it's all happening at the zoo

Children's Environmental Learning after School

by Jason A. Douglas and Cindi Katz

Talk of our vexed relationship with nature has become commonplace as the environmental crisis grows. Scholars from disciplines as varied as biology, geography, and psychology have insisted that we must better understand this relationship if we are to avoid further destruction of ecosystems that are vital to animals and humans (e.g., Bjerk, Odegardstuen, & Kaltenborn, 1998; Hart & Chawla, 1981; Shepard, 1998; Wilson, 1984). We hear increasingly of tropical forests and the wildlife they support being threatened by accelerating rates of forest conversion and degradation (Chapman & Lambert, 2000); the transformation of polar habitats is also daily in the news. Habitat destruction has countless implications for many animal species, including our own. However, throughout history humankind has depleted ecologies through such common and often necessary activities as agriculture, animal husbandry, hunting, urbanization, tourism, transportation development, resource extraction, logging, and war.

Sinha (2001), while pointing to the importance of education in influencing the public's view of wildlife, recognizes the difficulty of changing deeply held values, assumptions, and norms. Attitudes formed early in life tend to be persistent. Young people should thus have broad opportunities to engage

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with the environment and to develop their awareness of such tangible things as animals' needs and habits. Then they will be able to better understand their own role in sustaining these tangible needs—or not.

Pairing dynamic out-of-school-time (OST) programs with zoos can encourage young people's relationships with and sense of responsibility for animals and the environment. Our project, Animal Rescuers, gave us the opportunity to examine how such a pairing can work. OST programs enable learning in settings that are generally unavailable during school time (Honig & McDonald, 2005). They provide space for collaboration among students, teachers, and others such as program visitors or outside educators. Taking advantage of the flexibility, location, and educational playfulness of an OST setting, we worked intensively with a small number of 10–12-year-old children to discover how they thought and felt about animals and to develop creative ways for them to share their knowledge and experiences with others. The children participated in zoo visits, environmental education activities, and an online space for expressing their feelings and working through their emerging ideas.

Examining these activities and their effect on the children gives us a better understanding of the educational role of zoos and of the kinds of OST activities that can influence children's understanding of animals, extend their knowledge of conservation issues, and foster an ethic of care for the natural environment. While the primary focus of our project was to understand children's environmental learning through a series of OST activities, we also looked at how zoos encourage their visitors to understand and care for animals at all scales, from the individual through the global. Despite extensive research on human-wildlife interactions, there is very little work that explores the connection of these interactions with questions of environmental and animal justice—and even less concerning their role in children's development (see Hart & Chawla, 1981; Kellert, 2002; Watts, 2000; Wolch, 2002, for some notable exceptions). Our project addressed these questions with particular attention to the ways OST programs might foster children's engagement with and attention to the natural environment.

An Actively Produced Ecology

Our research combines the transactionalism (Dewey & Bently, 1949) of environmental psychology with an activity theory (Vygotsky, 1978) approach to developmental psychology to address children's environmental learning in context. The theoretical perspectives of transactionalism and activity theory dovetail in seeing the relationship between social actors and their environments—always imagined as physical and social—as an actively produced ecology that is constantly changing. People learn, and structure and consolidate their knowledge, by engaging with the environment. Social ecologies of learning and development both constitute and are constituted by broader social, cultural, political, and economic formations such as households, communities, school systems, and others.

Using these frameworks, we worked with children in a number of discrete but interconnected activities to discover and foster their knowledge of animal behavior, ecology, and vulnerability. We also worked toward an understanding of the complicated role of zoos in environmental protection. Our research was guided by the following questions:

- How do young people translate their experiences of animals and zoos into a broader understanding of nature, the human environment, and the relationship between society and nature?
- How can afterschool programs work with zoos and other institutions of environmental education to encourage critical engagement with environmental issues?
- How might information technologies provide means for young people to address issues of animals in captivity and in the wild and to develop a sense of stewardship and *biophilia*, that is, a deep connection with all living nature?

