第一讲：

## Ant Intelligence

When we think of intelligent members of the animal kingdom, the creatures that spring immediately to mind are apes and monkeys. But in fact the social lives of some members of the insect kingdom are sufficiently complex to suggest more than a hint of intelligence. Among these, the world of the ant has come in for considerable scrutiny lately, and the idea that ants demonstrate sparks of cognition has certainly not been rejected by those involved in these investigations.

Ants store food, repel attackers and use chemical signals to contact one another in case of attack. Such chemical communication can be compared to the human use of visual and auditory channels (as in religious chants, advertising images and jingle s, political slogans and martial music) to arouse and propagate moods and attitudes. The biologist Lewis Thomas wrote, Ants are so much like human beings as to be an embarrassment. They farm fungi, raise aphids* as livestock, launch armies to war, use chemical sprays to alarm and confuse enemies, capture slaves, engage in child lab our, exchange information ceaselessly. They do everything but watch television.'

However, in ants there is no cultural transmission -everything must be encoded in the genes - whereas in humans the opposite is true. Only basic instincts are carried in the genes of a newborn baby, other skills being learned from others in the community as the child grows up. It may seem that this cultural continuity gives us a huge advantage over ants. They have never mastered fire nor progressed. Their fungus farming and aphid herding crafts are sophisticated when compared to the agricultural skills of humans five thousand years ago but been totally overtaken by modern human agribusiness.

Or have they? The farming methods of ants are at least sustainable. They do not ruin environments or use enormous amounts of energy. Moreover, recent evidence suggests that the crop farming of ants may be more sophisticated and adaptable than was thought.

Ants were farmers fifty million years before humans were. Ants can't digest the cellulose in leaves - but some fungi can. They therefore cultivate these fungi in their nests, bringing them leaves to feed on, and then use them as a source of food. Farmer ants secrete antibiotics to control other fungi that might ac t as 'weeds', and spread waste to fertilize the crop.

It was once thought that the fungus that ants cultivate was a single type that they had propagated, essentially unchanged from the distant past. Not so. Ulrich Mueller of Maryland and his colleagues genetically screened 8 62 different types of fungi taken from ants' nests. These turned out to be highly diverse: it seems that ants are continually domesticating new species. Even more impressively, DNA analysis of the fungi suggests that the ants improve or modify the fungi by regularly swapping and sharing strains with neighbouring ant colonies.

Whereas prehistoric man had no exposure to urban lifestyles - the forcing house of intelligence - the evidence suggests that ants have lived in urban settings for close on a hundred million years, developing and maintaining underground cities of specialised chambers and tunnels.

When we survey Mexico City, Tokyo, Los Angeles, we are amazed at what has been accomplished by humans. Yet Hoelldobler and Wilson's magnificent work for ant lovers, The Ants, describes a supercolony of the ant Formica yessensis on the Ishikari Coast of Hokkaido. This 'megalopolis' was reported to be compose d of 360 million workers and a million queens living in 4, 500 interconnected nests a cross a territory of 2.7 square kilometres.

Such enduring and intricately meshed levels of technical achievement outstrip by far anything achieved by our distant ancestors. We hail as masterpieces the cave paintings in southern France and elsewhere, dating back some 20,000 years. Ant societies existed in something like their present form more than seventy million years ago. Beside this, prehistoric ma n looks technologically primitive. Is this then some kind of intelligence, albeit of a different kind?

Research conducted at Oxford, Sussex and Zurich Universities has shown that when desert ants return from a foraging trip, they navigate by integrating bearings and distances, which they continuously update in their heads. They combine the evidence of visual landmarks with a mental library of local directions, all within a framework which is consulted and updated. So ants can learn too.

