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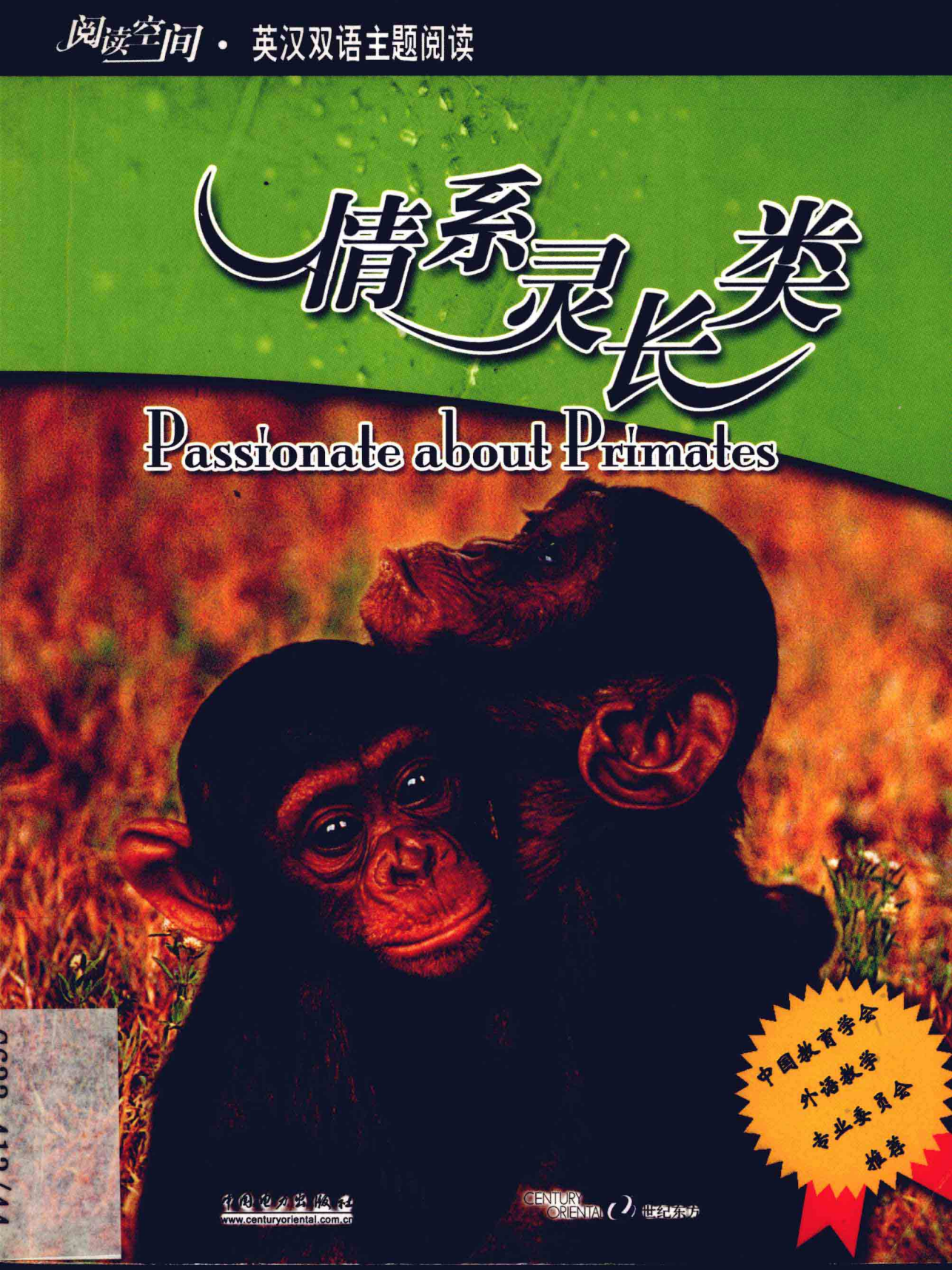
情系灵长类

Passionate about Primates



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郑秋雁 译

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CENTURY ORIENTAL 世纪东方

京权图字 01—2004—4530

图书在版编目（CIP）数据

情系灵长类／美国凯勒斯出版公司编著；郑秋雁译．
北京：中国电力出版社，2005
（阅读空间·英汉双语主题阅读）
书名原文：Passionate about Primates
ISBN 7-5083-2678-4