Methodology

We worked with 20 fifth and sixth grade students in an afterschool program in the Bronx. The program served lower-income African-American and Latino children living nearby. Before this group started its zoo visits, we administered a survey of attitudes toward wildlife to them and to 35 other children in the program. We conducted a follow-up survey with participants at the end of the research project to see how their attitudes toward wildlife and zoos changed after our environmental learning activities. Our survey was structured around a typology, developed by Kellert and Westervelt (1983) and by Kellert (1985, 1996), of nine different values toward nature. Table 1 lists these values and their definitions. The survey addressed such issues as hunting, environmental conservation, pets, and animals in captivity.

Other research methods included participant observation during group visits to the Bronx and Central Park

Table 1. Kellert's Typology of Attitudes toward Wildlife

ATTITUDE TYPE	DESCRIPTION
Aesthetic	Interest in the artistic and symbolic characteristics of animals
Dominionistic	Mastery and control of animals
Ecologistic	Concern for the environment as a system
Humanistic	Strong affection for individual animals
Moralistic	Concern for the right and wrong treatment of animals
Naturalistic	Affection for wildlife and the outdoors
Negativistic	Active avoidance of animals
Scientistic	Interest in the biological functioning of animals
Utilitarian	The practical use of animals and the environment

Zoos and during other activities such as a neighborhood walk. We also conducted a virtual focus group using an educational software suite known as the MOODLE (Modular Object Oriented Dynamic Learning Environment, www.moodle.com). This open-source software includes chat rooms, message forums, journals, and tools for building web pages. Finally, we conducted open-ended interviews with 16 participants at the end of the project. These interviews drew out participants' views of animals, zoos, animal protection, animal welfare, endangered ecosystems, and environmental stewardship. We triangulated these methods so we could compare the data and better understand the development of the children's relationship with animals and with nature.

The Animal Rescuers

Our OST program was designed to provide a stimulating and multifaceted environment in which children could both explore their interests in animals and reflect on the role of zoos in protecting animals and their environments. We initially called the program the "Zoo Club," but as the children became immersed in its activities, we invited them to rename it. Deciding that the program should be devoted not only to learning about animals but also to educating others, they chose the name "Animal Rescuers."

The program included both free walking visits and formal education programs in the Bronx and Central Park Zoos. These trips served as the main experiential learning environments in which the students were exposed to what Kellert (2002) refers to as "indirect experiences" of nature, that is, experiences of places that are rich in natural phenomena but extensively controlled by people. The group also took neighborhood walks to discuss the people, plants, animals, and environmental issues the students experienced close to home.

A central point of this project was the use of online technology to support our activities—a space for ongoing communication in and out of the afterschool environment. We referred to this space as a virtual focus group (VFG), which was administered through the open-source software MOODLE. The VFG provided an ideal online environment for critical discussion of the animals, places, and environmental issues encountered in program activities. The MOODLE also offered the tools the Animal Rescuers needed to complete a collective final project: a student-produced website.

The VFG was particularly productive because it enabled multilayered forms of communication for our discussions of ecological issues, while also helping participants to develop their computer skills. We used chat rooms for discussion and brainstorming sessions. This synchronous form of online communication acted like classroom discussion; participants offered their ideas in real time. Message forums engaged participants with specific questions about animals, zoos, and environmental problems. This asynchronous form of communication allowed the students to revisit the topics and continue discussions throughout the project, on their own time. The chat rooms and message forums were the primary spaces for critical engagement, where the group was challenged with questions on issues they learned about at the zoo. The MOODLE also offered a sort of survey process called "choice activities," which allowed participants to debate and select zoo trips and programs. In addition, the group used the MOODLE "wiki," a tool for editing websites, to collaborate on the final project: an informational (albeit elementary) website about four endangered species.

We describe four activities below to provide a picture of the interactions that took place in the program.

Activity 1: Getting to Know You

The first meeting of the afterschool group was a brief getting-to-know-you session in which one of us, Jason, discussed the scope of the project with the students, told them about his own interests and educational background in the science of animal behavior, and inquired about participants' interests. Jason conducted all of the

project's fieldwork and program activities. Under his leadership, the students had a fruitful discussion about what animals were interesting to them and why. The group also planned its first zoo activity: a free walking tour of the Bronx Zoo to seek out a few animals of particular interest, including lions, baboons, and lizards. This initial meeting laid the groundwork for the project by making clear that its dynamic was participatory. We hoped that creating a space for all group members to participate in an open process of program development would encourage the students to develop a sense of ownership of the project—and many did.

