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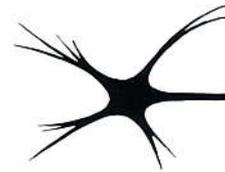
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# USE YOUR HEAD

SYNAPSIA

THE INTERNATIONAL

BRAIN CLUB JOURNAL



## ANIMAL INTELLIGENCE ISSUE

THE WORLD ABOUT DAVID ATTENBOROUGH

ANIMAL CONSCIOUSNESS AT WORK

PET POWER

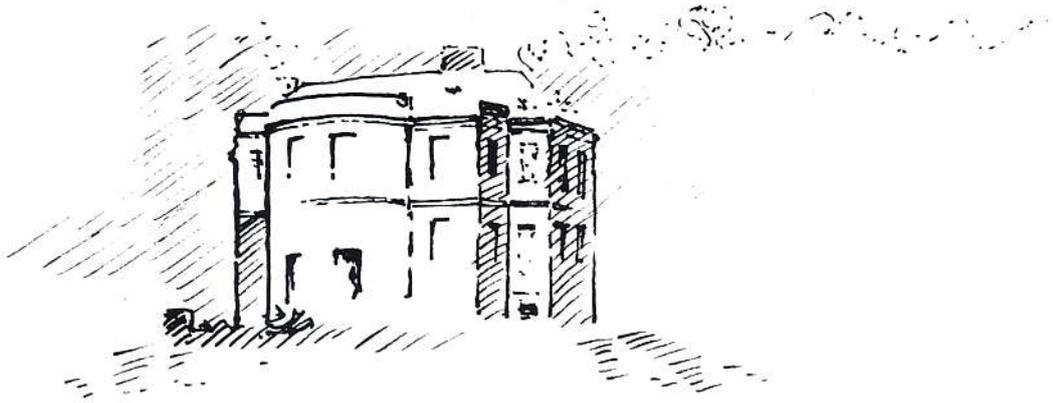
BACH, BEETHOVEN AND BIRDSONG

BUSINESS BRAIN

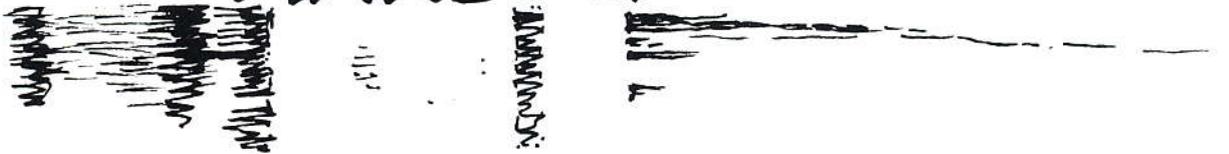
BRAIN CHILD • SARAH CHANG

# DUCK RACE

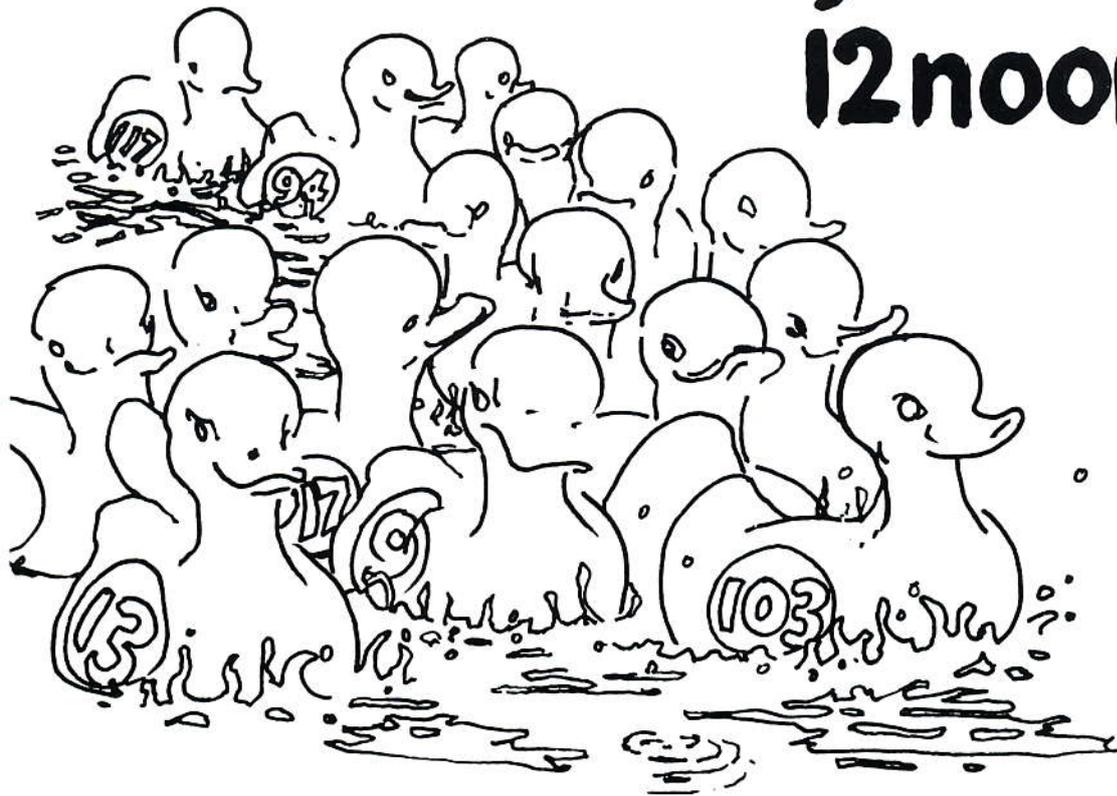
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# USE YOUR HEAD EDITORIAL

## *Instructive Ants*

Nobody would claim that human beings have appeared out of nowhere. We are complex creatures and did not arrive by pure chance as a result of random chemical reactions. Hundreds of millions of years ago, single-celled organisms formed out of the primordial soup and since then evolution has done its work to create the extraordinarily complex structures that are human beings.

We are not the only result of this process. Numerous other life forms have evolved from the same primordial soup and share with us many basic constituents. The similarities between ourselves and other life forms are often much greater than is generally appreciated. The genetic structure of humans and monkeys, for example, differs by only 2%, while defective yeast cells can be corrected by the introduction of human DNA into their systems (see *Synapsia* Vol 4 No 2, page 20). From a biological viewpoint, we can obviously learn a great deal from studying the animal kingdom. However, researchers are becoming increasingly aware that the benefits of such investigation can extend beyond the acquisition of biological knowledge.

The study of ants is a case in point. Ants are intriguing creatures and examination of their behaviour is a favourite activity of researchers. One puzzle which proved tough to crack is how ants always find the shortest route between two points. How do they collectively 'know' the most direct path without seeing a bird's eye view of the terrain? A consensus is emerging about this problem: ants lay down pheromones (animal perfume) on their paths and these accumulate in greatest quantity on the most successful (i.e. the straightest) paths. In this way, the shortest route is gradually marked out, although no individual ant knows where it is. This hypothesis is strikingly similar to the explanation, in quantum physics, of how photons of light travel on the shortest path between two points. In the quantum world, a beam of light follows all possible paths, but when these paths are super-imposed, the routes away from the shortest path interfere destructively,

leaving just the direct route. The photons collectively 'select' this path, without individually 'knowing' why.

The ant fan club has also attracted new recruits from the field of computer science. The reason for their interest is that while ants are unable to achieve much individually, ant colonies are extremely effective problem solvers and their behaviour is a good analogy for how computers process information. The individual components communicate on a very simple level - in the computer environment this is achieved by electrical signals between processors, in the ant environment by chemical exchange between individual ants - but the overall result can be to solve a highly complex problem. However, in one department, the ants heavily out-perform the computers. Computers are extremely vulnerable to tiny faults; if a program is running on 1000 processors and one goes down, the whole system invariably crashes. Ant colonies, on the other hand, do not suffer from this weakness. If a number of ants die, the system remains stable and the colony survives. The ant method of information processing is much more fault tolerant than the computer equivalent and this is what has attracted scientific interest.

However, some types of animal behaviour, intriguing though they may be, are perhaps best left to the animal kingdom. The female praying mantis, for example, clearly has little respect for the male's mental abilities and, as is well known, she reacts to his sexual advances by biting off his head and eating it. Curiously enough, this over-enthusiastic love bite does not appear to dampen the ardour of the male, and study indicates that decapitation may even enhance his sexual performance. Clearly there are still many lessons we have to learn from the study of animal behaviour, though practical human experimentation in this particular field is perhaps not to be encouraged.

**The editor welcomes contributions to *Use Your Head*. Please contact him at 23 Ditchling Rise, Brighton, Sussex BN1 4QL.**

### THE BRAIN CLUB CHARTER

The Brain Club was incorporated on 15 May 1989, and became a registered charity on 23 November 1990. Its official charter states the Club's formal purposes:

- A. To promote research into the study of thought processes, and into the investigation of the mechanics of thinking as manifested in learning, understanding, communication, problem-solving, creativity and decision-making.
- B. To disseminate the results of such research and study.
- C. To promote generally education and training in cognitive processes and techniques.
- D. To develop and exploit new techniques in cognitive processes.

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21st February 1995  
Revealed next issue

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# SYNAPTIC FLASHES

## Brain News

### Obituary

We regret to report the death of Californian physiologist Roger Sperry in April. Sperry was awarded a Nobel prize in 1981 for his ground-breaking work on the concept of left and right brain functions. He began by studying animals in which the corpus callosum, the main cable that allows communication between the two halves of the brain, had been severed, and discovered that each half had its own sensations, ideas and memories and fulfilled different functions (logic on the left and spatial perception on the right). He later studied the same phenomenon in humans, and his findings have since fuelled years of debate about differences in left and right brain thinking between social groups, particularly men and women.