And in a twelve-year programmed of work, Ryabko and Reznikova have found evidence that ants can transmit very complex messages. Scouts who had located food in a maze returned to mobilise their foraging teams. They engaged in contact sessions, at the end of which the scout was removed in order to observe what her team might do. Often the foragers proceeded to the exact spot in the maze where the food had been. Elaborate precautions were taken to prevent the foraging team

using odor clues. Discussion now centres on whether the route through the maze is communicated as a 'left-right' sequence of turns or as a 'compass bearing and distance ' message.

During the course of this exhaustive study, Reznikova has grown so attached to her laboratory ants that she feels she knows them as individuals - even without the paint spots used to mark them. It's no surprise that Edward Wilson, in his essay, 'In the company of ants', advises readers who ask what to do with the ants in their kitchen to: 'Watch where you step. Be careful of little lives.'

***Question 1-6***

Do the following statements agree with the information given in Reading Passage 1? In boxes 1-6 on your answer sheet, write

| | |
|---|---|
| ***TRUE*** | *if the statement agrees with the information* |
| ***FALSE*** | *if the statement contradicts the information* |
| ***NOT GIVEN*** | *if there is no information on this in the passage* |

1. Ants use the same channels of communication as humans do.
2. City life is one factor that encourages the development of intelligence.
3. Ants can build large cities more quickly than humans do.
4. Some ants can find their way by making calculations based on distance and position.
5. In one experiment, foraging teams were able to use their sense of smell to find food.
6. The essay, ‘In the company of ants’, explores ant communication.

***Question 7-13***

*Complete the summary using the list of words, **A-O**, below.*
*Drag the correct letter, **A—O**, into boxes 7-13 on your answer sheet.*

Ants have sophisticated methods of farming, including herding livestock and growing crops, which are in many ways similar to those used in human agriculture. The ants cultivate a large number of different species of edible fungi which convert 7 ..... into a form which they can digest. They use their own natural 8 ..... as weed-killers and also use unwanted materials as 9 ..... Genetic analysis shows they constantly upgrade these fungi by developing new species and by 10 ..... species with neighbouring ant colonies. In fact, the farming methods of ants could be said to be more advanced than human agribusiness, since they use 11 ..... methods, they do not affect the 12 ..... and do not waste 13 .....

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **A** | aphids | **B** | agricultural | **C** | cellulose | **D** | exchanging |
| **E** | energy | **F** | fertilizers | **G** | food | **H** | fungi |
| **I** | growing | **J** | interbreeding | **K** | natural | **L** | other species |
| **M** | secretions | **N** | sustainable | **O** | environment | | |

【答案】

1. FALSE2. TRUE3. NOT GIVEN4. TRUE5. FALSE6. NOT GIVEN

7. C8. M9. F10. D11. N12. O13. E

作业：

## Attitudes to Language

It is not easy to be systematic and objective about language study. Popular linguistic debate regularly deteriorates into invective and polemic. Language belongs to everyone, so most people feel they have a right to hold an opinion about it. And when opinions differ, emotions can run high. Arguments can start as easily over minor points of usage as over major policies of linguistic education.

Language, moreover, is a very public behaviour, so it is easy for different usages to be noted and criticised. No part of society or social behaviour is exempt: linguistic factors influence how we judge personality, intelligence, social status, educational standards, job aptitude, and many other areas of identity and social survival. As a result, it is easy to hurt, and to be hurt, when language use is unfeelingly attacked.

In its most general sense, prescriptivism is the view that one variety of language has an inherently higher value than others, and that this ought to be imposed on the whole of the speech community. The view is propounded especially in relation to grammar and vocabulary, and frequently with reference to pronunciation. The variety which is favoured, in this account, is usually a version of the Standard* written language, especially as encountered in literature, or in the formal spoken language which most closely reflects this style. Adherents to this variety are said to speak or write ’correctly; deviations from it are said to be 'incorrect!