Activity 5: People Learning vs. Animal Wellbeing

In the message forum, we challenged the group to "unpack" their feelings about zoos. We asked, "Which of these things is most important in making you feel good or bad about going to the zoo: Humans learning about animals, or the wellbeing of animals?" While the participants seemed to have varying understandings of the question, they tended to lean toward the value of people learning about animals. Seven of the 10 participants who responded to this question felt that zoos are places for learning; the other three said that zoos are there to protect animals from harm and extinction. As Esteban put it, "I feel that the most important thing is to learn about animals. I think this is important because I will learn great new things about animals. Maybe even I could rescue endangered animals. Who knows I may even become a zoologist." We considered responses such as this to fall under Kellert's categories of scientistic and moralistic, because they expressed both desire to acquire knowledge and concern for the wellbeing of animals. But Esteban went beyond simply thinking about what zoos do to look at how they facilitate *his own* development in relation to nature, going so far as to imagine himself helping endangered species. Reflecting this perspective, another student, Janet, said, "I feel very good about the zoos because I know there is a place that animals could be safe instead of all the animals being endangered." Janet's response displays a more immediate concern for animals and a moralistic attitude, even though she doesn't cast herself as part of a solution.

The psychologist Peter Kahn (1999) cautions that learning doesn't necessarily involve replacing incorrect views with correct ones, nor does it involve stacking new knowledge "like building blocks" on prior knowledge. Rather, Kahn argues that knowledge is acquired through transformations. These transformations occur in the course of children's active and original thinking, which arises spontaneously from their dynamic engagement with the environment. In this instance, program participants not only learned more about the animals and places they were interested in, but also began to develop a moral sense of connection with nature by learning about animal needs and by communicating with peers.

Activity 13: Zoo Trip / Research

The Animal Rescuers took three zoo trips. The third, to the Bronx Zoo, was organized for a research activity in which the group collected data on the four animals its members had chosen to portray on the website they were constructing: gorillas, African wild dogs, elephants, and polar bears. The group had already collected data on polar bears during an earlier trip to the Central Park Zoo, and unfortunately participants never got a chance to see the elephants due to time constraints. However, the visit to the Congo Gorilla Forest exhibit at the Bronx Zoo was a special experience. The children toured a naturalistic forest habitat that better created the feel of a holistic ecosystem than did exhibits they had seen in prior zoo trips. Halfway through the journey, the group watched a movie about gorillas and the issues that are threatening their survival in the Congo. Several participants were moved by the movie and were eager to talk about it as soon as it finished. One boy said that he felt the movie was convincing because it showed how gorillas and other animals in the Congo are being "killed." Another student chimed in, saying that "it's not fair" that people are destroying the gorillas' homes. The group continued to move through the exhibit, taking in facts about primate communities in central Africa and getting a feel for the sights and sounds of the animals' habitat.

As we neared the end of the Congo exhibit, we overheard a visitor complaining to a security guard that the gorillas were not on display. The visitor expressed her disappointment that she had spent money to see gorillas, but never saw one. When Jason asked the group what they thought of the scenario, they responded passionately. Almost to a person, the students took a moralistic tone in their responses, saying that the gorillas should not have to be on display if they choose not to be. One girl said, "I think that it's selfish for people to make gorillas come out if they really don't want to.... Why do we come out on cold days? We didn't have to come to the Bronx Zoo. We come because we wanted to, but the gorillas, they don't have a choice." These young people expressed concern about the treatment of goril-

las, displaying sensitivity to the power dynamic between our species and the "rights" of animals to "make choices" about their own activities.

These zoo visits not only helped the children to develop their knowledge of animals, but also fostered a sense of affiliation with the animals they saw and learned about. As we learned on later walks through the neighborhood, this connection extended to animals the children encountered closer to home (cf., Kellert, 2002). In the course of our zoo visits and critical reflections afterward, group members developed ethical and moralistic opinions about animal rights and the treatment of animals in captivity. This process recalls Dewey and Bentley's (1949) theory of transactionalism: Understanding develops in the course of ongoing interaction between the knower and the environment, in which the knower (the children) and the known (the animals and environments we encountered) are linked through active engagement. These transactions took place during the group's explorations of zoos and local parks, which engaged the students' curiosity about nature and their place in it (Heerwaagen & Orians, 2002; Hart & Chawla, 1981).