### No Safety in Numbers

The world's most secret cipher has been cracked by a 600-strong team of mathematicians from 43 countries. The RSA cipher was invented in 1977 at the Massachusetts Institute of Technology, since when it has been widely used by spies and financial institutions transferring money around the world. It was thought to be practically impregnable. However, using a supercomputer at Oxford University and several others 'talking to' each other around the world, the code-breakers have found the 'prime factors' of a number 129 digits long - and it only took them a year. The magic number that you have to find the two prime factors of is 114,381,625,757,888,867,669,235,779,976,146,612,010,218,296,721,242,362,562,561,842,935,706,935,245,733,897,830,597,123,563,958,705,058,989,075,147,599,290,026,879,543,541.

### Silicon Struggles

The first Intel Blitz Chess Challenge event (five minutes per player per game) involved the usual collection of grandmasters: Kasparov, Short, Anand, etc. But there was also a less familiar name: Fritz3. Fritz3 is in fact a personal computer program running on a Pentium processor, which has been developed by ChessBase in Hamburg.

Sensationally, Fritz3 finished equal first with Kasparov in the round robin tournament, recording victories over Kasparov himself, Anand, Short, Kramnik and several other grandmasters. In the play-off for first place, Kasparov struck back for the humans, defeating the machine 4-1.

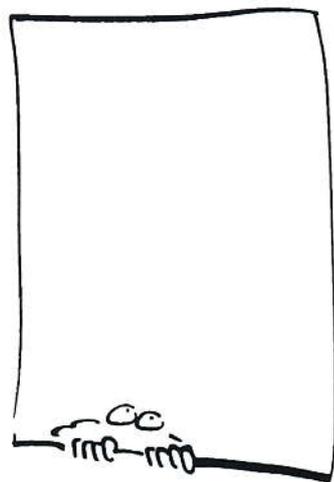
The neurally-powered have also been fighting back in chess played under normal tournament time controls. In the 9th Aegon Man v Machine tournament, the humans improved on their score from last year (see *Synapsia* Spring 1993, Vol 4 No 1), registering exactly 50% from 228 games. The strength of the human contingent in this event varies little from year to year, while computer hardware and software is improving all the time. It is thus clear that humans are beginning to latch on to the specific weaknesses of the machines and are adapting their play accordingly. For example, a German amateur, Dieter Steiner has, by international standards, a very modest rating of 2000 and yet scored an impressive 4/6 against silicon opposition that heavily outranked him.

### Queen Judit

Perhaps stung into top form by the recent loss of her world record as the youngest ever grandmaster to Peter Leko (as reported last issue), seventeen-year-old Judit Polgar has just recorded her best ever performance by winning a tournament in Madrid. Judit finished a full one and a half points ahead of a field that included four of the world's top ten players: Shirov, Bareev, Kamsky and Salov. It cannot be long before Judit, who is ranked just inside the top twenty, becomes a top ten player herself.

### Marathon Man

Graham Burgess, FIDE Master and Batsford chess editor, has broken the world record for endurance speed chess. In 72 hours over May 18-21, he played 510 games, scoring 431 wins, 25 draws and 54 losses. His wins included a remarkable victory against Grandmaster John Nunn, notched up when Graham had already been playing for over 70 hours continuously!



# SURVIVAL OF THE FITTEST

**Brain of the Year nominee David Attenborough is that rare TV animal: always modest, always astounded. The BBC recently celebrated 25 years of wildlife programmes. Mark Edwards on the man who's a natural.**

Hugos, Tuskers, Apples, Ribbons, Pandas, Antlers - these are just a few of the awards that have been won by the BBC's Natural History Unit, underlining both the pre-eminence of the Bristol-based unit in its field and the fact that, given a bit more imagination, you can come up with a more interesting name for a set of awards than 'Brits'.

Programmes produced by the Natural History Unit have won their fair share of more sober-sounding awards as well - Peabody Awards, International Film Festival of India Awards, Australian Cinematographers Society Awards, Tokyo International Film Festival Awards, Baftas, Emmys, and a whole clutch of 'lifetime achievement' awards for the unit as a whole from the Royal Television Society, the Academy of Natural Sciences and the Banff Television Festival, among others.

What we are getting at here is that the

BBC Natural History Unit is really rather good at what it does. Sir David Attenborough says simply that it is 'without question the foremost of its kind in the world. There is quite simply nothing like it'.

Attenborough, a man as modest as he is remarkable, prefaces this comment by underlining that he is not a member of the unit, 'merely a contributor', and therefore free to make such a claim. This 'mere' contributor is, however, the unit's most famous face - and voice.

In his management days he launched one of its key programmes, *The World About Us*, which recently celebrated its 25th anniversary with a special 'greatest hits' compilation - *Sex, Hot Eruptions and Chilli Peppers*.

Except it is not actually the 25th anniversary of *The World About Us*. The programme actually began in 1967; but it was

two years before the BBC had the resources to make its own films to fill the new slot, rather than buying in product from elsewhere. So what we are celebrating is 25 years of BBC-originated programmes called *The World About Us*. Except there has not actually been a programme called *The World About Us* since 1983, when it mutated into *The Natural World*. So congratulations, BBC, on 25 years of making your own programmes in a variously titled 50-minute slot. The BBC Natural History Unit, then, is really good at what it does, but not that hot at anniversaries.

Attenborough is really rather good at what he does, too, and has probably won more honours and awards than the unit. Apart from the

## The Often-Spotted David Attenborough

*English naturalist and broadcaster.*

**1926:** Born in London, younger brother of film-maker Sir Richard Attenborough

**1947-49:** Served in Royal Navy

**1952-54:** Trainee producer at the BBC

**1954-64:** The series *Zoo Quest* takes him to remote areas to capture footage of rare wildlife

**1965-68:** Controller of BBC2

**1969-72:** BBC Director of Programmes

**1973-94:** Documentary maker for BBC TV

*Series include: Life on Earth (1979), The Living Planet (1984), The First Eden (1987), The Trials of Life (1990).*

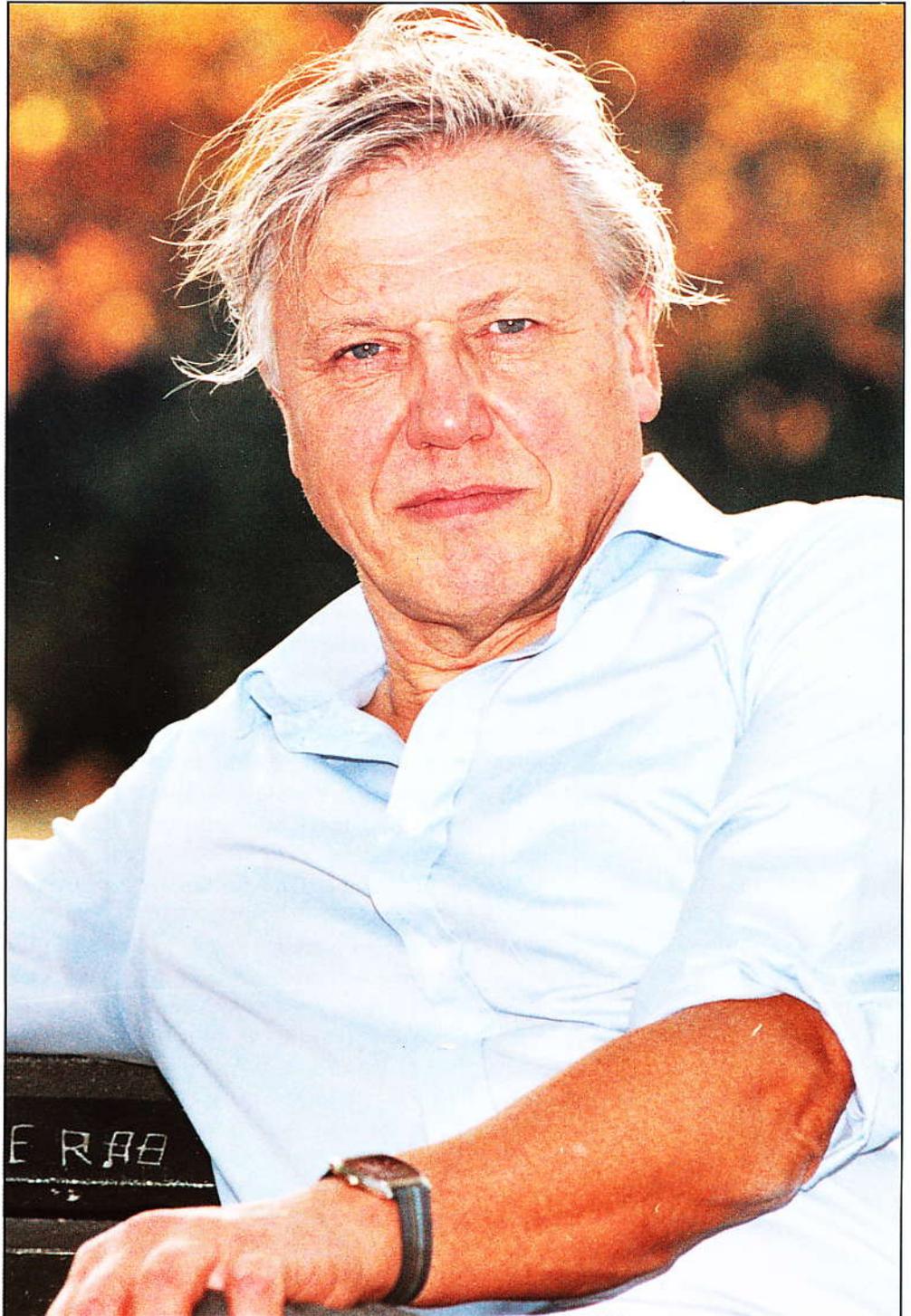
small matter of the CBE and the knighthood, he has honorary doctorates from 17 universities. He is also - by common consent - the best director-general the BBC never had.