All the main languages have been studied prescriptively, especially in the 18th century approach to the writing of grammars and dictionaries. The aims of these early grammarians were threefold: (a) they wanted to codify the principles of their languages, to show that there was a system beneath the apparent chaos of usage, (b) they wanted a means of settling disputes over usage, and (c) they wanted to point out what they felt to be

common errors, in order to ‘improve’ the language. The authoritarian nature of the approach is best characterised by its reliance on 'rules' of grammar. Some usages are ‘prescribed’, to be learnt and followed accurately; others are 'proscribed’, to be avoided. In this early period, there were no half-measures: usage was either right or wrong, and it was the task of the grammarian not simply to record alternatives, but to pronounce judgement upon them.

These attitudes are still with us, and they motivate a widespread concern that linguistic standards should be maintained. Nevertheless, there is an alternative point of view that is concerned less with standards than with the facts of linguistic usage. This approach is summarised in the statement that it is the task of the grammarian to *describe*, not *prescribe* -to record the facts of linguistic diversity, and not to attempt the impossible tasks of evaluating language variation or halting language change. In the second half of the 18th century, we already find advocates of this view, such as Joseph Priestley, whose Rudiments of English Grammar (1761) insists that ‘the custom of speaking is the original and only just standard of any language’. Linguistic issues, it is argued, cannot be solved by logic and legislation. And this view has become the tenet of the modem linguistic approach to grammatical analysis.

In our own time, the opposition between 'descriptivists’ and 'prescriptivists’ has often become extreme, with both sides painting unreal pictures of the other. Descriptive grammarians have been presented as people who do not care about standards, because of the way they see all forms of usage as equally valid. Prescriptive grammarians have been presented as blind adherents to a historical tradition. The opposition has even been presented in quasi-political terms - of radical liberalism vs elitist conservatism.

***Question 1-8***

*Do the following statements agree with the claims of the writer in Reading Passage 1?*
*In boxes 1-8 on your answer sheet, write*

| | |
|---|---|
| ***YES*** | *if the statement agrees with the claims of the writer* |
| ***NO*** | *if the statement contradicts the claims of the writer* |
| ***NOT GIVEN*** | *if it is impossible to say what the writer thinks about this* |

1. There are understandable reasons why arguments occur about language.
2. People feel more strongly about language education than about small differences in language usage.
3. Our assessment of a person's intelligence is affected by the way he or

she uses language.

4. Prescriptive grammar books cost a lot of money to buy in the 18th century.
5. Prescriptivism still exists today.
6. According to descriptivists it is pointless to try to stop language change.
7. Descriptivism only appeared after the 18th century.
8. Both descriptivists and prescriptivists have been misrepresented.

***Question 9-12***

*Complete the summary using the list of words,* ***A-I****, below.*

*Write the correct letter,****A-I****, into boxes 9-12 on your answer sheet.*

According to 9. ……, there is only one correct form of language. Linguists who take this approach to language place great importance on grammatical 10 ……. Conversely, the view of11……. such as Joseph Priestley, is that grammar should be based on 12 …….

| | | |
|---|---|---|
| **A.** descriptivists | **B.** language experts | **C.** popular speech |
| **D.** formal language | **E.** evaluation | **F.** rules |
| **G.** modem linguists | **H.** prescriptivists | **I.** change |

***Question 13***

*Choose the correct letter, A, B, C or D.*

*Write the correct letter in box 13 on your answer sheet.*

What is the writers purpose in Reading Passage 1?

A. to argue in favour of a particular approach to writing dictionaries and grammar books

B. to present a historical account of differing views of language

C. to describe the differences between spoken and written language

D. to show how a certain view of language has been discredited

【答案】

1. TRUE2. FALSE3. TRUE4. NOT GIVEN5. TRUE6. TRUE7. FALSE8. TRUE

9. H10. F11. A12. C

13. B

第二讲：

## Effects of Noise

In general, it is plausible to suppose that we should prefer peace and quiet to noise. And yet most of us have had the experience of having to adjust to sleeping in the mountains or the countryside because it was initially ‘too quiet', an experience that suggests that humans are capable of adapting to a wide range of noise levels. Research supports this view. For example, Glass and Singer (1972) exposed people to short bursts of very loud noise and then measured their ability to work out problems and their physiological reactions to the noise. The noise was quite disruptive at first, but after about four minutes the subjects were doing just as well on their tasks as control subjects who were not exposed to noise. Their physiological arousal also declined quickly to the same levels as those of the control subjects.