Ⅰ.情… Ⅱ.①美…②郑… Ⅲ.英语－阅读教学－
高中－课外读物 Ⅳ.G634.413

中国版本图书馆 CIP 数据核字（2004）第 074431 号

Passionate about Primates

情系灵长类

原著：**Faith Hickman Brynie** 等

翻　　译：郑秋雁
责任编辑：赵伟宏　李宝琳
出版发行：中国电力出版社
社　　址：北京市西城区三里河路 6 号（100044）
网　　址：http://www.centuryoriental.com.cn
印　　刷：北京世艺印刷有限公司
开　　本：178 × 226
印　　张：3.5
字　　数：67 千字
版　　次：2005 年 1 月第 1 版，2005 年 1 月第 1 次印刷
书　　号：ISBN 7-5083-2678-4
定　　价：9.90 元

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Editor's Message 编辑手记

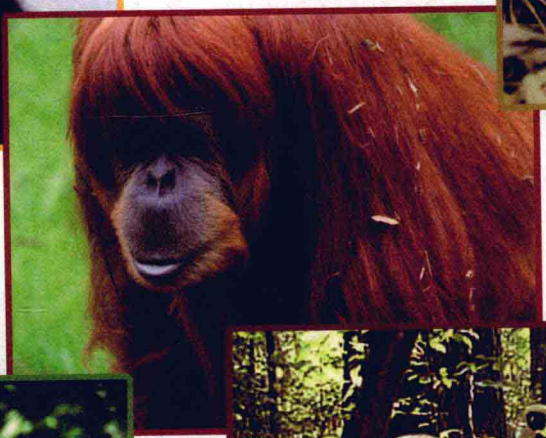
要用现成的词汇来准确描述本书中猩猩们的不同表情可并不容易。但看看它们憨态可掬的面庞绝对是一件开心事。近年来科学界对灵长类动物的研究有了令人惊异而有趣的发现：它们也许是人类最近的“亲戚”，尤其是黑猩猩，它们的DNA结构有98.7%和人类的相同！

通过研究猩猩，可以从多方面更深入地了解我们自身及人类的起源。但首先需要做的是，保护好这些人类的“亲属”，防止它们被杀戮，避免它们的栖息地——热带雨林——遭受破坏。

希望通过阅读本书能够激发起你对灵长类的关注，并共同致力于保护它们的生存。

WHAT IS A PRIMATE?

by Faith Hickman Brynie



什么是灵长类?

What do you have in common with the aye-aye, sifaka, siamang, and potto? If you said your collarbone, you're probably a *primatologist* – a person who studies primates. If you're not, read on.

Just like those animals with the weird names, you belong to the group of mammals called primates. (By the way, the group also includes the more commonly known monkeys, chimps, and gorillas.) Among other things, it's the structure of your shoulder that earns you membership in that club. In primates, the forearms are linked to the chest by the collarbone (also called the clavicle). That construction allows you and other primates to do something most mammals can't: hang by your arms. Watch kids crossing a jungle gym hand-over-hand. They share that ability with monkeys and apes, but don't expect rabbits, goats, or polar bears to perform such a feat!

The ability to swing isn't the only adaptation to life in the trees, where most primates live. Eyes face forward, encased in bony sockets. That lets the view from one eye overlap the other. The result is three-dimensional or stereoscopic vision – the perfect tool for judging both depth and distance.

Primates have agile arms *and* legs. Apes have no tails, but monkeys use their long, flexible tails for

人类与夜狐猴、马达加斯加狐猴、合趾猴、树熊猴有什么共同之处？如果你回答“锁骨”，那么你大概是一位研究灵长类动物的灵长类动物学家。如果你不是，那么请往下读。

就如同上述有着怪异名字的动物一样，人类是哺乳动物灵长目中的一员。（顺便一提，灵长目还包括人们熟知的猴类、黑猩猩及大猩猩。）在各种特征中，正是人类肩部的结构决定了我们属于灵长类大家庭。灵长类动物的前臂经由锁骨（锁骨的另一个词是clavicle）与胸部相连，这种构造使人类和其他灵长类动物能够做出大多数哺乳动物所无法做出的动作：借由前臂悬挂。你看到小孩子可以两手交替地过天梯。猴类和猿类也具备这种能力，不过，你可别指望兔子、山羊或北极熊有这样的本领。

大多数灵长类动物生活在丛林中，悬摆能力只是适应生活的方式之一。眼睛朝向正前方，嵌于骨窝关节中，双眼视野相交，构成三维或立体视觉，是判断深度和距离的理想工具。

灵长类动物具有敏捷的臂和腿。猿类没有尾巴，而猴类用它们那长而灵活的尾

balance. Many New World monkeys have ***prehensile*** tails that wrap around branches and act as an extra hand or foot. Some can support their entire weight using only their tail.