Attenborough was appointed controller of BBC2 in 1965, shortly after its launch, and was basically given a blank sheet of paper. 'I had total freedom,' he recalls. 'It was terrific. The best job in television. It was entirely up to me to decide what we should do and what we shouldn't do.'

He developed a new policy for BBC2 which - like all his ideas - he describes as 'perfectly obvious and simple' (and of course with the benefit of hindsight, it is): BBC2 should do nothing that BBC1 would do. Within this framework, Attenborough had one clear task. BBC2 was the first network in Europe to provide a colour service, and the programmes had to be such that they would persuade people to buy colour televisions. With this aim in mind, Attenborough devised three new series: *The World About Us*, *Civilisation* and *Pot Black*.

Practical considerations fuelled the launch of *The World About Us*. The BBC did not have many colour cameras, but it did have a telecine machine. It could show colour films, and Attenborough knew that there were already a lot of natural history films which could be bought in. So *The World About Us* began transmission, concentrating in its early programmes on anything red - volcanoes, scarlet ibises - which might best show off the startling technological miracle that was colour TV. The recent programme traced the development of *The World About Us/The Natural World* over the past quarter century, while also giving a nod in the direction of the many other wildlife shows that fill up the TV schedules.

The wildlife documentary is a successful genre, and as such it is ubiquitous (that is, all over the screens *and* all over the planet). 'Can there,' asked the voice-over in the



show, 'be a burning desert or a polar wilderness that remains unexplored by producers and wildlife cinematographers in pursuit of spectacle?' Probably not; nor an urban rubbish tip, nor a suburban backyard, because the scope of the genre has widened to include anything anywhere that can possibly be squeezed in under the headings *Fauna of Flora*.

So, yes, *The World About Us* has shown us hippos being graceful in an East African river, and hatching turtles being cute (and being eaten by iguanas) on a Costa Rican

*David Attenborough's miraculous new series Life on Earth has kept me sane. Two episodes have so far been screened. I have seen them each twice. Slack-jawed with wonder and respect, I keep trying to imagine what it must be like nowadays to be young, inquisitive and faced with programmes as exciting as these ...*

*Against all the contrary evidence provided by James Burke, and Magnus Pyke, here is proof that someone can be passionate about science and still look and sound like an ordinary human being ...*

*To Attenborough all that lives is beautiful: he possesses, to a high degree, the quality that Einstein called Einfühlung - the intellectual love for the objects of experience. Few who saw it will forget Attenborough's smile of ecstasy as he stood, some years ago, knee-deep in a conical mound of Borneo bat-poo. Miles underground, with cockroaches swarming all over him and millions of squeaking bats crapping on his head, he was as radiant as Her Majesty at the races.*

*Clive James,  
The Observer,  
January 1979*

beach. But it has also shown us a man wrestling with an anaconda, another eating jalapeno peppers and yet another falling into a river fully clothed (all three survived). A spider battling a wasp has been shown to be every bit as dramatic and tense as a lion battling a zebra (well, more so really, since shots of lions attacking their prey have the fearsome inevitability of Manchester United on Match Of The Day). We have been introduced to both The Wildlife Of New York City and The Rotten World About Us (fungi, maggots - that kind of thing).

The programmes that are best remembered tend to be those that show the social interaction of a group of animals. It may be that we used to enjoy these in a patronising way - gosh, they communicate almost as well as we do - but, given our crumbling social order, it may well be that we now look on enviously at the tidy group dynamics of other species. The most famous example was the oft-repeated Meerkats United, which was the first shown in Wildlife On One and which created riveting television out of the fact that one member of the group would stand guard while the others hunted for food, and that ... no ... actually that was all they did, wasn't it?

After his success at BBC2, Attenborough was promoted to a new role as director of programmes and found himself nominally in charge of both BBC1 and BBC2, but in fact dealing with trade union disputes rather than programme ideas. He did not enjoy it. And anyway he had another 'simple' idea for a programme - one that would become Life On Earth. 'It was an obvious idea,' he says, 'and I was just petrified that someone else would propose it before I could resign and propose it myself.'

So Attenborough - clearly destined for the very top at the corporation - quit, to get back in front of the camera. He was an experienced programme maker. He had begun Zoo Quest in 1954, in the days when Armand and Michaela Denis took viewers On Safari and Hans and Lotte Hass went Driving To Adventure, and continued to present programmes throughout the first half of the 1960s, when his most famous contemporaries were the Morrises (Johnny, famous for showing us that animals are just like humans really; and Desmond, famous for showing us that humans are just like animals really).

Life On Earth was, however, a very different kettle of yellow-eared angel fish. The

series simply could not have been made any earlier; it wasn't just the improvements in film stock and camera lenses that made the thing possible, it was also the improvements that had been made in airline schedules. 'In the 1950s and 1960s,' Attenborough says, 'it was extremely time-consuming getting around the world. A series such as Life On Earth involved knowing that you could get a film crew anywhere in the world within 48 hours.' During the three years it took to make the series, Attenborough travelled 1.5m miles.

More impressive figures: since Life On Earth was first shown in 1979 it has been seen in more than 100 countries by more than 500m people; the book of the series has sold 3m copies; and Attenborough has gone on to complete a trilogy of such series with The Living Planet (1984) and The Trials Of Life (1990).

Even a more 'routine' natural history show such as Wildlife On One will attract more than 10m viewers. Wildlife documentaries are second only to soap operas in consistently netting big audiences programme after programme after programme. There are similarities between the two genres: wildlife documentaries show us extreme moments, struggles that are literally a matter of life and death, and as such the programmes can have a similar cathartic effect to that achieved by a well-written soap. Feelings that are too difficult to have about our own lives can safely be felt in relation to the fate of Pauline Fowler. Or an earwig.

Again like soap operas, wildlife documentaries hold the promise of sex - up close and with no watershed worries. It may not classify as soft-porn, but the sex lives of animals (and even plants) are endlessly fascinating: fish that change sex, for example, or the bucket orchid. Well ... we're all adults here, aren't we? I suppose I can tell you. First of all it entices the bees into it by exuding this waxy substance that acts as an aphrodisiac to them. No, really. Then the bees fall off into this liquid within the orchid and they can't get out. Except, yes they can. Just. By forcing their way into this little funnel thing. Which then closes like a vice on them. While they're stuck there the orchid glues pollen sacs on their backs and then releases them and off they go. Steamy stuff, eh?

Another attraction of wildlife programmes is the lengths the programme

makers go to to bring back the footage. Although we do not really see behind-the-camera struggles, it is fairly obvious to any viewer that this is difficult television to produce. The team behind *Life In The Freezer*, for example, went through survival training with the Marines before heading off to spend months at a stretch in the Antarctic. That kind of dedication comes through the screen at you.

As does the enthusiasm of Attenborough himself. He has the ability of the very best TV presenters to infect you with his own love of his subject - or, more correctly, with his own astonishment. (He once said that, in fact, he was not all that fond of animals - 'merely astounded by them'.) Part of Attenborough is still the schoolboy collecting fossils. We watch to connect with - and perhaps to envy - a man with such a passion for his work.

Attenborough himself feels the secret of the genre's success is that 'one of the great pleasures of life is finding out how the world around us ticks. For this minimum commitment - sit in front of your television for 50 minutes a week - the great secret will be yours'.

He is not much taken with the idea that we watch animals to learn about ourselves.

'If someone said to me you're not supposed to look at migrant birds because they don't tell us anything about ourselves, they don't help us deal with each other or with our relatives, then I'd say they were missing the point. The point is, migrant birds are fascinating.'

Asked which wildlife programme he has particularly enjoyed, Attenborough singles out *Reefwatch*, particularly the moment when the presenter, Martha Holmes, was giving a live commentary from the bottom of the sea and her 'bubble helmet' began to leak.

'It's bad enough if you're using an aqualung and it starts leaking,' says Attenborough.

'What you do is you take it out of your mouth and make a controlled ascent. But if you've got a goldfish bowl on your head that you can't actually remove yourself and it starts filling up with water, and you're in full view of the audience, and you keep on commentating on what's going on around you - that's a piece of amazing bravery.'

Attenborough is surely no stranger to bravery? Sitting with those gorillas must have been pretty dangerous?

'No,' he replies. 'I don't do dangerous things. The point about these gorillas is they had been habituated by Dian Fossey. She had spent 10 years with those animals. She introduced us to them and told us how to behave. I took up a position midway between them and the camera and while I was in that position they started to come towards me. So I wasn't stressing them. They were stressing me.'

'It was an extraordinary moment - a moment of huge elation and privilege that they had treated us in that kind of way.'

Moments of huge elation and privilege - perhaps that is why so many of us watch so many wildlife documentaries.

(c) The Sunday Times, 1994

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*He has the ability of the very best TV presenters to infect you with his own love of the subject - or, more correctly, his own astonishment.*

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**I BUZZ  
THEREFORE  
I THINK**

There isn't a dog owner in the land who isn't convinced that Fido understands everything that is said to him. Dogs, canine-lovers tell the rest of us, are just like humans, but happen to be dressed in fur coats, have four legs and speak a different language. Not only are dogs intelligent and have feelings, but, like humans, they are also conscious of those feelings, or so we are assured.

Harvard biologist Donald Griffin has great sympathy for this view, although he would express it in somewhat more scholarly terms. For the past two decades he has been conducting an often lonely crusade to encourage his fellow researchers to take seriously the notion that animals have minds as well as brains. That is, he believes that animals think about options open to them, and decide on appropriate action: 'Animals want some things, fear others and expect that actions will lead to certain results.' All animals, he argues, from the lowliest insects to the most sophisticated primates, experience their world through a real, if limited, skein of consciousness.

In his bid to build a case for animal awareness, Griffin has compiled several volumes of experimental and field observations of animal behaviour, the latest being *Animal Minds*, published in 1992. Griffin's research credentials are impeccable. In the 1940s, he made the ground-breaking discovery, with his colleague Robert

Galambos, that bats use radar for navigation (echolocation). Yet his own voyage on animal consciousness has been no smooth ride.