But there are limits to adaptation and loud noise becomes more troublesome if the person is required to concentrate on more than one task. For example, high noise levels interfered with the performance of subjects who were required to monitor three dials at a time, a task not unlike that of an aeroplane pilot or an air-traffic controller (Broadbent, 1957). Similarly, noise did not affect a subject's ability to track a moving line with a steering wheel, but it did interfere with the subject's ability to repeat numbers while tracking (Finkelman and Glass, 1970).

Probably the most significant finding from research on noise is that its predictability is more important than how loud it is. We are much more able to ‘tune out' chronic background noise, even if it is quite loud, than to work under circumstances with unexpected intrusions of noise. In the Glass and Singer study, in which subjects were exposed to bursts of noise as they worked on a task, some subjects heard loud bursts and others heard soft bursts. For some subjects, the bursts were spaced exactly one minute apart (predictable noise); others heard the same amount of noise overall, but the bursts occurred at random intervals (unpredictable noise). Subjects reported finding the predictable and unpredictable noise equally annoying, and all subjects performed at about the same level during the noise portion of the experiment. But the different noise conditions had quite different after-effects when the subjects were required to proofread written material under conditions of no noise. As shown in Table 1 the unpredictable noise produced more errors in the later proofreading task than predictable noise; and

soft, unpredictable noise actually produced slightly more errors on this task than the loud, predictable noise.

| | Unpredictable Noise | Predictable Noise | Average |
|---|---|---|---|
| Loud noise | 40.1 | 31.8 | 35.9 |
| Soft noise | 36.7 | 27.4 | 32.1 |
| Average | 38.4 | 29.6 | |

**Table 1: Proofreading Errors and Noise**

Apparently, unpredictable noise produces more fatigue than predictable noise, but it takes a while for this fatigue to take its toll on performance.

Predictability is not the only variable that reduces or eliminates the negative effects of noise. Another is control. If the individual knows that he or she can control the noise, this seems to eliminate both its negative effects at the time and its after-effects. This is true even if the individual never actually exercises his or her option to turn the noise off (Glass and Singer, 1972). Just the knowledge that one has control is sufficient.

The studies discussed so far exposed people to noise for only short periods and only transient effects were studied. But the major worry about noisy environments is that living day after day with chronic noise may produce serious, lasting effects. One study, suggesting that this worry is a realistic one, compared elementary school pupils who attended schools near Los Angeles's busiest airport with students who attended schools in quiet neighbourhoods (Cohen et al., 1980). It was found that children from the noisy schools had higher blood pressure and were more easily distracted than those who attended the quiet schools. Moreover, there was no evidence of adaptability to the noise. In fact, the longer the children had attended the noisy schools, the more distractible they became. The effects also seem to be long lasting. A follow-up study showed that children who were moved to less noisy classrooms still showed greater distractibility one year later than students who had always been in the quiet schools (Cohen et al, 1981). It should be noted that the two groups of children had been carefully matched by the investigators so that they were comparable in age, ethnicity, race, and social class.

***Question 27-29***

*Choose the correct letter, **A, B, C** or **D**.*

*Write the correct letter in boxes 27-29 on your answer sheet.*

**27** The writer suggests that people may have difficulty sleeping in the mountains because

A humans do not prefer peace and quiet to noise.
B they may be exposed to short bursts of very strange sounds.
C humans prefer to hear a certain amount of noise while they sleep.
D they may have adapted to a higher noise level in the city.

**28** In noise experiments, Glass and Singer found that
A problem-solving is much easier under quiet conditions.
B physiological arousal prevents the ability to work.
C bursts of noise do not seriously disrupt problem-solving in the long term.
D the physiological arousal of control subjects declined quickly.