Primate fingers are flexible with sensitive ends, giving them a keen sense of touch. Except for marmosets and tamarins, all primates have flat fingernails and toenails instead of claws. Many primates, like humans, have a thumb that can bend to meet the other fingers or toes. This opposable thumb makes grasping small objects easy and paves the way for using and making tools. Tool use is aided by another very special primate feature – a large brain in relation to body size.

Many primates, especially those that are diurnal (active during the day), live in social groups. Some of the smaller, nocturnal (active at night) primates live alone. Like all mammals, primates have hair or fur. They nurse their young with milk from mammary glands. Compared to other mammals, however, primates have few offspring, and the babies take a long time to mature.

Prehensile
Adapted for seizing, grabbing, or holding, especially by wrapping around an object

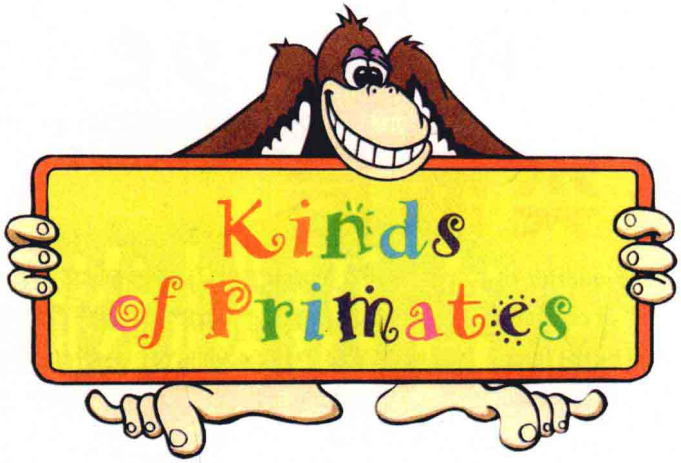
That growth and maturation varies greatly among species. The largest primate, the lowland gorilla, can achieve an adult weight of up to 225 kilograms (about 500 pounds). The smallest, the pygmy mouse lemur of Madagascar, tips the scales at a modest 30 grams (about one ounce) when fully grown.

巴保持平衡。许多新大陆猴有可盘卷的尾巴，能卷住枝条，充当第五肢。有些新大陆猴可以仅用尾巴支撑全身的重量。

灵长类动物手指灵活，指尖敏感，具有灵敏的触觉。除了狨和绢毛猴，所有灵长类动物都具有扁平的指（趾）甲而非爪子。许多灵长类动物与人类一样，其第一指（趾）弯曲后可以碰到其他四指（趾）。拇指（趾）所处的对立位置使灵长类动物能轻易地抓住小东西，从而为使用和制造工具铺平了道路。灵长类的另一显著特点是，与身体大小相比，它们有巨大的脑袋，这是使工具使用成为可能的另一要素。

许多灵长类动物，尤其是昼行性（白天活动的）灵长类动物，是群居动物，而一些小型的、夜行性（夜间活动的）灵长类动物则独自生活。同所有哺乳动物一样，灵长类动物长有毛发，以乳腺分泌的乳汁哺育下一代。然而，与其他哺乳动物相比，灵长类动物产子数量少，且幼年至成年所需时间长。

不同种类的灵长类动物之间生长及成年的标准有很大差异。最大的灵长类动物——低地大猩猩成年时体重可达225千克（约500磅）；最小的灵长类动物——马达加斯加侏儒鼠狐猴成年时仅重30克（约1盎司）。



by Faith Hickman Brynie

Scientists group the more than 200 living species of primates into two main categories. The first are the *prosimians*, or "primitive" primates. This group includes lemurs, pottos, lorises, and tarsiers. Mostly, the prosimians are small in size. They have long whiskers and pointed snouts. Their senses of hearing and smell are keen. They have moist noses and whiskers and mobile ears. Many are nocturnal and have only black-and-white vision.

The second group is the *anthropoids*, which contains nearly three times as many species as the prosimians. Anthropoids include New World and Old World monkeys, marmosets, tamarins, siamangs, and gibbons.

The "Great Apes" are another major group of anthropoids. That group includes our closest cousins, the gorilla, chimpanzee, orangutan, and bonobo. (Recently, many scientists have also started to classify humans as a fifth species of great ape.) Most anthropoids have flat faces, keen color vision, and a relatively poor sense of smell. Anthropoids are intelligent and quick to learn. Many use and make tools and set up social systems.