Many animal behaviourists see Griffin's goal - to 'reopen the basic question of what life is like, subjectively, to nonhuman animals' - as taboo. 'Animal cognition [or thinking], but not animal consciousness, is fair game for science,' wrote Andrew Whiten, a psychologist at the University of St Andrews, in a review of Griffin's last book. '[Cognitivists] are simply at a loss in scientifically distinguishing the conscious and the nonconscious in nonhumans.'

### **Negative Dogmatism**

'Interesting and infuriating' is how Sonja Yoerg, a psychologist at California State University at Hayward, describes Griffin's last book. Interesting, because the examples of animal thinking or cognition make a persuasive case for the phenomenon. Infuriating, because '[Griffin] simply does not grasp why most behavioural scientists have not joined him in making the study of animal awareness a research priority'. The problem is one of scientific accessibility, says Yoerg: 'It is in distinguishing empirically between mental events and mental experiences that we run aground.'

Griffin chides such commentators for succumbing to a 'self-inflicted paralysis of inquiry'. He states bluntly that 'the

**Can animals think? Researchers are beginning to take an increasingly positive view. Roger Lewin reports.**

customary view of animals as always living in a state comparable to that of human sleepwalkers is a sort of negative dogmatism.'

In the early decades of this century, psychologists would have broadly agreed with him. At that time animals were certainly held to have thoughts. How else could animals process the mental information needed to perceive their environment and act appropriately? Animals' minds, nevertheless, were considered to be limited in their scope, focusing on the present, immediate past, or near future, and concerned with the practicalities of life rather than abstractions.

But then came behaviourism. Beginning in the 1920s, the common-sense model of animal behaviour was swept away, partly by a new, aggressive enthusiasm for a 'more scientific' approach to psychological research. Led initially by John B. Watson of Harvard University and later by B. F. Skinner of the Massachusetts Institute of Technology, the behaviourists considered as unjustified any interpretation of animal behaviour that included rational thinking and insight.

The behaviourist paradigm insisted that all behaviour, no matter how complex, must be explained in the context of learned responses, with no reference to subjective reflection. Strict behaviourists denied the existence of cognition and consciousness in nonhuman animals. And while less radical behaviourists did not dismiss conscious thinking, they saw it as a private phenomenon that was unmeasurable and therefore outside the scope of scientific study. Animal behaviour was defined as what could be observed and measured in the laboratory, and the study of it became part of the reductionist triumph of modern biology: the idea that we can understand nature most effectively by dismantling it.

Behaviourism dominated psychology and, subsequently, biology for more than half a century. Thinking about think-

ing was taboo for the serious scholar of animal behaviour. As a student at Harvard in the 1930s, Griffin was in the thick of the behaviourists' hegemony. His thesis supervisor was Karl Lashley, a leader of the new movement. 'There was a tremendous desire to get away from the "fuzziness" of earlier psychological work,' Griffin recalls, 'and an enthusiasm for doing good, clean, controlled experiments.'

### Hive mentality

Inevitably, his own work followed the behaviourist line very closely, and his discovery of echolocation fits the mechanistic tradition. Nevertheless, Griffin felt intuitively that animal brains were more than unconscious mental machines. 'I didn't challenge the behaviourist position at the time,' he explains. 'I was just a student, and I was



aware of the social pressures to conform to the intellectual norm.'

It was Karl von Frisch's discovery of the significance of the waggle dance in bees that prompted Griffin to pursue animal cognition more closely. The discovery, made in the late 1940s, helped to establish the field of ethology and earned von Frisch a share in the 1973 Nobel Prize for Physiology or Medicine. What caught Griffin's attention about the bees' dance was its apparent symbolic content.

The dance communicates distance, direction and desirability of a food source. But it is also symbolic, as bees perform it at a great distance from the food and well after seeing it. 'The behaviourist approach I had been brought up on would not have predicted something like this,' says Griffin. 'It seemed to confirm what I felt to be true about animal awareness, and gave me a way of approaching the subject.'

As a result Griffin came to see communication as the window into animal consciousness. Humans infer consciousness in other individuals principally through communication, including non-verbal communication. Griffin's insight was that perhaps the same could be true for nonhuman animals, an idea he now sees as naive. 'I wouldn't suggest that every communication signal necessarily implies the animal is thinking something,' he observes, 'but it seemed to

be a promising entering wedge to a difficult scientific problem.'

### The Death of Behaviourism

Communication remains the central pillar of Griffin's argument for animal awareness, although his search has widened in recent years to include versatility of behaviour and physiological signals that might be associated with consciousness. And over the past three decades, other researchers have joined the quest to understand animal thinking, slowly giving birth to what Griffin calls the discipline of 'cognitive ethology'. A key step was the move out of the laboratory and into the wild. As field observations of animal behaviour accumulated, everyone began to realise that animals were smarter and more versatile than the conditioned-response creed of behaviourism could accommodate. Today behaviourism is effectively dead, even if, as Griffin suspects, its corpse is not yet completely cold.

So what was Griffin's role in this revolution? 'He made talk about animal minds respectable,' says Mark Bekoff, a biologist at the University of Colorado who has extensively studied the history of behaviourism and cognitive ethology. 'It was liberating to be reminded of the taboo we had all erected about mentalistic hypotheses,' says Peter Marler, a former colleague of Griffin's at Rockefeller University who is

## Three lines of evidence suggesting that nonhuman animals are conscious

### Versatile Behaviour

Many animals use 'tools' in inventive ways. Certain neotropical assassin bugs use pieces of material from the outer surface of a termite nest as camouflage, lurk at a nest entrance and then capture a single termite. After sucking the juices from the termite's body, the bug dangles the corpse near the nest entrance, drawing out the other termites, who are swiftly dispatched. The Japanese green-backed heron breaks twigs into small pieces which are then floated on pond surfaces. Minnows are attracted to this 'bait' and often end up as lunch for the heron.

Further examples include nut cracking by chimps, elaborate cooperation by lionesses in a hunt, prey selection by starlings and the building of beaver dams. These activities exhibit elements of versatility that imply mental processes beyond unconscious programming.

### Physiological Signals

There is no specific neuroanatomical structure that is known to be essential for conscious thinking in humans. All central nervous systems are assembled from the same basic

components and the functioning of neurons and synapses is common to all such systems. Hence there is no *a priori* reason to rule out the possibility of conscious thinking in nonhuman animals.

### Communication

Communication signals between animals have tended to be seen as involuntary responses to internal states, such as groans of pain. The key factor in distinguishing between this kind of communication and intentional communication, is the effect on the audience. Intentional communication requires an audience.

There are numerous examples of the latter. The honey bees' waggle dance is highly symbolic in nature and a similar method is used by weaver ants to recruit nest members to attack intruders or search out food sources. Furthermore, monkeys and apes sometimes deceive their fellows, to gain an advantage in the quest for sex or food. To deceive by giving false alarm calls or concealing actions, the animal must have a sense of how other individuals perceive it, and therefore a sense of self.

now at the University of California at Davis.

Nevertheless, most cognitive ethologists, Marler included, remain sceptical about animal consciousness, even though most accept the reality of animal cognition. One complaint is that Griffin fails to provide a theory of mind which can explain the wealth of observational data he has accumulated. 'It is disappointing to find a biologist so concerned with the existence of this phenomenon offering no theory of what distinguishes consciousness as a biological process,' laments Whiten. What specific role should we ascribe to consciousness in the realm of perception, information analysis and action?

Griffin's reply is that it is impossible to prove rigorously the existence of subjective experience. 'In other realms of scientific endeavour we have to accept proof that is less than a hundred per cent rigorous,' says Griffin. 'The historical sciences are like that - think of cosmology, think of geology. And Darwin couldn't prove the fact of biological evolution in a rigorous way.' Psychologists and ethologists have seemed to be 'almost petrified by the notion of animal consciousness' - a manifestation, he suggests, of 'a lingering behaviourism'.

As with Darwin's *On the Origin of Species*, the force of Griffin's work is in the cumulative effect of many examples. But this 'weight of evidence' approach is not seen as conventional science, particularly in these reductionist times. 'It works as a common sense approach,' concedes Whiten, 'but I am wary of it as a scientific approach.' Marler finds it troublesome. 'It leads,' he fears, 'to a temptation to overindulge in rich interpretations of animal behaviour.'

Some blame the tendency to succumb to this temptation on a widespread urge to impute human motives to animals. 'Anthropomorphism must take its slice of the blame for a sort of malaise that has lately afflicted ethology,' writes John S. Kennedy, former professor of animal behaviour at Imperial College, London, in his book *The New Anthropomorphism*. The malaise in question is presumably the notion of animal minds.

Griffin has no doubts about the Darwinian benefit of consciousness in animals. 'Consciousness confers an enormous advantage by allowing animals to select those actions that are most likely to get them what they want or ward off what they fear,' says Griffin. Paraphrasing a comment on humans by the British philosopher Karl

Popper, Griffin asserts that 'animals that think consciously can try out possible actions in their heads without the risk of actually performing them solely on a trial-and-error basis.' In other words, consciousness, even at a minimal perceptual level, allows behaviour to be flexible and therefore more sophisticated.

To Helena Cronin, an evolutionary biologist at the University of Oxford and the London School of Economics, this argument is weak. 'All that Mr Griffin's animal stories illustrate is the immense power of information-processing machinery to produce versatile and complicated behaviour,' she wrote in a *New York Times* review of Griffin's latest book. Like computers, animals can be programmed to do complex things, but this need not involve consciousness.

'[Griffin] vastly underestimates genes,' Cronin continued. 'He thinks the only alternative to plodding genetic clockwork is a take-over by the liberating army of conscious deliberation.' Cronin does not categorically deny consciousness to nonhuman animals - and in fact is 'convinced that ... chimpanzees are conscious' - but rather argues that there is no logical necessity for it.