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Activity 15: Digital Voice

The Animal Rescuers' research culminated in a collaborative, interactive web-based project. In the course of one month, the children produced a website about the four animals they had been studying in the zoo trips and about the environmental issues affecting those animals. The group formed four teams of five students each, and each team picked one of the four animals. The teams gathered information from their zoo notes, informational websites, books, and even peer-reviewed scientific journal articles Jason gave them. In addition to researching animals and writing text about them, the teams collected pictures of their animals from the Internet.

The whole group had to agree on some basic design parameters for the website. Jason worked with the students to sketch out the website design using the MOODLE's wiki feature. Once the teams agreed collectively to the design, they modified the template to fit their team goals and ideas. Together, they learned how to format a webpage, make links between webpages, reformat the colors and structure of webpages, and integrate images. Creating this website was a major accomplishment for the Animal Rescuers. Not only did they acquire real-world skills in website design and construction, but they also developed a sense of unity and pride in what they had accomplished. Once the website was complete, it was posted on a free hosting service. Although participants did not have a chance to assist in this final part of the process because the program had already concluded, they could share the posted site (www.geocities.com/animal_rescuers) with their friends and families.

These and other activities combined real-world experiences with a space for critical discussion and development of technical knowledge. Together they formed a dynamically negotiated system, a space of ongoing interaction and collaboration, in which the students worked together to learn about animals, zoos, and environmental issues. This kind of interaction and engagement can easily be transferred to other activities and areas of knowledge. The key is to be mindful of students' interests, to provide opportunities for them to learn about and experience these things first-hand, and to mediate spaces—online discussion forums and wikis or face-to-face debates—where they can engage in critical discussions about their newfound knowledge and the issues it raises.

Space, Place, and Morality

For the Animal Rescuers, one of these areas of new knowledge concerned the role of zoos in animal care and protection. Contemporary zoos, including the Bronx Zoo, carefully create exhibits to represent natural habitats where the animals have some space to roam, as opposed to old-style zoos where animals were kept in cages or given limited open space. This improvement notwithstanding, the Animal Rescuers saw that the zoo's naturalistic habitats could not replace the open space of the wild, where the animals could express their full behavioral repertoires. This feeling comes through in the following interview:

Jason: Try to imagine being a polar bear. If you were a polar bear living in a zoo, how would you feel?

Gabriel: Not the same. I'll feel lonely, uh, I'll feel weird.

Jason: How so?

Gabriel: [shouting] 'CAUSE IT'S NOT THE SAME! Seeing all those polar bears. Like the zoo, they got two or three in one thing. One place that it's not really the same experience.

Jason: Now try to imagine being this animal in the wild, how do you think this experience would differ?

Gabriel: 'Cause you get to do everything you can't do in the zoo. Like hunt, find, mate with other polar bears, different polar bears.

This interview reveals Gabriel's feelings about what environmental psychologists refer to as the "affordances" of the zoo versus wild environment. The theory of environmental affordances, associated with J. J. Gibson (1979), suggests that an environment contains a series of "action possibilities" that enable particular behaviors based on the actors' capabilities. The affordances of the natural environment are obviously much broader than those of a zoo, even one that provides a naturalistic habitat. The students raised this idea about the animals' environments and actions time and again. At the Central Park Zoo, the group saw a polar bear repetitively swimming in a circle. Our participants and other zoo visitors wondered why. Jason, knowing the zookeeper who worked with this animal, had some knowledge of the situation. He explained that the bear could not express its full behavioral repertory in this limited environment. Essentially, the animal was bored and did not know what to do other than to swim in circles. Gabriel took this information and made it a fundamental part of his critique of keeping animals in captivity. He recognized the importance of space with respect to the animals' behavior. The views he expressed in the interview are a result of the relationship between his out-of-school-time experiences, his newly acquired knowledge about animals in captivity, and his evolving attitudes toward wildlife. This sort of stretching of the children's knowledge was typical.

Several other participants also identified properties of the zoo environment that they recognized "afford" only a limited repertoire of behaviors. For example, the chil-

dren noted that most predators in captivity do not have the opportunity to hunt their prey. However, while the group did criticize zoos for their lack of affordances, most also indicated that zoos offered care and safety for the animals. Alia expressed this view of zoos as safe havens.