科学家将200多种现存的灵长类动物分为两大类。第一类是原猴类，即“原始”灵长类，包括狐猴、树熊猴、懒猴、眼镜猴。通常原猴类体型较小，它们长有长须和尖嘴，听觉与嗅觉敏锐，有潮湿的鼻、须和可活动的耳；这类动物多为夜行性，只具备黑白视觉。

第二类是类人猿，种类约三倍于原猴类，它们包括新大陆猴、旧大陆猴、狨猴、绢毛猴、合趾猴、长臂猿。

“大型猿类”是类人猿的重要一支，包括与人类最接近的大猩猩、黑猩猩、猩猩、倭黑猩猩。(最近，许多科学家已开始将人类划归为大型猿类的第五种。)大多数类人猿面部扁平，视觉灵敏，可分辨色彩，但嗅觉较弱。类人猿聪明，学习能力强。许多类人猿使用及制造工具，并建立社会体系。

灵长类的种类

Primates in Danger

by Faith Hickman Brynie

灵长类濒危

Where's the single place to find one-quarter of primate species? On the "Red List" of critically endangered, or vulnerable, species published by the International Union for Conservation of Nature and Natural Resources (IUCN). Today's world is a dangerous place for primates, and when we lose them, we'll lose these amazing creatures – including our closest cousins – forever (see "Cousins in Crisis").

One of the most dangerous areas for the world's primates is Madagascar. Some species of forest-dwelling lemurs found there live nowhere else in the world, but their homes are nearly all gone. Between 1950 and 1985 (say researchers at American University in Washington, DC), half of all Madagascar's forests disappeared, as people cut the trees to grow coffee, mine the earth, and raise cattle. Between 1990 and 1995, the island continued to lose nearly 130,000 hectares of its forest land annually, according to estimates from the World Resources Institute.

在什么地方可以一下子找到四分之一的灵长类动物种类？在国际自然及自然资源保护协会（IUCN）公布的濒危或易受攻击的动物名单中。当今世界对灵长类动物来说十分危险。我们失去灵长类时，就将永远失去这些令人惊异的生物，其中也包括与人类最亲近的物种。

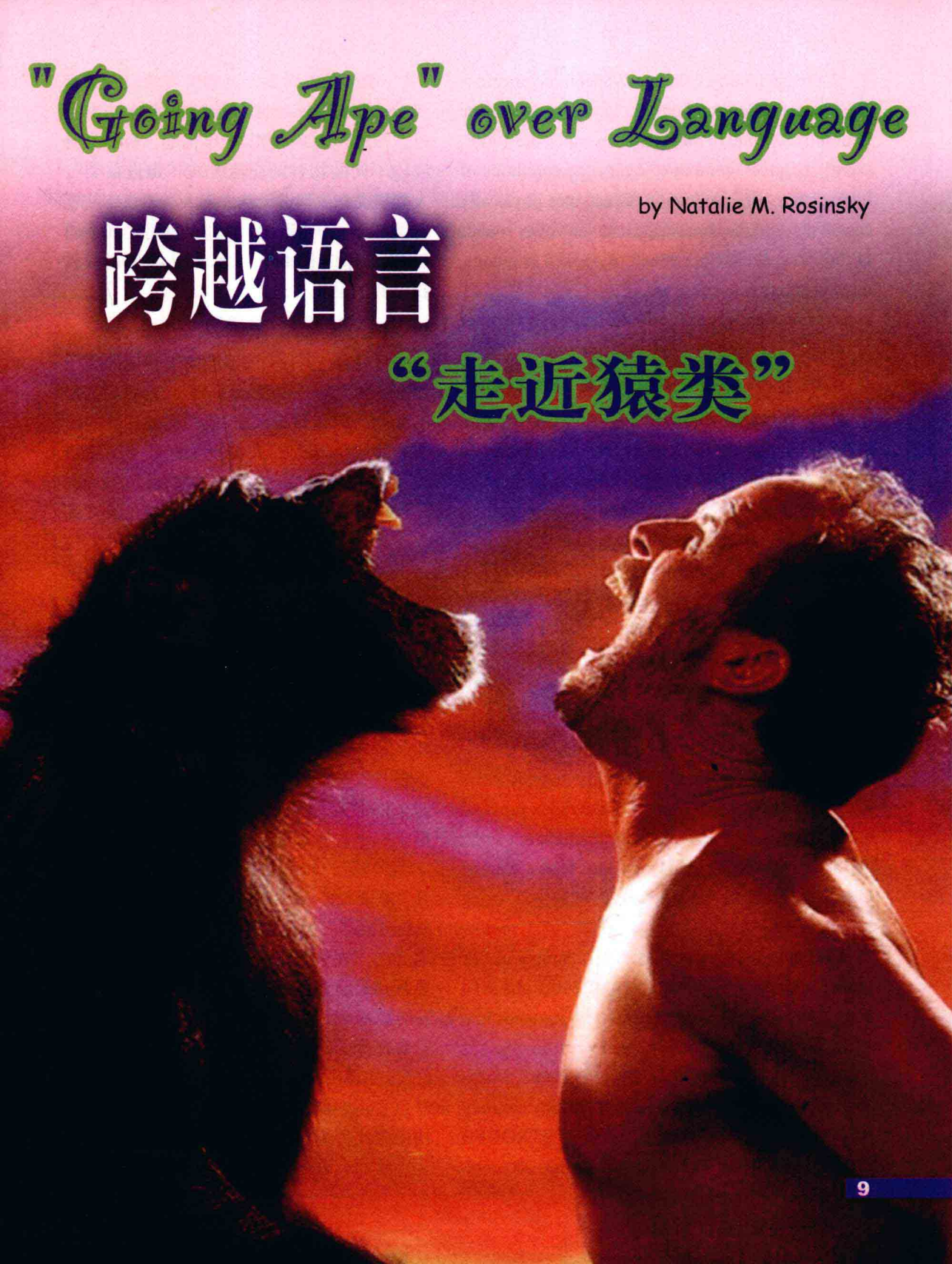
对世界上的灵长类动物而言，马达加斯加是世界上最危险的地区之一。一些生活在丛林中的狐猴种类只存活于马达加斯加，然而它们的家园已几乎不存在了。1950到1985年间（据哥伦比亚特区华盛顿美利坚大学的研究人员说），由于人类砍伐树木以种植咖啡、开采矿藏、放养牛群，马达加斯加的丛林面积减少了一半。据世界资源协会预计，1990到1995年间，马达加斯加的森林面积以每年近13万公顷的速度减少。