Natural selection is powerful enough to produce behaviours that might seem to be the result of subjectivity. 'I think Cronin has fallen into the philosophical trap of assuming that if something is affected by genetics and selection, it can't have a conscious, subjective component,' retorts Griffin. 'I see no reason why animal consciousness shouldn't be the product of evolution. This is speculative, I agree, and I don't know how to test it. But I would say it is at least as plausible as Cronin's proposition.'

The debate comes down to both sides asserting that their brand of brain operation - programmed versus reflective - can produce complicated behaviour. Griffin likes to suggest that cognition and consciousness allows for greater flexibility of behaviour than can be achieved by programming for a wide range of possibilities. 'This is the more parsimonious position,' claims Griffin. 'I'd say it is so plausible that I would put the burden of proof on Dr Cronin, Dr Yoerg, or anyone else to tell me why it would not be useful for animals to think consciously.'

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(c) Roger Lewin, 1994

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*'Consciousness confers an enormous advantage by allowing animals to select those actions that are most likely to get them what they want or ward off what they fear.'*

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# SINGING IN THE BRAIN

**It has been estimated that the skylark composes the equivalent of 40 original Mozart symphonies each day. Do they share their basic rules and techniques with us?**

Musicians can take inspiration from many different sources. A common stimulus, and one from which numerous pieces have been written, is birdsong. Vaughan Williams composed a piece entitled 'The Lark Ascending' and Delius wrote 'On hearing the first

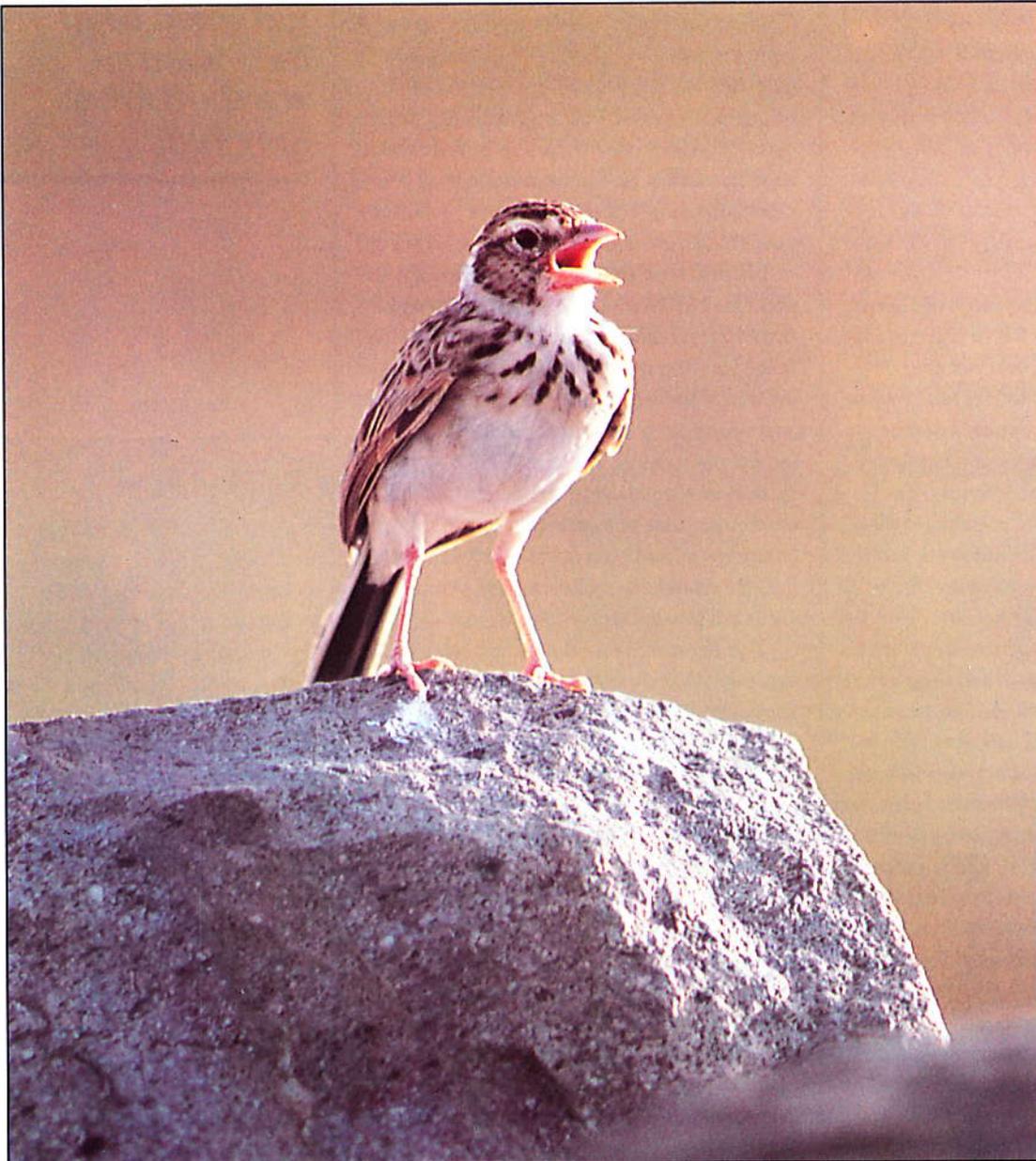
cuckoo in spring'. Olivier Messiaen has even written an entire catalogue of birdsong. Very few musicians, however, have spent time actually studying and analysing recordings of this source of inspiration.

An exception is David Hindley. Hindley

was director of music at Homerton College, Cambridge until the mid-eighties when he decided to retire early. Since then, he has spent much of his spare time investigating the techniques by which birds compose their songs.

Hindley's first choice was the woodlark. The woodlark's song is an intricate cascade that can only be appreciated by the human ear when the recording is slowed down about eight times. There followed much painstaking research, noting down all the tones produced by the bird and translating them into a piano score. However, the results were astonishing: the woodlark seemed to be creating its song according to rules and principles of composition that would have been understood by trained musicians. In

The skylark - the Beethoven of the skies.



fact, the woodlark's song precisely followed the structure of Bach's first prelude.

Hindley then attempted to convert the woodlark's song into a form more familiar to human ears. In principle this was no problem - all the tones could be converted into musical notes, but by slowing the song the music had been stripped of much of its vigour. To surmount this problem, Hindley used the structure of the composition, but added some notes of his own - a common musical practice. The result was an intriguing new kind of keyboard music. However, Hindley considered this interpretation unsatisfactory and therefore went in search of a bird that could provide a song closer to the finished composition. He found it in the skylark.

The skylark spends much of its time two hundred feet up in the air. At this height there are no visible boundaries, so skylarks carve out their territory with a continuous stream of sound. To this end, nature has thoughtfully endowed them with the ability to generate a remarkable 200 notes per second. In order to hear the individual notes and transcribe them for the piano, the skylark's song had to be slowed down by a factor of 16. The results again confirmed the extraordinary similarity of musical structure shared by birds and humans. The woodlark had found a kindred spirit in Bach: with the skylark it turned out to be Beethoven.

However, it again proved necessary to add some music to the transcribed song, and Hindley remained dissatisfied with the results. The resultant score turned out to be very difficult for a pianist to play, but could be reproduced without error by computer. He therefore invested in a software program that could handle musical notation and play back the music through a digital piano. Intrigued by what had been created, Hindley then assembled a panel of judges to comment on and discuss the results. Peter Hill, an academic and pianist was reminded of 20th century composers, particularly Stravinsky, Schoenberg and Boulez, but commented that this was 'definitely a new voice'. Nigel Osborne, composer and editor of *Contemporary Music Review*, felt that the music was 'tremendously strong and important' and invited us to look at nature and listen and value it. He also felt that there was a definite similarity in the musical structure used by humans and birds.

Is it far-fetched to speculate that humans

*A robin redbreast in a cage  
Puts all Heaven in a rage  
A dog starved at his master's gate  
Predicts the ruin of the State  
A horse misused upon the road  
Calls to Heaven for human blood  
Each outcry of the hunted hare  
A fibre from the brain does tear  
A skylark wounded in the wing  
A cherubim does cease to sing*

*Auguries of Innocence, William Blake*

and birds share the same rules for musical composition? It is known that musical activity involves widespread areas of the brain, including the brain stem. This is a part of the brain that we share with birds and forms part of our common reptilian ancestry. It is possible that sound pattern and recognition are governed by primeval influences and this may be why we instinctively appreciate the songs produced by birds.

### **The Call of the Huia**

As an encore to his lark investigations, Hindley has now recreated the song of the huia, a New Zealand bird that became extinct in 1907. Hindley embarked on this remarkable project after being approached by the International Council for Bird Preservation, who wished to launch a CD featuring the songs of several endangered species.

All Hindley had to go on were a few written accounts and two 1954 recordings of a Maori tracker, whistling an imitation of the bird's intricate song. The huia was revered by the Maoris, who hunted the bird for its tail feathers. This gave Hindley confidence that the recording would be an accurate representation of the bird's song. After all, if it were not, the tracker would never have been able to lure the birds into a trap.

Hindley completed the project last November, again using a software package. It would be impossible to score the piece for conventional instruments as they do not have the pitch and no human could play the music at the required speed. Thus, in terms of musical recital, the skylark can outperform the best human efforts.