Jason: Try to imagine being a tiger. If you were that animal living in the zoo, how would you feel?
Alia: I'd be happy 'cause I would feel safe.
Jason: Yeah?
Alia: There's no one to kill me, people to take care of me when I'm sick. When I'm in the wild I can't do that.

As did the majority of participants, Alia developed an awareness of the environmental issues surrounding animals in the wild. She expressed a combination of humanistic and moralistic attitudes toward animals, expressed through such ideas as the relative safety of captivity compared to the wild.

The development of children's morality and sense of responsibility toward animals became a central theme in the group's zoological adventures. One way the program got at these ideas was to challenge participants to think about environmental issues and how zoos might be part of the equation. When Alia was discussing what she had learned at the zoo, this conversation on global warming followed:

Jason: Do you think global warming affects animals?
Alia: Yes.
Jason: How?
Alia: It's killing them little by little, each animal. It's flooding the earth and … each time one animal disappears, the food chain goes lower and animals getting extinct little by little.
Jason: What are some things people can do about this problem?
Alia: Stop polluting and take care of the earth.
Jason: Can zoos help this problem?
Alia: Yes, they could convince people not to hurt the earth

Alia's response poses a tall order for zoos, but her perspective was provoked at least in part by zoo educators doing precisely what she suggests. A similar view was expressed by several participants who said it was very important for zoos to communicate with visitors

and engage them in doing something about issues of global warming, deforestation, and other pervasive environmental problems affecting animals and the planet.

From Global to Local

The children's response to environmental issues did not stop with a generalized concern for the planet as a whole. One of the most exciting things to emerge from our project was that the group not only expressed concern for the places and animals they learned about at the zoo, but also extrapolated that knowledge onto the local environment. During a walk in a local park, for instance, participants pointed out several sources of pollution and talked about the adverse effects on wild animals and the urban environment. These conversations led to discussions about how the students felt about where they live. One participant suggested that the mayor and the governor did not care about their neighborhood and its people. After learning about global and local environmental issues and thinking critically together about these issues in the MOODLE, group members spontaneously expressed a desire to reclaim their local environment and make it safer for animals and people. Some group members even began to plan a way to get funding to clean the pond in nearby Crotona Park. Though this program extension would have allowed the students to take their action from the web to the ground, it never came to fruition for a variety of pragmatic and programmatic reasons.

This sort of integrated project is particularly well suited to OST programs, which excel at fostering diverse learning practices in active communities of knowledge.

But the desire to do more was certainly sparked in several of the Animal Rescuers. For instance, when asked in his closing interview if there was anything else he would have liked to learn about animals or the places they come from, Noah responded:

> Um yeah, I'd like to learn more about certain animals' habitats. See what I can do as a person, as a kid, see what I can do in certain spots is what I'd like to learn more about, where they live so I can do certain things. Like maybe I could start cleaning up around my neighborhood, like around the park where certain animals live.

Beyond the moralistic and ecologistic attitudes Noah expresses, he has extended what he has learned in a somewhat exotic setting about animals and environmental issues to consider his own urban environment as a system in which people and animals cohabit. He continued this stream of thought in another remark about pigeons and people living together. Noah's responses suggest that he sees the possibility for people and animals to live in harmony, understanding that respect for the environment is necessary to foster this symbiotic relationship and that he has a role to play in achieving this goal.

Social Ecology of Learning

The Animal Rescuers afterschool program fostered a learning environment that enabled and encouraged participants to shift their attitudes toward animals and nature. Participants interacted in the MOODLE to discuss issues concerning animals in captivity and in the wild. In the process they were part of and helped to shape a learning community focused on their environmental concerns, both local and global. The afterschool program, its neighborhood, and city zoos served as complementary spaces for the production of knowledge, the encouragement of biophilia, and a budding practice of stewardship. While all of the participants had visited a zoo before, this afterschool project fostered critical reflection on the experiences of animals in zoos and the wild. By learning about and then engaging one another on issues such as endangered species, environmental degradation, and the lives of animals in captivity, the group reached a level of awareness and thoughtfulness that would not likely be achieved in superficial zoo visits. This collaborative process highlights Lave and Wenger's (1991) notion of *situated learning*, in which knowledge gained through active thinking and participation is not isolated, but rather is situated in the social context of the learning environment, which includes both physical settings and a community of learners in which everyone is learning and sharing knowledge.

