GTR 43

READING PASSAGE 1

THE CULTURE OF CHIMPANZEE!

A. The similarities between chimpanzees and humans have been studied for years, but in the past decade, researchers have determined that these resemblances run much deeper than anyone first thought. For instance, the nut-cracking observed in the Taï Forest is far from a simple chimpanzee behavior; rather it is a singular adaptation found only in that particular part of Africa and a trait that biologists consider being an expression of chimpanzee culture. Scientists frequently use the term "culture" to describe elementary animal behaviors – such as the regional dialects of different populations of songbirds – but as it turns out, the rich and varied cultural traditions found among chimpanzees are second in complexity only to human traditions.

B. During the past two years, an unprecedented scientific collaboration, involving every major research group studying chimpanzees, has documented a multitude of distinct cultural patterns extending across Africa, in actions ranging from the animals' use of tools to their forms of communication and social customs. This emerging picture of chimpanzees not only affects how we think of these amazing creatures but also alters human beings' conception of our own uniqueness and hints at ancient foundations for extraordinary capacity for culture.

C. Homo sapiens and Pan troglodytes have coexisted for hundreds of millennia and share more than 98 percent of their genetic material, yet only 40 years ago we still knew next to nothing about chimpanzee behavior in the wild. That began to change in the 1960s when Toshisada Nishida of Kyoto University in Japan and Jane Goodall began their studies of wild chimpanzees at two field sites in Tanzania. (Goodall's research station at Gombe – the first of its kind – is more famous, but Nishida's site at Mahale is the second oldest chimpanzee research site in the world.)

D. In these initial studies, as the chimpanzees became accustomed to close observation, the remarkable discoveries began. Researchers witnessed a range of unexpected behaviors, including fashioning and using tools, hunting, meat-eating, food sharing and lethal fights between members of neighboring communities. In the years that followed, other primatologists set up camp elsewhere, and, despite all the financial, political and logistical problems that can beset African fieldwork, several of these outposts became truly long-term projects. As a result, we live in an unprecedented time, when an intimate and comprehensive scientific record of chimpanzees' lives, at last, exists not just for one but for several communities spread across Africa.

E. As early as 1973, Goodall recorded 13 forms of tool use as well as eight social activities that appeared to differ between the Gombe chimpanzees and chimpanzee populations elsewhere. She ventured that some variations had what she termed a cultural origin. But what exactly did Goodall mean by "culture"? According to the Oxford Encyclopedic English Dictionary, culture is defined as "the customs … and achievements of a particular time or people." The diversity of human cultures extends from technological variations to marriage rituals, from culinary habits to myths and legends. Animals do not have myths and legends, of course. But they do have the capacity to pass on behavioral traits from generation to generation, not through their genes but by learning. For biologists, this is the fundamental criterion for a cultural trait: it must be something that can be learned by observing the established skills of others and thus passed on to future generations.

F. What of the implications for chimpanzees themselves? We must highlight the tragic loss of chimpanzees, whose populations are being decimated just when we are at last coming to appreciate these astonishing animals more completely. Populations have plummeted in the past century and continue to fall as a result of illegal trapping, logging and, most recently, the bushmeat trade. The latter is particularly alarming: logging has driven roadways into the forests that are now used to ship wild-animal meat-including chimpanzee meat to consumers as far afield as Europe. Such destruction threatens not only the animals themselves but also a host of fascinatingly different ape cultures.

G. Perhaps the cultural richness of the ape may yet help in its salvation, however. Some conservation efforts have already altered the attitudes of some local people. A few organizations have begun to show videotapes illustrating the cognitive prowess of chimpanzees. One Zairian viewer was heard to exclaim, “Ah, this ape is so like me, I can no longer eat him.”

H. How an international team of chimpanzee experts conducted the most comprehensive survey of the animals ever attempted. Scientists have been investigating chimpanzee culture for several decades, but too often their studies contained a crucial flaw. Most attempts to document cultural diversity among chimpanzees have relied solely on officially published accounts of the behaviors recorded at each research site. But this approach probably overlooks a good deal of cultural variation for three reasons.