**29** Researchers discovered that high noise levels are not likely to interfere with the
A successful performance of a single task.
B tasks of pilots or air traffic controllers.
C ability to repeat numbers while tracking moving lines.
D ability to monitor three dials at once

***Question 30-34***
*Complete the summary using the list of words and phrases,* ***A-J****, below.*
*Drag the correct letter,* ***A-J****, into boxes 30-34 on your answer sheet.*

***NB*** *You may use any letter more than once.*

Glass and Singer (1972) showed that situations in which there is intense noise have less effect on performance than circumstances in which 30..... noise occurs. Subjects were divided into groups to perform a task. Some heard loud bursts of noise, others soft. For some subjects, the noise was predictable, while for others its occurrence was random. All groups were exposed to 31..... noise. The predictable noise group 32..... the unpredictable noise group on this task.
In the second part of the experiment, the four groups were given a proofreading task to complete under conditions of no noise. They were required to check written material for errors. The group which had been exposed to unpredictable noise 33.....the group which had been exposed to predictable noise. The group which had been exposed to loud predictable noise performed better than those who had heard soft, unpredictable bursts. The results suggest that 34 ..... noise produces fatigue but that this manifests itself later.

| | |
|---|---|
| A | no control over |
| B | unexpected |
| C | intense |
| D | the same amount of |
| E | performed better than |
| F | performed at about the same level as |
| G | no |
| H | showed more irritation than |
| I | made more mistakes than |
| J | different types of |

***Question 35-40***

*Look at the following statements (Questions 35-40) and the list of researchers below.*

*Match each statement with the correct researcher(s),* ***A-E****.*

*Write the correct letter,* ***A-E****, into boxes 35-40 on your answer sheet.*

***NB*** *You may use any letter more than once.*

**35** Subjects exposed to noise find it difficult at first to concentrate on problem-sovling tasks.

**36** Long-term exposure to noise can produce changes in behaviour which can still be observed a year later.

**37** The problems associated with exposure to noise do not arise if the subject knows they can make it stop.

**38** Exposure to high-pitched noise results in more errors than exposure to low-pitched noise.

**39** Subjects find it difficult to perform three tasks at the same time when exposed to noise.

**40** Noise affects a subject's capacity to repeat numbers while carrying out another task.

| **List of Researchers** | |
|---|---|
| A | Glass and Singer |
| B | Broadbent |
| C | Finkelman and Glass |
| D | Cohen et al. |
| E | None of the above |

【答案】

27. D28. C29. A

30. B31. D32. F33. I34. B

35. A36. D37. A38. E39. B40. C

作业：

# Why Pagodas Don't Fall Down

In a land swept by typhoons and shaken by earthquakes, how have Japan's tallest and seemingly flimsiest old buildings - 500 or so wooden pagodas - remained standing for centuries? Records show that only two have collapsed during the past 1400 years. Those that have disappeared were destroyed by fire as a result of lightning or civil war. The disastrous Hanshin earthquake in 1995 killed 6,400 people, toppled elevated highways, flattened office blocks and devastated the port area of Kobe. Yet it left the magnificent five-storey pagoda at the Toji temple in nearby Kyoto unscathed, though it levelled a number of buildings in the neighbourhood.

Japanese scholars have been mystified for ages about why these tall, slender buildings are so stable. It was only thirty years ago that the building industry felt confident enough to erect office blocks of steel and reinforced concrete that had more than a dozen floors. With its special shock absorbers to dampen the effect of sudden sideways movements from an earthquake, the thirty-six-storey Kasumigaseki building in central Tokyo - Japan's first skyscraper - was considered a masterpiece of modern engineering when it was built in 1968.

