "addictive" nature of this habit, one might logically conclude that a practice remaining virtually unchanged for thousands of years has underlying adaptive value. Both micro- and macro- level analysis of the pharmacology of the leaf itself, its physiological effects, and the demographics and lifestyles of populations that utilize it, suggest that coca-chewing may be an adaptive technique that helps mitigate the expected polycythemic response to chronic hypoxia. Moreover, despite concerns over the prevalent use of an active narcotic such as cocaine (one of many alkaloids contained in the leaf), highlanders appear to successfully avoid both the potentially harmful effects of overuse and the addictive properties of the drug. Perhaps due to a long history of ritualistic use, plant and populations have co-evolved both biological and cultural strategies designed to reap the benefits of a readily available chemical substance while avoiding the potential downfalls of dependence, abuse, and withdrawal.

The use of the coca leaf has remained prevalent in indigenous Andean societies since its documented origins in pre-Incan times, and neither the uses themselves nor the rituals associated with them have changed much over time. The leaf is employed in religious ceremonies and divinations, social rituals of greeting and parting, as an economic media of exchange, and for a multitude of medicinal purposes from acute pains to chronic rheumatism and asthma (Grinspoon 1985). It also contains significant quantities of vitamins (particularly B 1 and C) and riboflavin, possibly an important point in an area where fresh produce can be scarce. Indeed, it could be considered a panacea of Andean life, comparable to the numerous uses of coffee, tea, or aspirin in many other countries. One of its most prevalent uses is in the context of agricultural and mining labor, activities that employ nearly 80% of the rural labor force. The reasoning stated by the consumers themselves is strikingly consistent: chewing coca leaves alleviates hunger and fatigue, dulls pain, and renews energy (Butrón 1996).

Again, one must assume that a practice thousands of years old most likely bestows some benefit, or at the very least does little harm. However, the mechanism of its physiological action remains largely unknown. The chemistry of the leaf itself is complex: it contains 14 different alkaloid substances, the most prevalent of which is cocaine, composing 50%-90% of the chemical content (Grinspoon 1985). The presence of the thirteen other active chemicals may become an important point of investigation for the future. Most of the cited studies to date have concentrated on the effects of pure cocaine (either derived from the leaf or from purified product); however, as

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indicated by several authors (Fuchs 1978, Grinspoon 1985, Rerat 1997, Spielvogel 1996) perhaps several of the coca alkaloids act together in concert or as cofactors in the body to produce the reported physiological effects.

Andrew Fuchs (1978) suggested a specific adaptive application for some of these aforesaid effects. His hypothesis was that coca chewing might be beneficial in mitigating polycythemia, an acute biological response to hypoxia that can escalate to maladaptive levels under chronic hypoxic stress (Fuchs 1978, Winslow 1987). The mechanism of this red blood cell growth (erythropoiesis) is normally regulated through the hormone erythropoietin (EPO), which is synthesized through a negative feedback loop sensitive to changing oxygen levels in the plasma. The acute advantages of this adaptation to altitude include protection against anemia and increased oxygen delivery due to higher circulatory pressure and more hemoglobin units. The disadvantages that can manifest under chronic hypoxic conditions include increased blood viscosity (and therefore increased flow resistance), cardiac overload or failure, erythrocytosis, and dyspnea.

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Evidencing the survival of this acute hypoxic response even in native high altitude populations, highland natives of Peru have been noted as having chronically elevated EPO levels as compared to sojourners in the same area (Winslow 1987). Red blood cell levels, hemoglobin concentration, and hematocrits have also been noted by some studies as elevated in high altitude native populations as compared to populations at sea level. These acute physiological responses to hypoxic conditions have been observed in transient visitors to the same areas (Fuchs 1987), indicating that the hematology is induced by the altitude environment and not due to unique physiology of the natives or lifestyle practices (such as chronic coca chewing). However, whatever the reason, the chronically elevated levels of these hematological factors in highland natives would make them particularly vulnerable to the negative effects of polycythemia, especially when exposed to increased hypoxic stress such as hard manual labor. This gives an enticing adaptive context for Fuchs' proposal, as coca is usually chewed in specific contexts of work and labor. The data of others appear to support his hypothesis; studies of Peruvian communities provide empirical evidence that coca chewers have lower hematocrit values (-2.3% hemoglobin and -7.2% packed red blood cells) than carefully matched control subjects at the same altitude (Fuchs 1978). Further empirical evidence are the reports by chewers themselves, noting that coca dulls hunger and thirst, sensations which are controlled by the same area of the posterior hypothalamus that has been preliminarily indicated in the regulation of EPO levels. Moreover, two of the primary conditions treated by coca remedies (headache and fatigue) are initial symptoms of polycythemia.