"Going Ape" over Language

by Natalie M. Rosinsky

跨越语言

“走近猿类”



Humans talking with apes? Such conversations were once found only in fables, or in science fiction like *Planet of the Apes*. But, since the 1960s, scientists have "gone ape" over other methods of interspecies communication. Great apes physically cannot produce the consonants or some vowel sounds of human speech. So, instead of spoken language, researchers are using ***American Sign Language (ASL)*** and technology to teach human language to other primates.

A CHIMPANZEE NAMED WASHOE

In 1966, Dr. Allen Gardner and his wife, Beatrix, began teaching ASL to a year-old female chimpanzee named Washoe. They taught Washoe by "cross-fostering" her – that is, treating her like a deaf human child. Washoe had a stimulating environment filled with toys and attentive human companions who used ASL to "discuss" daily activities. In those first years, one important topic of conversation was – of course – potty training! Dr. Roger Fouts, an early companion, and his wife, Debbi, have now spent more than 30 years with "Project Washoe". In 1992, the Fouts founded the Chimpanzee and Human Communication Institute at Central Washington University, where Washoe lives with an adoptive family of four other ASL-using chimpanzees.

American Sign Language (ASL)
An American system of communication for the hearing-impaired that employs manual signs

Washoe is the most "talkative" member of this group, with an ASL vocabulary of 240 signs. She often "translates" spoken words she understands into ASL. Washoe signs correctly even when an object is out of sight - signaling "DOG," for example, whenever she hears canine barking. She also accurately puts together short "sentences" – signing "ROGER TICKLE WASHOE" when this is what has occurred.

人类与猿类对话？这样的交谈只在寓言或科幻小说（如《猿的星球》）中出现过。不过，从19世纪60年代起，科学家已经以不同的物种间交流方式“走近猿类”。大型猿类在生理上无法发出人类语言中的辅音及部分元音。因此，研究人员用美式手语（ASL）和技术取代口语，将人类的语言教授给其他灵长类动物。

一只名叫瓦舒的黑猩猩

1966年，艾伦·加德纳博士和他的妻子比阿特丽克斯开始教一只一岁大的名为瓦舒的雌性黑猩猩美式手语。他们在教瓦舒的时候将她视为耳聋的人类孩子进行“交叉培养”。瓦舒生活在一个激励性的环境中，四周满是玩具和专心使用美式手语“讨论”日常活动的人类伙伴。在头几年里，交谈的一个重要话题当然是——使用便盆的训练。很早就参加该项目的罗杰·福茨博士和他的妻子黛比已经在“瓦舒项目”上研究了30多年了。1992年，福茨夫妇在中央华盛顿大学创建了黑猩猩与人类交流学会。在那里，瓦舒和另外四个使用美式手语的黑猩猩生活在一起，组成了一个收养家庭。

瓦舒会240种美式手语的手势，是其中最“健谈”的一个。她经常将她理解的口语单词“翻译”为美式手语。她甚至可以正确地比划出视线范围之外的东西。例如，她只要听到犬吠声就可以比出“狗”的手势。她还可以准确地组合短“句”，例如，当罗杰胳肢瓦舒的时候，她会比划出“罗杰胳肢瓦舒”。如果不知道某样事物的手势，瓦舒会符合逻辑地创造出手势，例如，把她的第一块糖棒比划为“糖香蕉”。

然而，瓦舒与人类的对话中最值得纪

If she does not know the sign for an item, Washoe creatively yet logically "renames" it. She called her first candy bar a "CANDY BANANA"!