Yet in 826, with only pegs and wedges to keep his wooden structure upright, the master builder Kobodaishi had no hesitation in sending his majestic Toji pagoda soaring fifty-five metres into the sky - nearly half as high as the Kasumigaseki skyscraper built some eleven centuries later. Clearly, Japanese carpenters of the day knew a few tricks about allowing a building to sway and settle itself rather than fight nature's forces. But what sort of tricks?

The multi-storey pagoda came to Japan from China in the sixth century. As in China, they were first introduced with Buddhism and were attached to important temples. The Chinese built their pagodas in brick or stone, with inner staircases, and used them in later centuries mainly as watchtowers. When the pagoda reached Japan, however, its architecture was freely adapted to local conditions - they were built less high, typically five rather than nine storeys, made mainly of wood and the staircase was dispensed with because the Japanese pagoda did not have any practical use but became more of an art object. Because of the typhoons that batter Japan in the summer, Japanese builders learned to extend the eaves of buildings further beyond the walls. This prevents rainwater

gushing down the walls. Pagodas in China and Korea have nothing like the overhang that is found on pagodas in Japan.

The roof of a Japanese temple building can be made to overhang the sides of the structure by fifty per cent or more of the building's overall width. For the same reason, the builders of Japanese pagodas seem to have further increased their weight by choosing to cover these extended eaves not with the porcelain tiles of many Chinese pagodas but with much heavier earthenware tiles.

But this does not totally explain the great resilience of Japanese pagodas. Is the answer that, like a tall pine tree, the Japanese pagoda - with its massive trunk-like central pillar known as shinbashira - simply flexes and sways during a typhoon or earthquake? For centuries, many thought so. But the answer is not so simple because the startling thing is that the Shinbashira actually carries no load at all. In fact, in some pagoda designs, it does not even rest on the ground, but is suspended from the top of the pagoda - hanging loosely down through the middle of the building. The weight of the building is supported entirely by twelve outer and four inner columns.

And what is the role of the shinbashira, the central pillar? The best way to understand the Shinbashira's role is to watch a video made by Shuzo Ishida, a structural engineer at Kyoto Institute of Technology. Mr. Ishida, known to his students as 'Professor Pagoda' because of his passion to understand the pagoda, has built a series of models and tested them on a 'shake- table' in his laboratory. In short, the Shinbashira was acting like an enormous stationary pendulum. The ancient craftsmen, apparently without the assistance of very advanced mathematics, seemed to grasp the principles that were, more than a thousand years later, applied in the construction of Japan's first skyscraper. What those early craftsmen had found by trial and error was that under pressure a pagoda's loose stack of floors could be made to slither to and fro independent of one another. Viewed from the side, the pagoda seemed to be doing a snake dance - with each consecutive floor moving in the opposite direction to its neighbours above and below. The shinbashira, running up through a hole in the centre of the building, constrained individual storeys from moving too far because, after moving a certain distance, they banged into it, transmitting energy away along the column.

Another strange feature of the Japanese pagoda is that, because the building tapers, with each successive floor plan being smaller than the one below, none of the vertical pillars that carry the weight of the building is connected to its corresponding pillar above. In other words, a five- storey

pagoda contains not even one pillar that travels right up through the building to carry the structural loads from the top to the bottom. More surprising is the fact that the individual storeys of a Japanese pagoda, unlike their counterparts elsewhere, are not actually connected to each other. They are simply stacked one on top of another like a pile of hats. Interestingly, such a design would not be permitted under current Japanese building regulations.

And the extra-wide eaves? Think of them as a tightrope walker's balancing pole. The bigger the mass at each end of the pole, the easier it is for the tightrope walker to maintain his or her balance. The same holds true for a pagoda. 'With the eaves extending out on all sides like balancing poles,' says Mr Ishida, 'the building responds to even the most powerful jolt of an earthquake with a graceful swaying, never an abrupt shaking.' Here again, Japanese master builders of a thousand years ago anticipated concepts of modern structural engineering.