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*It is possible that sound pattern and recognition are governed by primeval influences and this may be why we instinctively appreciate the songs produced by birds.*

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# PET POWER

**Want to get fit, stay healthy, reduce stress and live a long life? Getting a pet could be the answer.**

## Healthy Pets, Healthy People

Can pets really be good for your health? For many years this idea was held to be ridiculous, but as more and more research is undertaken, the evidence increasingly

Avoiding stress

suggests that pet ownership is strongly related to human health. In *Use Your Head* Vol 4 No 2 we reported on an Australian survey showing that pet owners have significantly lower blood pressure and cholesterol levels than non-owners. At the Baker Medical Research Institute, 5,741 people attending a heart disease risk clinic were questioned about their lifestyle and it was discovered that the pet owners probably had 4% less chance of a heart attack. This research supports an earlier survey of 92 convalescing males by Erica Friedmann at the University of Maryland, who found that those who did not have a pet were more likely to be socially isolated and were more at risk to a further heart attack. She estimated that the pet owners were 3% less likely to die, a small figure perhaps, but given the number of heart disease sufferers in the US, enough to save 30,000 Americans a year. Neither are health benefits restricted simply to reducing the risk of heart disease, pet owners also suffer fewer minor ailments, such as influenza, headaches and colds, so that pet owners live longer and are more healthy than their pet less counterparts. The recent National Pet Week in the UK even carried the slogan 'Healthy Pets, Healthy People'.

There are many ways in which pets can improve human health - it is not just the regular exercise from walking the dog. Stroking cats and dogs is now established as an important way of relieving stress, as is watching fish in an aquarium. Pets often provide people with something to love, a sense of security and real self-worth, and encourage them to keep a regular routine of meals and sleep, a particularly important health benefit for those living alone. Many homeless people in London and other cities around the world keep a dog for company and to watch over them while they sleep on the streets. Dogs can also be important in



improving communication as their owners often get a friendly reception from strangers on their walks.

### Super-Sensory Dogs

Long known for their extraordinary sensory capabilities, dogs have recently been discovered to possess another 'super-sense' - a sense that may help, and in certain incidences even save the lives of, those suffering from pattern-induced seizure disorders.

A case in point is eight-year-old Erin Leth, from Quincy, Massachusetts. Despite receiving the best medical care available, Erin still has about twenty seizures a day, triggered by simply looking at patterns on a TV or computer screen, clothing, a printed page or elsewhere.

Her best hope may now lie in Shadow, a two-year-old Golden Retriever who recently joined the Leth family. The dog is being trained to cushion Erin should she collapse during a seizure, roll her onto her back, and seek help from others. Shadow's trainers at the Michigan-based 'Paws with a Cause' hope that the dog will eventually prevent some seizures by distracting Erin *before* she drifts into a trance.

This is possible because of the fact that a number of dogs have been found to be capable of predicting seizures between five and forty-five minutes before they occur. Dogs possessing this talent, and there are apparently a number of them, provide an invaluable service by both warning the owners and others.

One of the dogs trained at the Prison Pent partnership, a vocational programme at the Washington Correction Centre, alerted, for example, its young owner of an impending seizure while the child was performing on a balance beam. What probably would have been a serious accident was prevented.

A study underway at the New York City-based Epilepsy Institute is working to discover the basis of the dogs' mystifying talent. 'If we can find out what these "seizure" dogs do, it's possible that other dogs, and even we, could be trained to tune into



the same clues,' says the Institute's Executive Director Reina Berner.

### Dolphin Friendly

There is also some evidence that even undomesticated animals can have beneficial health benefits. Dr Horace Dobbs, a fellow of the Royal Society of Medicine, has been studying wild dolphins since 1974 and claims that they can have important therapeutic effects. He has found that if depressives swim with a dolphin they experience lasting uplifting effects. Although other scientists are sceptical of this, claiming that the sheer physical exercise of swimming in a wet suit may be the contributing factor, there is no doubt that animals have the power to influence human health and general well-being.

*Planning early for a long life*



# BUSINESS BRAIN

**We are Number Two!**

Bookshops have this strange attraction, and having been drawn in while waiting at Heathrow Airport, I wandered by the 'business best-sellers' shelves. From the usual array of intense looking business people and stark titles, burst, splendiferous in colour and design, *The Mind Map Book*, *Radiant Thinking*, *The Major Evolution in Human Thought*. Addressing the one key issue that is the foundation upon which all other strategies, processes, procedures, recipes for success and 'How To Do Its' are built, it was proudly sitting in the No 2 slot.

With increasing business emphasis on quality and teamwork it seems that more time than ever is being spent in meetings. When I speak to business groups around the world their responses to 'meetings', are a universal dirge of 'time-wasting', 'boring', 'frustrating', 'useless'.

Meetings are the first Mind Map application (MMapplication) mentioned in *The Mind Map Book*. In this article I would like to discuss how I have seen companies use Mind Maps to:

1. Create the agenda
2. Plan the meeting details
3. Run the meeting
4. Create the minutes of the meeting
5. Communicate to others about the meeting
6. Complete the relevant actions

## 1. Creating the Meeting Agenda

Mind Maps have an important role in creating the agenda. Common techniques are:

- a) a communal white board has items added to the branches of the Meeting Mind Map as members of that regular weekly meeting think of them. (If several people think of the same item an additional tick is placed by it, indicating its importance.)
- b) team members send in mini Mind Maps with their agenda items. These are aggregated to create the Mind Map Agenda.
- c) the Mind Map Agenda is created at the

meeting as each person indicates their items.

## 2. Planning the Meeting Details

The administrator responsible for considering and handling all the details can capture, track, complete and evaluate the entire process via a generic Mind Map (see Fig. 1).

## 3. Running the Meeting

Whether one person is elected Chairperson or if it is a rotating responsibility, a Mind Map Agenda can be either:

- a) shown on a white board.
- b) given to each member.
- c) projected on a screen either from an OHP or from the Mind Map Plus computer programme; or all of these.

The following now need consideration:

- a) make a group decision on how long each topic will be discussed. Set a timer!
- b) if a person seems to wander off the topic, ask which branch their discussion refers to. If none, note the topic for another meeting.
- c) if a person says what he or she has said before, ask if the key words cover it, or do they wish to add more?
- d) if someone else wants to agree with something already said, a tick or initials can quickly indicate this.
- e) the clarification and summary of the entire meeting can be easily made. This ensures the clarity of agreed topics.

## 4. Creating the Minutes

Here Mind Maps have various uses:

- a) one person can 'officially' Mind Map the minutes. This may be done on the white board so that everyone can see and confirm the accuracy as the meeting proceeds.
- b) Mind Maps can be collected and shown on a projected computer screen, using Mind Map Plus software.
- c) each person may take his or her own Mind Map minutes.

**In the first of a new series, Vanda North suggests Mind Mapping your own business.**

d) some groups tape the meeting, referring to the counter number on the Mind Map for later reference or linear notes of particular wording if necessary.

e) some groups have one person make linear notes, and the Mind Map can then be the cover page to these notes. People will actually read the one-page Mind Map.

**5. Communicating to Others**

Again this can be done in different ways:

a) some groups place the white board, or paper scroll, in a communal room for all to see and follow the necessary actions.

b) some boards have copier facilities incorporated to make immediate copies.

c) black and white copies can be made for those attending and those unable to attend; the individual may then highlight or outline the parts that are relevant to them.

**6. Completing the Relevant Actions**

Here Mind Maps can be useful again:

a) each major theme branch (or even sub-level word) may be a general focus for a person/team/department, who may make it the centre of their own Mind Map to add a greater level of detail. (N.B. If all these levels of Mind Maps within Mind Maps need to be recorded they can either be added to the central Mind Map on a large wall, or recorded up to 14 levels on Mind Map Plus.)

b) one Mind Map can show the date by which each activity is to be completed and even the flow or order of activities (if appropriate).

c) the Mind Map acts as a gentle reminder for everyone as to who needs to do what and by when!

d) greater satisfaction arises as items are completed and ticked off.

e) any problem areas can be rolled over for agenda items for the next meeting.

**Additional Advantages**

**Team Responsibility**

People Mind Mapping meetings report stronger team support and shared responsibility. If one member is unable to complete an action, and others are aware of its implications, they are more likely, as a group, to seek a solution, so as to achieve the goal.

**Vision Focus**

In lengthy meetings (or meetings

held over months/years) it is important to keep the vision (mission/goal) in mind. The detail of the action will be far clearer and motivational if kept in an overall perspective; a Mind Map keeps everything in focus.

**Colour Coding**

Whether you organise your Mind Map minutes with the main branches for the agenda or the people present - you could use a colour legend to:

a) represent each time a person spoke on a topic, e.g. Fred=green; Mary=blue etc.

b) give the agenda topics a colour, e.g. green for research; red for a possible name change; and put the colour by the person speaking.

c) represent departments or projects.

d) show the importance of an item.

e) show action needed.

f) even be a 'secret code' to show agreement or disagreement with a topic!

A colleague was using a Mind Map in a meeting. His manager was passing some negative remarks about 'doodling'. At the end of a long and circuitous discussion, when people were trying to summarise, John was able to clarify who said what in what order and the outcome. The manager put the Mind Map on his wall! The Brain Trust Executive Committee Meetings are beautifully Mind Mapped by Lady Mary Tovey, and an example is included here (see overleaf).

Please send your Meeting Mind Map applications, with quotes and examples, to enable us to help others get to the point of saying 'I really enjoy our meetings, and feel they are highly productive.'