I. First, scientists typically don’t publish an extensive list of all the activities they do not see at a particular location. Yet this is exactly what we need to know-which behaviors were and were not observed at each site. Second, many reports describe chimpanzee behaviors without saying how common they are; without this information, we can’t determine whether a particular action was a once-in-a-lifetime aberration or a routine event that should be considered part of the animals’ culture. Finally, researchers’ descriptions of potentially significant chimpanzee behaviors frequently lack sufficient detail, making it difficult for scientists working at other spots to record the presence or absence of the activities.

J. To remedy these problems, the two of us decided to take a new approach. We asked field researchers at each site for a list of all the behaviors they suspected were local traditions. With this information in hand, we pulled together a comprehensive list of 65 candidates for cultural behaviors.

K. Then we distributed our list to the team leaders at each site. In consultation with their colleagues, they classified each behavior in terms of its occurrence or absence in the chimpanzee community studied. The key categories were customary behavior (occurs in most or all of the able-bodied members of at least one age or sex class, such as all adult males), habitual (less common than customary but occurs repeatedly in several individuals), present (seen at the site but not habitual), absent (never seen), and unknown.

GTR 43

Questions 1 - 5

The Reading Passage has seven paragraphs 1-5.

Which paragraph contains the following information?

Write the correct letter, A-K, in boxes 1-5 on your answer sheet.

1. A problem of researchers on chimpanzee culture which are only based on official sources.
2. Design a new system by two scientists aims to solve the problem.
3. Reasons why previous research on ape culture is problematic.
4. Classification of data observed or collected.
5. An example that showing the tragic outcome of animals leading to an indication of the change in local people's attitude in preservation.

Questions 6-10

Do the following statements agree with the information given in Reading Passage 1?

In boxes 6-10 on your answer sheet, write

TRUE	**if the statement is true**
FALSE	**if the statement is false**
NOT GIVEN	**if the information is not given in the passage**

6. The research found that scientist can make chimpanzees possess the same complex culture as human.
7. Human and apes live together long ago and share most of their genetic substance.
8. Even Toshisada Nishida and Jane Goodall's beginning studies observed many surprising features of civilized behaviors among chimpanzees.
9. Chimpanzees, like a human, have the ability to deliver cultural behaviors mostly from genetic inheritance.
10. For decades, researchers have investigated chimpanzees by data obtained from both unobserved and observed approaches.

Questions 11-14

Answer the questions below.

Choose **NO MORE THAN THREE WORDS AND/OR A NUMBER.**

11. When the unexpected discoveries of chimpanzee behavior start?
12. Which country is the researching site of Toshisada Nishida and Jane Goodall?
13. What did the chimpanzee have to get used to in the initial study?
14. What term can depict it than Jane Goodall found the chimpanzee used the tool in 1973?

READING PASSAGE 2

NUMERACY: CAN ANIMALS TELL NUMBERS?

A. Prime among basic numerical faculties is the ability to distinguish between a larger and a smaller, says psychologist Elizabeth Brannon. Humans can do this with ease – providing the ratio is big enough – but do other animals share this ability? In one experiment, rhesus monkeys and university students examined two sets of geometrical objects that appeared briefly on a computer monitor. They had to decide which set contained more objects. Both groups performed successfully but, importantly, Brannon's team found that monkeys, like humans, make more errors when two sets of objects are close in number. The students' performance ends up looking just like a monkey's. It's practically identical, she says.

B. Humans and monkeys are mammals, in the animal family known as primates. These are not the only animals whose numerical capacities rely on ratio, however. The same seems to apply to some amphibians. Psychologist Claudia Uller's team tempted salamanders with two sets of fruit flies held in clear tubes. In a series of trials, the researchers noted which tube the salamanders scampered towards, reasoning that if they had a capacity to recognise the number, they would head for the larger number. The salamanders successfully discriminated between tubes containing 8 and 16 flies respectively, but not between 3 and 4, 4 and 6, or 8 and 12. So it seems that for the salamanders to discriminate between two numbers, the larger must be at least twice as big as the smaller. However, they could differentiate between 2 and 3 flies just as well as between 1 and 2 flies, suggesting they recognise small numbers in a different way from larger numbers.