### *Question 1-4*

*Do the following statements agree with the claims of the writer in Reading Passage 1?*

*In boxes 1-4 on your answer sheet, write*

**TRUE** **if the statement agrees with the claims of the writer**
**FALSE** **if the statement contradicts the claims of the writer**
**NOT GIVEN** **if it is impossible to say what the writer thinks about this**

1. Only two Japanese pagodas have collapsed in 1400 years.
2. The Hanshin earthquake of 1995 destroyed the pagoda at the Toji temple.
3. The other buildings near the Toji pagoda had been built in the last 30 years.
4. The builders of pagodas knew how to absorb some of the power produced by severe weather conditions.

### *Question 5-10*

*Classify the following as typical of pagodas*

***A*** *both Chinese and Japanese pagodas*
***B*** *only Chinese pagodas*
***C*** *only Japanese pagodas*

*Write the correct letter,* **A, B** *or* **C,** *in boxes 5-10 on your answer sheet.*

5. easy interior access to top
6. tiles on eaves

7. use as observation post
8. size of eaves up to half the width of the building
9. original religious purpose
10. floors fitting loosely over each other

***Question 11-13***

Choose the correct letter, **A, B, C** or **D.**
Write the correct letter in boxes 11-13 on your answer sheet.

11. In a Japanese pagoda, the shinbashira
    A. bears the full weight of the building.
    B. bends under pressure like a tree.
    C. connects the floors with the foundations.
    D. stops the floors moving too far.
12. Shuzo Ishida performs experiments in order to
    A. improve skyscraper design.
    B. be able to build new pagodas.
    C. learn about the dynamics of pagodas.
    D. understand ancient mathematics.
13. The storeys of a Japanese pagoda are
    A. linked only by wood.
    B. fastened only to the central pillar.
    C. fitted loosely on top of each other.
    D. joined by special weights.

【答案】

1. TRUE2. FALSE3. NOT GIVEN4. TRUE
5. B6. A7. B8. C9. A10. C
11. D12. C13. C

# Telepathy

Since the 1970s, parapsychologists at leading universities and research institutes around the world have risked the derision of sceptical colleagues by putting the various claims for telepathy to the test in dozens of rigorous scientific studies. The results and their implications are dividing even the researchers who uncovered them.

Some researchers say the results constitute compelling evidence that telepathy is genuine. Other parapsychologists believe the field is on the brink of collapse, having tried to produce definitive scientific proof and failed. Sceptics and advocates alike do concur on one issue, however: that the most impressive evidence so far has come from the so-called 'ganzfeld' experiments, a German term that means 'whole field1. Reports of telepathic experiences had by people during meditation led parapsychologists to suspect that telepathy might involve 'signals' passing between people that were so faint that they were usually swamped by normal brain activity. In this case, such signals might be more easily detected by those experiencing meditation-like tranquillity in a relaxing 'whole field' of light, sound and warmth.

The ganzfeld experiment tries to recreate these conditions with participants sitting in soft reclining chairs in a sealed room, listening to relaxing sounds while their eyes are covered with special filters letting in only soft pink light. In early ganzfeld experiments, the telepathy test involved identification of a picture chosen from a random selection of four taken from a large image bank. The idea was that a person acting as a 'sender' would attempt to beam the image over to the 'receiver' relaxing in the sealed room.Once the session was over, this person was asked to identify which of the four images had been used. Random guessing would give a hit-rate of 25 per cent; if telepathy is real, however, the hit-rate would be higher. In 1982, the results from the first ganzfeld studies were analysed by one of its pioneers, the American parapsychologist Charles Honorton. They pointed to typical hit-rates of better than 30 per cent - a small effect, but one which statistical tests suggested could not be put down to chance.