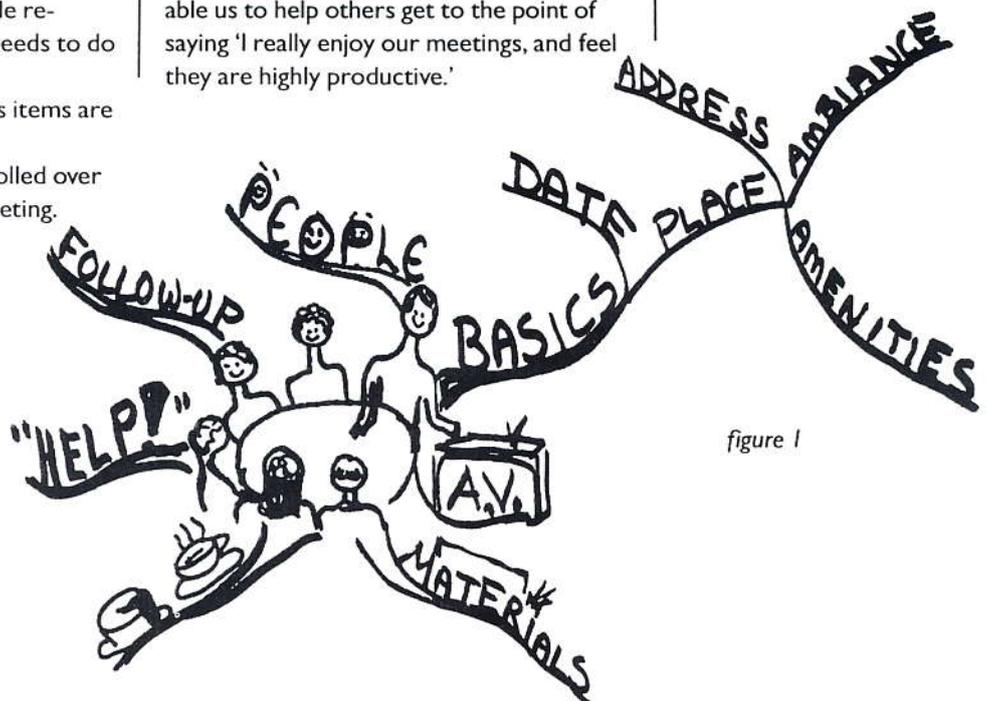
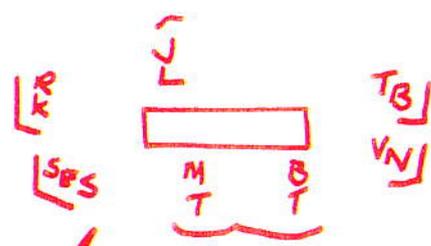


figure 1

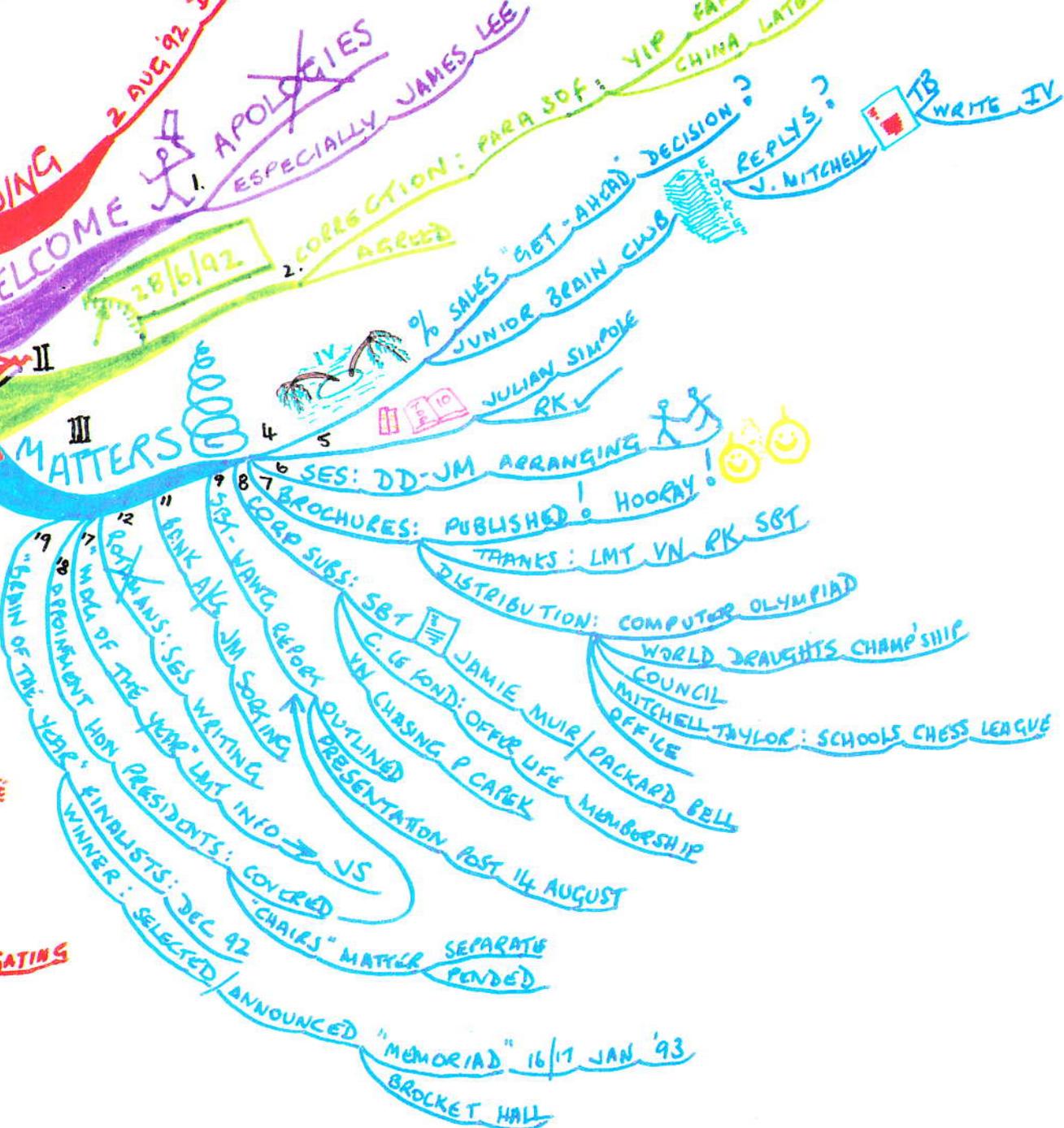


TB: TONY BUZAN  
 VN: VANDA NORTH  
 SBT: SIR BRIAN TOVEY  
 LMT: LADY MARY TOVEY  
 RK: RAYMOND KEENE  
 SES: SALLY SHELFORD  
 JL: JAMES LEE (IN ATTENDANCE)  
 JM: JEFFREY MALYON \*  
 JS: JULIAN SIMPOLE \*  
 \* REFERRED TO BUT NOT AT MEETING.

OLYMPIAD 5-11 AUG  
 DRAUGHTS CHAMPIONSHIP 6 AUG  
 MEMORIAL 16-17 JANUARY: BROCKET HALL  
 LMT/RK CROSSWORD  
 "FUN" DISTRIBUTED



ATTENDING 2 AUG 92 DURHAM  
 WELCOME 28/6/92



DUT-OF-DATE AMEND  
 PONSE  
 INVESTIGATING

## INTELLIGENCE ABOUT INTELLIGENCE

### *Launching Your Mind into Space*

**Warren Day (UYHCM 149) makes some mind-bending calculations.**

*Mankind hasn't been to the moon and back fifteen times yet ... We definitely haven't even begun to use all of our mental capabilities!*

I have always enjoyed playing with numbers, and here is something I worked out back in 1988, when I first read *Make the Most of Your Mind*. I was reminded of these results recently, and here they are documented.

Professor Piotr Annokin's conservative estimate for the total number of possible 'states' that a human brain could be in, is a number that starts with a '1' and is followed by  $10\frac{1}{2}$  million kilometres of typewritten noughts (this can also be written numerically as 10,500,000 kilometres). As there are a thousand metres to the kilometre and a thousand millimetres to the metre, this number can also be expressed as a one followed by  $10\frac{1}{2}$  million million millimetres of typewriter-written zeros.

It occurred to me that a typewritten zero can only be a few millimetres in width. Having measured this distance I found it to be about  $2\frac{1}{2}$  millimetres. Thus giving us Piotr Annokin's estimate, not in terms of a physical length anymore, but as an actual number. In fact the actual number is a one, followed by 4.2 million million zeros!

This number is familiar to us. It is similar to the number of brain cells we have, one million million. Which is often written for brevity as  $10^{12}$  and pronounced either as, 'ten to the power of twelve', or just, 'ten to the twelve'. The twelve being the number of zeros in a million million.

So, to put things into perspective, an on/off switch can, at any one time, be in any one of two possible states. Similarly, the brain, which consists of  $10^{12}$  cell, at any one time can be in any one of, it is estimated.

$$10^{4.2 \times 10^{12}}$$

states. Or roughly speaking,

$$10^{10^{12}}$$

which is pronounced, 'ten, to the ten, to the twelve'.

So that is the *real* number. However, the original distance is still useful to us. The average

distance between the surface of the moon and the surface of the earth is 376,284 kilometres (the moon orbits in an ellipse, which is a slightly squashed circle). Also, at its perigee (the point in its orbit when the moon is nearest the earth) this distance is 348,294 kilometres.

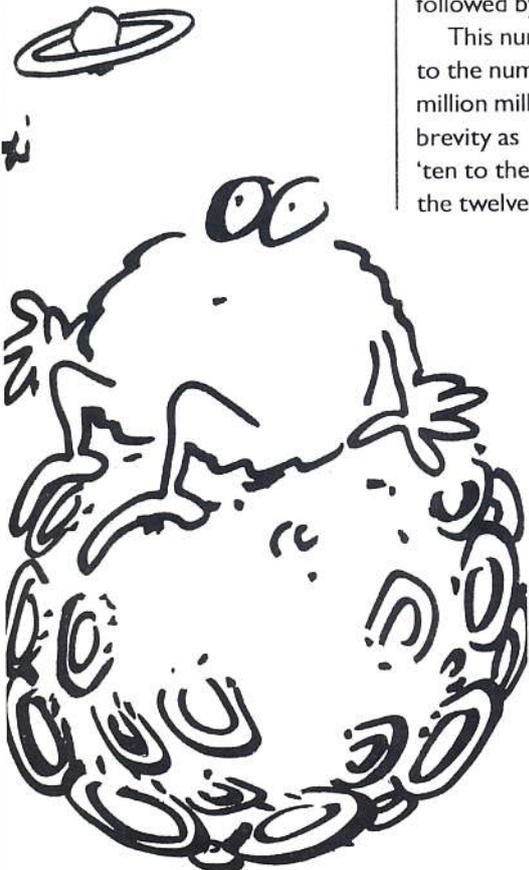
Thus, if we had this number typed out on a very long, thin (and presumably a very strong!) piece of paper, just big enough to hold Professor Annokin's number, and when the earth and the moon were at their average distance apart we attached one end of the piece of paper to the surface of the earth; it would reach to the surface of the moon (one journey), all the way back (two journeys) and we could keep on going until we had completed 27.9 journeys, i.e. almost 14 round trips to the moon and back, and travelling 90% of the way back from the moon on the last journey. If we then waited for the moon to move so it was as close to us on earth as it gets, then there would be enough slack, not only for us to get our piece of paper back the remaining 10% of the way to the earth, but also for another two journeys again! - yet one more complete round trip, making 15 round trips in total, to the planet's satellite and back. Plus, with another 14% of a journey remaining, 51,180 kilometres.