C. Further support for this theory comes from studies of mosquitofish, which instinctively join the biggest shoal they can. A team at the University of Padova found that while mosquitofish can tell the difference between a group containing 3 shoal-mates and a group containing 4, they did not show a preference between groups of 4 and 5. The team also found that mosquitofish can discriminate between numbers up to 16, but only if the ratio between the fish in each shoal was greater than 2:1. This indicates that the fish, like salamanders, possess both the approximate and precise number systems found in more intelligent animals such as infant humans and other primates.

D. While these findings are highly suggestive, some critics argue that the animals might be relying on other factors to complete the tasks, without considering the number itself. 'Any study that's claiming an animal is capable of representing number should also be controlling for other factors,' says Brannon. Experiments have confirmed that primates can indeed perform numerical feats without extra clues, but what about the more primitive animals?

E. To consider this possibility, the mosquitofish tests were repeated, this time using varying geometrical shapes in place of fish. The team arranged these shapes so that they had the same overall surface area and luminance even though they contained a different number of objects.

Across hundreds of trials on 14 different fish, the team found they consistently discriminated 2 objects from 3. The team is now testing whether mosquitofish can also distinguish 3 geometric objects from 4.

F. Even more primitive organisms may share this ability. Entomologist Jurgen Tautz sent a group of bees down a corridor, at the end of which lay two chambers – one which contained sugar water, which they like, while the other was empty. To test the bees' numeracy, the team marked each chamber with a different number of geometrical shapes – between 2 and 6. The bees quickly learned to match the number of shapes with the correct chamber. Like the salamanders and fish, there was a limit to the bees' mathematical prowess – they could differentiate up to 4 shapes, but failed with 5 or 6 shapes.

G. These studies still do not show whether animals learn to count through training, or whether they are born with the skills already intact. If the latter is true, it would suggest there was a strong evolutionary advantage to a mathematical mind. Proof that this may be the case has emerged from an experiment testing the mathematical ability of three – and four-day-old chicks. Like mosquitofish, chicks prefer to be around as many of their siblings as possible, so they will always head towards a larger number of their kin. If chicks spend their first few days surrounded by certain objects, they become attached to these objects as if they were family. Researchers placed each chick in the middle of a platform and showed it two groups of balls of paper. Next, they hid the two piles behind screens, changed the quantities and revealed them to the chick. This forced the chick to perform simple computations to decide which side now contained the biggest number of its "brothers". Without any prior coaching, the chicks scuttled to the larger quantity at a rate well above chance. They were doing some very simple arithmetic, claim the researchers.

H. Why these skills evolved is not hard to imagine, since it would help almost any animal forage for food. Animals on the prowl for sustenance must constantly decide which tree has the most fruit, or which patch of flowers will contain the most nectar. There are also other, less obvious, advantages of numeracy. In one compelling example, researchers in America found that female coots appear to calculate how many eggs they have laid – and add any in the nest laid by an intruder – before making any decisions about adding to them. Exactly how ancient these skills are is difficult to determine, however. Only by studying the numerical abilities of more and more creatures using standardized procedures can we hope to understand the basic preconditions for the evolution of number.

GTR 43

Questions 15-21

Answer the table below.

Write **NO MORE THAN THREE WORDS AND/OR A NUMBER** on your answer sheet.