Yet emotion, not just logic, has filled some of Washoe's most memorable conversations with humans. Washoe had already had two unsuccessful pregnancies when she learned that a caregiver's

念的是她表达的情感，而不只是逻辑。瓦舒两次怀孕失败之后，当得知一名照看她的工作人员的婴儿死了的时候，她低头看着地面，然后直视那名工作人员的眼睛，摸了摸她的眼睛下方的面颊，做出“哭”的手势。当天晚些时候，瓦舒再次安慰了这名工作人员，做出“请－人－拥抱”的

"Aping Their Betters"

by Natalie M. Rosinsky

Linguist Noam Chomsky insists that human beings are the only primates neurologically capable of language. Some other scientists, including MIT's Dr. Steven Pinker, share this view. They conclude that "Project Washoe" and similar research prove only that apes can be trained, and that they will imitate the behavior of trainers just for rewards or approval. These critics maintain that investigators, along with animal rights activists, have misinterpreted the results of these research projects because they *want* to believe that apes can "talk."

But there are answers to these objections. The private signing done by chimpanzees is evidence that apes use language for more than rewards or approval. And the technology used to teach "Yerkish" to bonobos lessens the possibly questionable element of imitation in this and similar research. Furthermore, as Dr. Sue Savage-Rumbaugh notes, comprehension and visual cues between humans are themselves part of a broader definition of language. It may be unfair to define language for apes only in the narrowest sense. Lastly, current research into how apes communicate among themselves in the wild is reshaping our views of them. Geographically separated groups of bonobos have their own "dialects" of communicative gestures and sounds. And bonobos already may communicate symbolically among themselves, smashing plants and placing them at particular angles as "road signs."

“模仿佼佼者”

语言学家诺姆·乔姆斯基坚称人类是灵长类中惟一在神经系统上有语言能力的。包括麻省理工学院的史蒂文·平克博士在内的其他科学家也同意这一观点。他们断定“瓦舒项目”和其他类似研究只能证明猿类能够接受训练，并且为了得到报偿或赞许而模仿训练师的行为。他们主张，调查人员连同动物权利提倡者都误解了这些研究项目的结果，因为他们想相信猿类可以“说话”。

但是，对这些异议的反驳之声也是有的。黑猩猩私下对手语的使用证明了猿类对语言的使用不仅仅是为了得到报偿或赞许。而用于教授倭黑猩猩“耶基斯语”的技术减少了在这个及类似研究中模仿因素的可能性。此外，正如苏·萨瓦吉·伦堡博士所记录，人类之间的相互理解和视觉提示本身就是更为广义的语言的一部分。将猿类的语言划定于一个狭窄的范围内，或许是不公平的。最后，当前关于猿类如何在野外相互沟通的研究正在改变我们对它们的观点。地理上分散于各处的倭黑猩猩有它们自己的“方言”——用于交流的姿势和声音。倭黑猩猩或许已经能够通过砸碎植物，并将残枝放置成特定角度以表示“路标”，以此来象征性地相互交流。