Studies of population demographics can also provide circumstantial evidence for this hypothesis. It is widely cited in literature that the context of chewing is almost always during manual labor (in other words, during times of increased hypoxic stress, which might make one more susceptible to a polycythemic response). Indeed, as Kathia Butrón (1996) learned through personal interviews with Bolivian *acullicadores* (those that chew the coca leaf), periods of increased consumption are most often associated with times of more intensive labor, and that those members considered by their own community as at risk for dependency on the plant use it "everyday, even days with no work" (p. 69)*. It has also been observed that native highlanders tend to give up their coca habits upon moving permanently to lower altitudes.

Fuchs also notes that the prevalence of coca chewing is related to both gender and altitude; at lower altitudes men chew more than women, but as settlement altitude increases, coca consumption increases in both genders, such that everyone chews to the same degree at the very

highest altitudes (where hypoxic stress is greatest). This data on sex differences might seem no more than an idiosyncrasy; however, more recent research has uncovered effects of female sex hormones on erythropoiesis that might suggest another hypothesis. According to one study (Favier 1997), treating male rats reared at 3600 m with a combination of progesterone and estrogen effectively decreased EPO levels and the subsequent degree of polycythemia. Pequignot (1997) provides further evidence by observing that hematocrit, red blood cell, and EPO levels were all decreased (-5%, -15%, and -53% respectively) in female vs. male rats reared at high altitudes for several generations. He postulated that since ovarian steroids are ventilatory stimulators, perhaps EPO response in females was blunted due to improved oxygen levels provided by these hormones. He also observed that orchidectomy of male rats decreased their hematological factors to similar levels, indicating that testosterone may inhibit neuronal activity in key regions of the central nervous system that regulate EPO levels. Therefore, a possible mechanism of ovarian steroid action with regards to EPO levels might be the modulation of noradrenaline and dopamine levels in the central nervous system (note that noradrenaline neurons in the brainstem have been indicated as playing a role in the systematic chemoreflex to hypoxia).

It is interesting now to recall that the chemical structure of cocaine mimics that of the neurotransmitter receptors for dopamine (and to a lesser extent, noradrenaline), suggesting a possibility of a similar site and/or mechanism of action for naturally occurring alkaloids in the coca leaf. Given the above, it may not be so far-fetched to see coca chewing as an evolutionary adaptation of male highlanders to achieve similar regulatory effects over EPO inborn in females due to sex hormones. Consider two additional pieces of related empirical evidence: that the onset of coca chewing usually occurs during the late teens (Butron 1996), after the onset of puberty and the introduction of major sex hormones, and that older women (presumably post-menopausal) sometimes chew coca at high altitudes in areas where younger women do not (Fuchs 1978).

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The possible mechanisms of coca alkaloids (either of cocaine specifically or of several in concerted action) on EPO regulation remain speculative at best. Fuchs suggests that cocaine (or possibly ecgonine, a product of cocaine metabolism) derived from chewing the coca leaf acts as an antimuscarinic substance in key areas of the posterior hypothalamus, thus depressing EPO synthesis. A review of recent physiological knowledge also supports the role of the hypothalamus as a possible regulatory center of EPO levels (Jelkmann 1992). As evidence, Fuchs cites the regulatory effects of atropine (chemically similar to both cocaine and ecgonine) on the posterior hypothalamus, and the subsequent decrease in red blood cell levels. Recall also the empirical evidence cited above, indicating coca alkaloid action at this region.