Animal numeracy		
Subjects	Experiments	Results
Mammals and birds		
rhesus monkeys and humans	looked at two sets of geometrical objects on a computer screen	Performance of the two groups is almost 15……..
chicks	chose between two sets of **16……** which are altered	chicks can do calculations in order to choose a larger group
coots	behaviour of female birds was observed	A bird seems to have ability to **17……..**
Amphibians, fish and insects		
salamanders	offered clear tubes containing different quantities of **18……**	salamanders distinguish between numbers over four if the bigger number is at least two times larger
19……	shown real shoals and later artificial ones of geometrical shapes; these are used to check the influence of total **20……** and brightness	subjects know the difference between two and three and possibly three and four, but not between four and five
bees	Had to learn where **21……** was stored	could soon choose the correct place

Questions 22-27

Do the following statements agree with the information given in Reading Passage 2?

In boxes 22-27 on your answer sheet, write

YES **if the statement is true**

NO **if the statement is false**

NOT GIVEN **if the information is not given in the passage**

22. Primates are better at identifying the larger of two numbers if one is much bigger than the other.
23. Jurgen Tautz trained the insects in his experiment to recognise the shapes of individual numbers.
24. The research involving young chicks took place over two separate days.
25. The experiment with chicks suggests that some numerical ability exists in newborn animals.
26. Researchers have experimented by altering quantities of nectar or fruit available to certain wild animals.
27. When assessing the number of eggs in their nest, coots take into account those of other birds.

GTR 43

READING PASSAGE 3

Company Innovation

A

In a scruffy office in midtown Manhattan, a team of 30 artificial-intelligence programmers is trying to simulate the brains of an eminent sexologist, a well-known dietician, a celebrity fitness trainer and several other experts. Umagic Systems is a young firm, setting up websites that will allow clients to consult the virtual versions of these personalities. Subscribers will feed in details about themselves and their goals; Umagic's software will come up with the advice that the star expert would give. Although few people have lost money betting on the neuroses of the American consumer, Umagic's prospects are hard to gauge (in ten years' time, consulting a computer about your sex life might seem natural, or it might seem absurd). But the company and others like it are beginning to spook large American firms because they see such half-barmy "innovative" ideas as the key to their own future success.

B

Innovation has become the buzz-word of American management. Firms have found that most of the things that can be outsourced or re-engineered have been (worryingly, by their competitors as well). The stars of American business tend today to be innovators such as Dell, Amazon and Wal-Mart, which have produced ideas or products that have changed their industries.

C

A new book by two consultants from Arthur D. Little records that, over the past 15 years, the top 20% of firms in an annual innovation poll by Fortune magazine have achieved double the shareholder returns of their peers. Much of today's merger boom is driven by a desperate search for new ideas. So is the fortune now spent on licensing and buying others' intellectual property. According to the Pasadena-based Patent & Licence Exchange, trading in intangible assets in the United States has risen from $15 billion in 1990 to $100 billion in 1998, with an increasing proportion of the rewards going to small firms and individuals.

D

And therein lies the terror for big companies: that innovation seems to work best outside them. Several bigs established "ideas factories", including 3M, Procter & Gamble and Rubbermaid, have had dry spells recently. Gillette spent ten years and $1 billion developing its new Mach 3 razor; it took a British supermarket only a year or so to produce a reasonable imitation. "In the management of creativity, size is your enemy," argues Peter Chernin, who runs the Fox TV and film empire for News Corporation. One person managing 20 movies is never going to be as involved as one doing five movies. He has thus tried to break down the studio into smaller units – even at the risk of incurring higher costs.

E

It is easier for ideas to thrive outside big firms these days. In the past, if a clever scientist had an idea he wanted to commercialise, he would take it first to a big company. Now, with plenty of cheap venture capital, he is more likely to set up on his own. Umagic has already raised $5m and is about to raise $25m more. Even in capital-intensive businesses such as pharmaceuticals, entrepreneurs can conduct early-stage research, selling out to the big firms when they reach expensive, risky clinical trials. Around a third of drug firms' total revenue now comes from licensed-in technology.

F

Some giants, including General Electric and Cisco, have been remarkably successful at snapping up and integrating scores of small companies. But many others worry about the prices they have to pay and the difficulty in hanging on to the talent that dreamt up the idea. Everybody would like to develop more ideas in-house. Procter & Gamble is now shifting its entire business focus from countries to products; one aim is to get innovations accepted across the company. Elsewhere, the search for innovation has led to a craze for “intrapreneurship” – devolving power and setting up internal ideas-factories and tracking stocks so that talented staff will not leave.