Our mutually constructed social ecology of learning developed a group of children who were informed about animal life and environmental issues and were determined to make positive change both locally and globally. Online and offline environments provided complementary spaces in which children could engage with real-world issues and document their engagement in the virtual focus groups and project website. The Animal Rescuers program thus enabled new paths and practices of learning through innovative forms of interwoven communication. This sort of integrated project is particularly well suited to OST programs, which excel at fostering diverse learning practices in active communities

of knowledge. One of the most encouraging outcomes of this project is that the parent afterschool program and a new charter school have plans incorporate its environmental learning program as a regular offering.

Activity to Efficacy

The project's participatory approach and pedagogical activities, paired with its web-based work, supported knowledge acquisition through a unique interplay of physical activity and more traditional forms of learning. Documenting information gathered from the Internet, journal articles, and zoo classes and walking tours in a collaborative learning environment gave the Animal Rescuers the opportunity to revisit what they had learned. The asynchronous communication of the message forum and wiki allowed group members to consider their thoughts and feelings carefully before engaging their peers. This form of engagement kept the issues open for sharing for the duration of the project, in a way that is often not possible during the regular school day. It also provided a space where the participants could let their ideas grow at their own pace. Revisiting important topics allowed participants to develop their ideas, engaging their peers to form a deeper understanding while maintaining a level of autonomy that allowed each participant to form his or her own perspective.

Particularly encouraging was the development of self-efficacy in group members. Environmental issues on the scale of global warming often cause people to feel divorced from the problems' causes and incapable of taking action (Devine-Wright, Devine-Wright, & Fleming, 2004; Katz, 2004). When environmental issues seem too enormous and all-encompassing to have workable solutions, young people—and others—can feel disempowered: further removed from nature and overwhelmed by the pressure to "save" it (King, 1995). The Animal Rescuers developed an understanding of some of the causes and effects of global warming in a more tangible way than is often the case. As they discussed ways they might mediate its effects, not coincidentally, they wanted to change their own behavior and discourage others from environmentally irresponsible practices.

Two factors in the development of self-efficacy were the collaborative nature of the project and its environmental affordances. The VFG served not only as a means for discussing environmental issues, but also as a space where group members developed technical skills, such as web-based research and webpage construction, to support their burgeoning environmental interests. The environmental issues considered in this program revolved around the group's experiences of animals that are affected by environmental degradation. Students understood broad environmental problems such as global climate change through the specifics they learned about "their" animals. In other words, they could discuss global warming easily by referring to what they had learned about polar bears. That learning in turn heightened their sense of urgency in dealing with the issues. Further, participants easily appropriated the web-building tools they learned in order to express their concern. The group demonstrated a sense of self-efficacy by alerting, teaching, and otherwise engaging a broad audience through the Internet.

While this project focused on animal wellbeing, its approach is amenable to a variety of concerns. For example, Yvonne Hung (2004) and Kimberly Libman (2007) looked at similar modes of engagement in gardening, nutrition, and urban agriculture. The Animal Rescuers' evolving responses evoke Wilson's (1984) concept of biophilia, which stresses the importance of building knowledge and understanding of immediate issues in order to act ethically and effectively. "When very little is known about an important subject, the questions people raise are almost invariably ethical. Then as knowledge grows, they become more concerned with information and amoral, in other words more narrowly intellectual. Finally, as understanding becomes sufficiently complete, the questions turn ethical again" (Wilson, 1984, p. 119).

Through an open, participatory process, the Animal Rescuers took a significant step toward such engagement. They went beyond the initial barrage of information and their gut feelings to transform their concerns into a quest for more knowledge, to develop a more holistic understanding, and to translate these newly formed understandings into ideas for further engagement. Working in a collaborative afterschool environment with the MOODLE to document their interactions, the Animal Rescuers consolidated and organized their knowledge into a working understanding not only of the issues, but also of ways to translate their sense of self-efficacy into action. Beside producing an informative website about large-scale environmental problems and their effects on selected animals, the students also discussed ways to clean up and care for their local neighborhood environment. This is the sort of lateral growth and branching engagements that OST activities are uniquely poised to encourage.

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