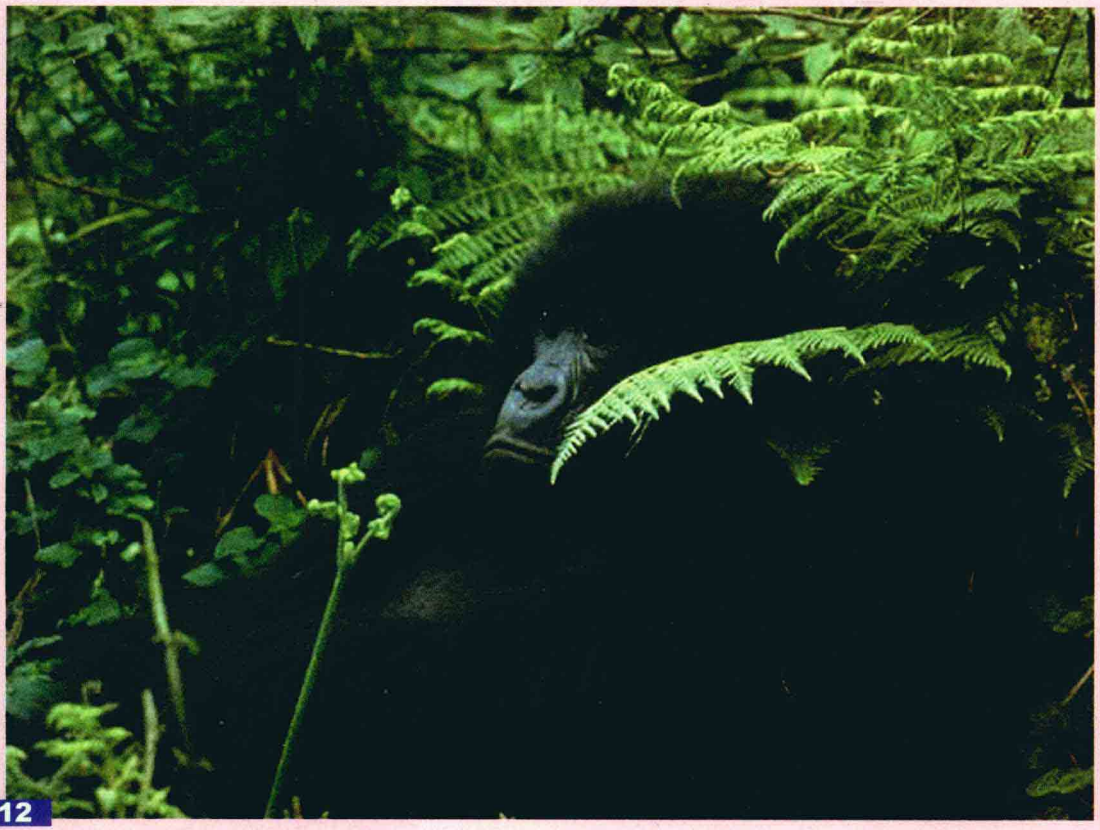
baby had died. The chimpanzee looked groundward, then directly into the woman's eyes, and signed "CRY" while touching the woman's cheek just below her eye. Later that day, Washoe wouldn't let her caregiver go home without further consolation, signing "PLEASE PERSON HUG."

Researchers are also excited by the chimpanzees' use of ASL among themselves. Washoe, her adoptive son Loulis, and other family members have been videotaped having ASL conversations on their own about games, food, and "housecleaning." Birthday parties and holiday celebrations are other "hot" topics of conversation. The chimpanzees have even been observed "talking to themselves," much as a human might mutter under her breath. When Loulis mischievously ran away with one of her favorite magazines, an annoyed Washoe signed "BAD, BAD, BAD" to herself.

手势之后，才让她回家。

研究人员对黑猩猩相互之间使用美式手语的行为也感到十分兴奋。录像记录下了瓦舒和她的养子路利斯以及其他家庭成员之间用美式手语谈论游戏、食物、“家庭卫生”。此外，生日聚会和节日庆祝也是谈论的“热点”话题。观察中甚至还发现，黑猩猩会“自言自语”，就像某人小声嘀咕那样。当路利斯淘气地拿着瓦舒喜欢的杂志跑了时，瓦舒气愤地自己比划着“坏，坏，坏”。

然而，路利斯对美式手语的使用才是最具意义的。在一项设计好的实验中，在起初的五年里，研究人员不在路利斯的面前使用美式手语，而让他像耳聋的人类孩子那样，通过看和模仿养母和其他家庭成员来学习美式手语。黑猩猩似



It is Loulis's use of ASL, though, that may be most significant. In a planned experiment, researchers avoided signing in Loulis's presence during his first five years. Yet Loulis – like deaf human children – learned ASL by watching and imitating his adoptive mother and other family members! Chimpanzees, it seems, not only can learn human language, but also can transmit it to others.

A GORILLA NAMED KOKO

Koko, a female lowland gorilla, began learning ASL in 1972, when she was one year old. Her teacher, Dr. Francine Patterson, provided her with a gorilla companion in 1976, when three-year-old Michael joined them at the official start of the Gorilla Foundation.

Koko has a working vocabulary of 1,000 signs and understands 2,000 spoken words. Michael – before his unexpected death last year – used 600 signs to communicate. Both gorillas, like Washoe, have shown creativity and logic in naming unknown objects. It was obvious to Koko that a face mask is an "EYE HAT," while Michael had no difficulty at all in titling his painting (yes, gorillas paint) of a bouquet of flowers "STINK"!

Koko has even used ASL to "talk" herself out of trouble. When a trainer caught her eating a crayon, Koko signed "LIP" and pretended to be applying lipstick! Koko also likes to joke using ASL, calling herself an "ELEPHANT" after pointing to a long tube held out in front of her like that animal's trunk. Koko has also used ASL to express sadness and some complex ideas. She mourned the death of her kitten, named All Ball, by repeatedly signing "SAD." When asked when gorillas die, Koko signed "TROUBLE OLD." When she was then asked what happens to gorillas after they die, Koko answered "COMFORTABLE HOLE." With Dr. Patterson as an interpreter, Koko has even participated in on-line, computerized "chats"!