G

Some people think that such restructuring is not enough. In a new book, Clayton Christensen argues that many things which established firms do well, such as looking after their current customers, can hinder the sort of innovative behaviour needed to deal with disruptive technologies. Hence the fashion for cannibalization – setting up businesses that will actually fight your existing ones. Bank One, for instance, has established Wingspan, an Internet bank that competes with its real branches (see article). Jack Welch’s Internet initiative at General Electric is called “Destroyyourbusines.com”.

H

Nobody could doubt that innovation matters. But need large firms to be quite so pessimistic? A recent survey of the top 50 innovations in America, by Industry Week, a journal, suggested that ideas are as likely to come from big firms as from small ones. Another sceptical note is sounded by Amar Bhidé, a colleague of Mr Christensen’s at the Harvard Business School and the author of another book on entrepreneurship. Rather than having to reinvent themselves, big companies, he believes, should concentrate on projects with high costs and low uncertainty, leaving those with low costs and high uncertainty to small entrepreneurs. As ideas mature and the risks and rewards become more quantifiable, big companies can adopt them.

I

At Kimberly-Clark, Mr Sanders had to discredit the view that jobs working on new products were for “those who couldn’t hack it in the real business.” He has tried to change the culture not just by preaching fuzzy concepts but also by introducing hard incentives, such as increasing the rewards for those who come up with successful new ideas and, particularly, not punishing those whose experiments fail. The genesis of one of the firm’s current hits, Depend, a more dignified incontinence garment, lay in a previous miss, Kotex Personals, a form of disposable underwear for menstruating women.

J

Will all this creative destruction, cannibalization and culture tweaking make big firms more creative? David Post, the founder of Umagic, is skeptical: “The only successful intrapreneurs are ones who leave and become entrepreneurs.” He also recalls with glee the looks of total incomprehension when he tried to hawk his “virtual experts” idea three years ago to the idea labs of firms such as IBM – though, as he cheerfully adds, “of course, they could have been right.” Innovation – unlike, apparently, sex, parenting and fitness – is one area where a computer cannot tell you what to do.

Questions 28-33

Which paragraph contains the following information?

Write the correct letter **A-J**, on your answer sheet.

NB You may use any letter more than once.

_____28. Approach to retain the best employees

_____29. Safeguarding expenses on an innovative idea

_____30. Integrating outside firms might produce a certain counter effect

_____31. Example of three famous American companies' innovation

_____32. Example of one company changing its focus

_____33. Example of a company resolving financial difficulties itself

Questions 34 - 37

Do the following statements agree with the information given in Reading Passage 3?

In boxes 34-37 on your answer sheet, write

TRUE	**if the statement is true**
FALSE	**if the statement is false**
NOT GIVEN	**if the information is not given in the passage**

_____34. Umagic is the most successful innovative company in this new field.

_____35. Amazon and Wal-Mart exchanged their innovation experience.

_____36. New idea holder had already been known to take it to a small company in the past.

_____37. IBM failed to understand Umagic's proposal for one new idea.

Questions 38-40

Choose the correct letter, A, B, C or D. Write your answers on your answer sheet.

38. What is the author's opinion on the effect of innovation in paragraph C?

A. It only works for big companies
B. Fortune magazine has a huge influence globally
C. It is getting more important
D. Effect on American companies is more evident

39. What is Peter Chernin's point of view on innovation?

A. Small company is more innovative than the big one
B. Film industry needs more innovation than other industries
C. We need to cut the cost when risks occur
D. New ideas are more likely going to big companies

40. What is the author's opinion on innovation at the end of this passage?

A. Umagic success lies on the accidental "virtual experts"
B. Innovation is easy and straightforward
C. IBM sets a good example of innovation
D. The author's attitude is uncertain on innovation