The implication was that the ganzfeld method had revealed real evidence for telepathy. But there was a crucial flaw in this argument — one routinely overlooked in more conventional areas of science. Just because chance had been ruled out as an explanation did not prove telepathy must exist; there were many other ways of getting positive results. These ranged from 'sensory leakage' - where clues about the pictures accidentally reach

the receiver - to outright fraud. In response, the researchers issued a review of all the ganzfeld studies done up to 1985 to show that 80 per cent had found statistically significant evidence. However, they also agreed that there were still too many problems in the experiments which could lead to positive results, and they drew up a list demanding new standards for future research.

After this, many researchers switched to autoganzfeld tests - an automated variant of the technique which used computers to perform many of the key tasks such as the random selection of images. By minimizing human involvement, the idea was to minimize the risk of flawed results. In 1987, results from hundreds of autoganzfeld tests were studied by Honorton in a 'meta-analysis'， a statistical technique for finding the overall results from a set of studies. Though less compelling than before, the outcome was still impressive.

Yet some parapsychologists remain disturbed by the lack of consistency between individual ganzfeld studies. Defenders of telepathy point out that demanding impressive evidence from every study ignores one basic statistical fact: it takes large samples to detect small effects. If, as current results suggest, telepathy produces hit-rates only marginally above the 25 per cent expected by chance, it's unlikely to be detected by a typical ganzfeld study involving around 40 people: the group is just not big enough. Only when many studies are combined in a meta-analysis will the faint signal of telepathy really become apparent. And that is what researchers do seem to be finding.

What they are certainly not finding, however, is any change in attitude of mainstream scientists: most still totally reject the very idea of telepathy. The problem stems at least in part from the lack of any plausible mechanism for telepathy.

Various theories have been put forward, many focusing on esoteric ideas from theoretical physics. They include 'quantum entanglement1, in which events affecting one group of atoms instantly affect another group, no matter how far apart they may be. While physicists have demonstrated entanglement with specially prepared atoms, no-one knows if it also exists between atoms making up human minds. Answering such questions would transform parapsychology. This has prompted some researchers to argue that the future lies not in collecting more evidence for telepathy, but in probing possible mechanisms. Some work has begun already, with researchers trying to identify people who are particularly successful in autoganzfeld trials. Early results show that creative and artistic people do much better than average: in one study at the University

of Edinburgh, musicians achieved a hit-rate of 56 per cent. Perhaps more tests like these will eventually give the researchers the evidence they are seeking and strengthen the case for the existence of telepathy.

***Question 27-30***

*Complete each sentence with the correct ending,* **A-G**, *below.*

*Write the correct letter,* **A-G**, *into boxes 27-30 on your answer sheet.*

27 Researchers with differing attitudes towards telepathy agree on

28 Reports of experiences during meditation indicated

29 Attitudes to parapsychology would alter drastically with

30 Recent autoganzfeld trials suggest that success rates will improve with

A. the discovery of a mechanism for telepathy.

B. the need to create a suitable environment for telepathy

C. their claims of a high success rate.

D. a solution to the problem posed by random guessing.

E. the significance of the ganzfeld experiments.

F. a more careful selection of subjects.

G. a need to keep altering conditions.

***Question 31-40***

Complete the table below.

Choose **NO MORE THAN THREE WORDS** from the passage for each answer.

Write your answers in boxes 31-40 on your answer sheet.

**Telepathy Experiments**

| Name/Date | Description | Result | Flaw |
|---|---|---|---|
| Ganzfeld studies 1982 | Involved a person acting as a _____, who picked out one _____ from a random selection of four, and a _____ who then tried to identify it | Hit-rates were higher than with random guessing. | Positive results could be produced by factors such as _____ or _____ |
| Autoganzfeld studies 1987 | _____ were used for key tasks to limit the amount of _____ in carrying out the tests. | The results were then subjected to a _____ | The _____ between different test results was put down to the fact that sample groups were not _____ (as with most ganzfeld studies). |

【答案】

27. E28. B29. A30. F

31. sender 32. picture / image 33. receiver 34. sensory leakage

35. outright fraud / fraud 36. Computers 37. human involvement

38. meta-analysis 39. lack of consistency 40. big enough / large enough

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