However, further research about the possible interaction of other, less well-studied alkaloids contained in the coca leaf is warranted, due to some conflicting evidence concerning the isolated effects of cocaine on erythropoiesis. Cocaine is known to cause, among other things, vasoconstriction of the renal vessels. According to current knowledge about the mechanisms of EPO synthesis by the kidneys, reduction in renal blood flow may reduce oxygen delivery to these tissues, resulting in *rising* EPO levels. Doses of pure cocaine taken either intravenously or intranasally have also been shown to cause an *increase* in hemoglobin, red blood cell count, and hematocrit (Siegel 1999), through either renal vasoconstriction or other mechanisms. Upon further observations of female sex hormones on erythropoiesis regulation *en vivo*, both authors (Favier 1996, 1997; Pequignot 1997) have noted that the hormones act with regional specificity at *both*

peripheral and central nervous system sites. Given that cocaine has active sites in the central nervous system, the observation of activity in the periphery argues that one or more of the other active chemicals in coca leaves may be acting aside from or in concert with cocaine to produce the observed effects. Preliminary studies of Andean highland natives concerning the effects of coca chewing during exercise (creating conditions of hypoxic stress) suggest that benzoylecgonine may also play a significant role in the reputed benefits of coca (Rerat 1997).

Whatever the source of these effects, coca seems to be largely more of a help than a hindrance in the lives of those who utilize it. This is a fact that is overwhelmingly reported by the Andean populations (Butron 1996, Grinspoon 1985) and cautiously acknowledged by an increasing majority of the scientific community (Fuchs 1978, Sullivan 2002). However, others have questioned how one population can ingest a drug for years at a time in significant quantities, and show few or no negative symptoms, while other populations seem to succumb far more easily to dependency and side-effects of the same substance. Part of the answer may lie in the oral consumption ritual of the leaf itself, a process that has remained virtually the same for thousands of years. The truth of coca's lengthy history lies in the development of the Andean regional language itself; the word *cocada* refers to a length of about 45 min, or the approximate amount of time that a wad of coca leaves is chewed before being discarded (Grinspoon 1985). The process of chewing is relatively constant from population to population: about 50g of leaves are moistened with saliva, mixed with an alkaline substance (plant ash, powdered seashells, or quicklime, used to facilitate the absorption of chemical alkaloids through the membranes), and "sucked" between the cheek and the gum. The alkaloids (about 80% cocaine) are absorbed into the blood through the mucous membranes of the mouth. From here, some chemicals go directly to the brain, but a large proportion remains in the bloodstream. The slower absorption of the alkaloids themselves through the buccal membranes, and a steady metabolization of the drug, maintains a relatively constant plasma level of cocaine derivative followed by a gradual decrease (Bock 1992). This would result in extended and moderated action on any affected regulatory pathways. This contrasts with ingesting cocaine by snorting, smoking, or injecting it. Smoking is the most efficient way to get a drug immediately into the central nervous system, with intravenous or intranasal routes only slightly less so. This rapid hit to the brain results in more rapid and elevated activity at affected CNS sites, and a subsequent "peak and crash" effect on these neurotransmitter paths (in this case, dopamine and noradrenaline). It is this rapid rise and fall of neurotransmitter activity, not the absolute levels themselves, which appear to produce both the acute euphoric symptoms and the gradual addictive behaviors reported by many cocaine users (Bock 1992). In one study cited in *Cocaine: Scientific and Social Dimensions* (1992), subjects who smoked cocaine still renewed their dose more frequently than those who took it nasally, despite the fact that both groups had the same plasma levels of cocaine at the time. However, the plasma levels of the smokers were decreasing at a faster rate. This would indicate that the rate of metabolism, rather than the absolute levels, of cocaine stimulates the behavioral craving response. It may be that the rough timing between "chews" defined by Andean populations (according to those interviewed by Kathia Butron, one usually maintains a 3-4 hour pause between each fresh batch of leaves) has actually been adapted over time to maximize the maintenance of steady neurotransmitter levels in the brain, and renew them continuously throughout the workday.

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All questions of biological mechanism and cultural ritualism aside, the fact remains that a stable framework for use of the coca leaf has been developed and perfected, and has withstood the test of the centuries for an indigenous population in a challenging environment. Further research on specific actions of each alkaloid and their purpose in the adaptive framework of high-altitude living may add valuable physiological and clinical information to scientific knowledge, but the results would do nothing to negate the success of what the Andean highlanders have already discovered and have known for centuries about these very questions. The biological and cultural strategies to optimally exploit this available natural resource seem to be firmly in place, and continue to ease the challenges presented by harsh high-altitude living conditions.

* All citations taken from Spanish sources have been translated by the author.

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