乎不仅能学习人类语言，还能把它传给其他黑猩猩。

一只名为科科的猩猩

科科是雌性低地大猩猩，从1972年即一岁的时候开始学习美式手语。1976年，大猩猩基金会正式成立。此时，她的老师弗朗辛·帕特森博士给她带来了一名大猩猩同伴——三岁的迈克尔。

科科会1000种手势，能理解2000个口语单词。迈克尔在去年意外死亡之前，能使用600种手势进行交流。这两只大猩猩同瓦舒一样，在表达未知事物时表现出创造力和逻辑能力。很明显，对科科来说，面具就是“眼帽”；而迈克尔可以毫无困难地给自己画的一束花命名为“散发臭味”（是的，大猩猩会作画）！

科科甚至用美式手语帮助自己逃脱麻烦。当训练师发现她在吃蜡笔的时候，科科做出“嘴唇”的手势，并假装在抹口红！科科还喜欢用美式手语开玩笑：指指面前像象鼻一样伸出的长管子，她称自己为“大象”。科科还用美式手语表达悲伤的情感和其他一些复杂的思想。她有一只叫“球球”的小猫，球球死的时候，她一遍又一遍地比划着“悲伤”来为之哀悼。当被问及大猩猩什么时候死亡，科科做出“苦恼老”的手势。之后，当被问及大猩猩死后会遇到什么的时候，科科回答“舒服的洞”。由帕特森博士做口译，科科还曾经参加了网上“聊天”！

一只名为康子的倭黑猩猩

康子是一只雄性倭黑猩猩，生于1980年。与瓦舒和科科不同，它“说”另外一种人类语言。他使用耶基斯语与人交流。耶基斯语是一种视觉代码，由佐治亚州立大学和耶基斯灵长类研究中心的研究人员

A BONOBO NAMED KANZI

Kanzi, a male bonobo born in 1980, "speaks" a different human language than Washoe and Koko. He communicates in "Yerkish," a visual code invented by researchers at Georgia State University and the Yerkes Primate Research Center. "Yerkish" is a set of several hundred geometric symbols called "lexigrams," each representing a verb, noun, or adjective. These lexigrams are placed on an adapted computer keyboard, which bonobos learn to use while learning the meanings of the lexigrams. Kanzi communicates by computer! (Outdoors, Kanzi points to lexigrams on a carry-around tagboard.)

Kanzi, who also understands more than 1,000 spoken English words, first learned Yerkish by watching humans train his mother. Like a silent toddler who astonishes parents by first speaking in complete sentences, two-year-old Kanzi amazed researchers on the day he first "spoke" Yerkish by using most of the lexigrams taught to his mother. By the age of six, he had a Yerkish vocabulary of 200 lexigrams. According to Dr. Sue Savage-Rumbaugh, Kanzi and other bonobos construct logical sentences in Yerkish and even use the lexigram for "later" to discuss future activities.

发明。“耶基斯语”由数百个名为“图形符号”的几何符号组成，每一个符号代表一个动词、名词或形容词。这些图形符号排列在相应的计算机键盘上，使倭黑猩猩能够一边学习图形符号的含义，一边学习如何使用键盘。康子用计算机与人交流。(在户外，康子则使用便携的标签纸上的图形符号。)

康子能理解1000多个英语口语单词。他起初是通过观看人类训练他的母亲来学习耶基斯语的。不发一语的、刚开始学习走路的孩子，第一次说出完整句子会使父母感到大为惊讶。康子两岁的时候，第一次使用教授给他母亲的那些图形符号，并用了其中的大部分词汇“说”耶基斯语，宛如那刚开始学习走路的孩子一样，它让研究人员大吃一惊。到了六岁的时候，他的耶基斯语词汇量已经达到200个。据苏·萨瓦吉·伦堡博士说，康子和其他倭黑猩猩用耶基斯语合理地造句，甚至用表示“稍后”的图形符号来讨论今后的活动。

OTHER PRIMATES: At Washington, DC's National Zoo, scientists have begun to investigate how orangutans use another visual language, one designed just for them, to communicate.

See these Web sites to learn more about language and. . .

orangutans: natzoo.si.edu/zooview/exhibits/thinktan/tthome.htm
chimpanzees: www.cwu.edu/~cwuchci
gorillas: www.gorilla.org
bonobos:www.gsu.edu/~wwwlrc/