What a number! Mankind hasn't been to the moon and back fifteen times (*the various Apollo missions actually made eight visits - Ed.*). We definitely haven't even begun to use all of our mental capabilities!

In the interests of making this article easy to read, I have rounded off the percentages. Readers interested in astronomical facts can easily work out the exact values for themselves by dividing the length of Professor Annokin's number by the size of the orbits given.

#### References:

1. The Guinness Book of Astronomy Facts and Feats 2nd edition, Patrick Moore, 1983
2. Use Your Head, Tony Buzan, 1989
3. Make the Most of Your Mind, Tony Buzan, 1988



# AMAZING MEMORY STORIES

*Nico the Greek*



Ever thought of becoming a professional gambler, travelling from casino to casino in the style of a high-roller? The advice of Jacques Black in *The Money-Spinners* (recently published by Faber & Faber at £5.99) for any-

one tempted to go to a casino, is: don't.

Fortunately for us, this is a temptation that the mysterious Mr Black himself was unable to resist. His entertaining book charts his own attempts, and those of other gamblers, to beat the odds by developing systems to win at roulette, blackjack and baccarat. Unfortunately, his conclusion is a gloomy and predictable one: unless you are highly motivated and prepared to work tremendously hard, there is no sure way to beat a casino. What is more, professional gamblers who are believed to be card-counting are often subjected to sudden removal from the premises with no legal comeback. What Jacques Black does offer is a fascinating insight into the gambling world and, for those reluctant to take his initial advice, some valuable tips to ensure that the bank does not break you.

One of the most glamorous stories in the book is that of Nico Zographos, who led a famous Greek baccarat syndicate which operated on the French Riviera from the 1920s to the 1950s. Such was Zographos's skill that the syndicate was able to take on all-comers in no-limit games. This required not only phenomenal powers of calculation, remarkable intuition and a strong nerve, but also an amazing memory. He was reputed to be capable of remembering every card dealt from a shoe of 312 cards, then of making an assessment of the exact chances of drawing the desired card and choosing the appropriate strategy.

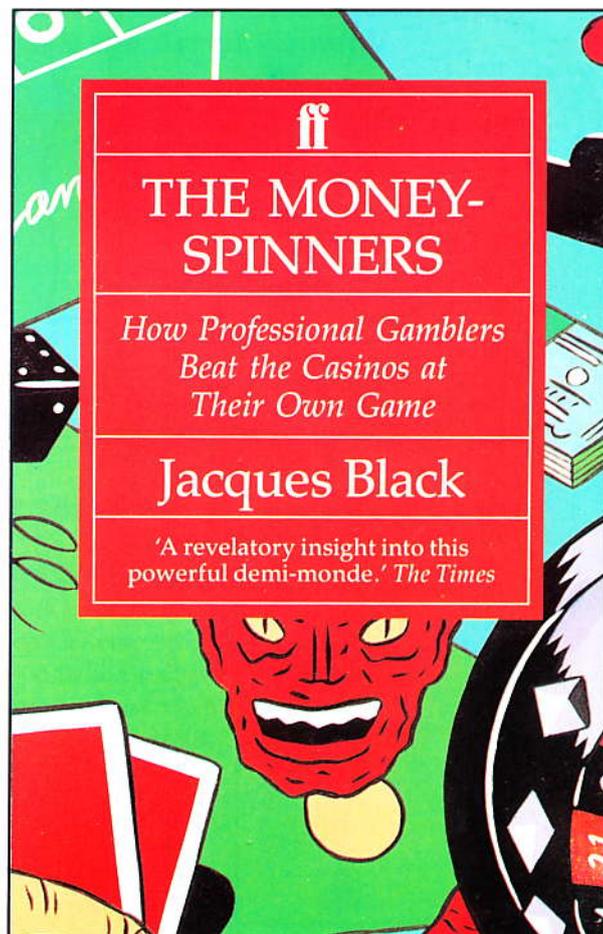
Apparently the syndicate, which com-

prised Zographos himself, Vagliano, a wealthy shipowner who financed the risk, and André, a casino manager who supplied the premises, was only ever in danger of being wiped out once in thirty years. On this occasion, at Cannes in 1928, Zographos was down to the last of the thirty million franc bankroll, which was now riding on a single deal. Here luck (or was it?) came to his aid and, with all hope running out, he drew the perfect third card and saved the syndicate, which then prospered until Zographos's death in 1953. While Zographos was alive, it seemed that the syndicate would go on forever. Deprived of his skill, however, it was not long before it ran into trouble, incurring a £350,000 loss over the course of just a few days, from which it never recovered.

Zographos himself did not believe in the luck of the draw. He is quoted as saying:

'There is no such thing as luck. It is all mathematics. There are three kinds of cards - good cards, bad cards and indifferent cards. You must play them according to what they are. This is not a contradiction. You may have luck for an hour or two, even a day or two, even a week. But what people call luck is merely an established fact seen through the spectacles of after events.' As Jacques Black says, professional gamblers are not lucky players, they are highly focused individuals who have developed a system to maximise their chances and have the memory, concentration and will-power to carry it through.

*Professional gamblers ... are highly focused individuals who have developed a system to maximise their chances and have the memory, concentration and will-power to carry it through.*



## RUNNING AND THE ALEXANDER TECHNIQUE

*Paul Collins (UYHCM 373) provides the second instalment*

I trust my first article has stimulated your interest in the Alexander Technique and you are still out there and having fun with the lying down experiment I suggested. You may have noticed that it was far from being a static experiment, but rather one in which you had to be constantly running alongside yourself to keep up with all the changes taking place. This time we shall try another

experiment which involves a little more overt activity but is still based on observation of the effects of gravity on the body.



figure 5



figure 4



figure 3



figure 2

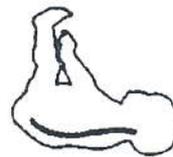


figure 1

*Changes in curvature of the human vertebral column from infancy to adulthood.*

### Experiment 2

#### Part 1.

**A.** From a standing position take a small step backward and go down to a position resting on that knee. Then bring the other leg back and sit on your heels for a moment. Some of you may find it uncomfortable to sit on your heels; so instead, bring the body up sufficiently to avoid an extreme position for the knees and ankles.

**B.** Leading with your head, allow the body to move forward until the arms fall to the floor, and you find yourself in an 'all-

fours', crawling position. Now stop! Consider for a moment: you most likely have not made much use of this position since childhood, except for those awkward moments spent trying to fish out pencils from where they've rolled, underneath the fridge.

**C.** If you really do pause in this crawling position, you should notice a few things slowly changing. As in the first experiment I'll avoid saying what you will feel. It's *your* experiment!

**D.** Look at the outline drawings for a moment. Fig. 1 shows a simple curve, observable in young babies lying supine. This is customarily called the primary curve. In Fig. 2 (crawling), the head has lifted somewhat, introducing a neck curve in the opposite direction, called the secondary curve (surprised?!). In Figs. 3, 4 and 5, the curves develop, the most marked change being the introduction of a new part of the secondary curve in the lower back - called the lumbar curve. This latter development enables us to attain the upright position, with the eyes

looking out horizontally.

**E.** All clear? When you go back to a crawling position, Fig. 2, you will be resuming a simpler, flatter curve shown in the diagram. But hang on! It's a little more complicated than that. You've become so accustomed to being like Fig. 5 that your muscles and ligaments will have become a bit rigid. As you allow yourself to stay in a crawling position this should gradually undo itself, simply through nature's need to re-adapt. Another important feature to observe concerns the shoulders, arms and hands. As

you go back to the crawling position you re-awaken a support reflex in the hands and arms similar to those in your legs (the plantar reflex), which supports us in standing. Since childhood this arm support reflex has fallen into disuse; nothing in upright posture normally calls for it. So you may find that it feels awkward, perhaps in the wrists or the shoulders. Stay with it, and you will find everything easing out - perhaps not for a few days, but consider the amount of time you haven't used it!

### Part 2.

**A.** Let yourself sway gently forwards and backwards, noticing how the support stresses change in the arms and legs and indeed throughout the back.

**B.** Lift each paw in turn and stay there for a few seconds. Of course, the weight which was distributed equilaterally is now supported around a triangle. How does this redistribution arrange itself? Does each limb take on just a bit more weight, or does something rather different happen? It would spoil the fun of the game if I told you the answer.

**C.** When you've found the answer to B., rationalise (or guess!) why it should work this way.

Now then, what has all this got to do with the Alexander Technique? Alexander's work had to do with using the conscious brain to figure out where and how our development had gone wrong and using this understanding to find ways to eliminate interferences. As he said himself, 'Anyone can do what I did, provided he has patience. If you don't have the patience, go to a teacher to help you sort it out. It's quicker!'

In these articles I'm presuming you haven't an Alexander teacher to hand, so I'm doing you the compliment of landing you right back on your own resources. It takes a wee bit longer; it took Alexander ten years. Never mind; art is long, life is short.

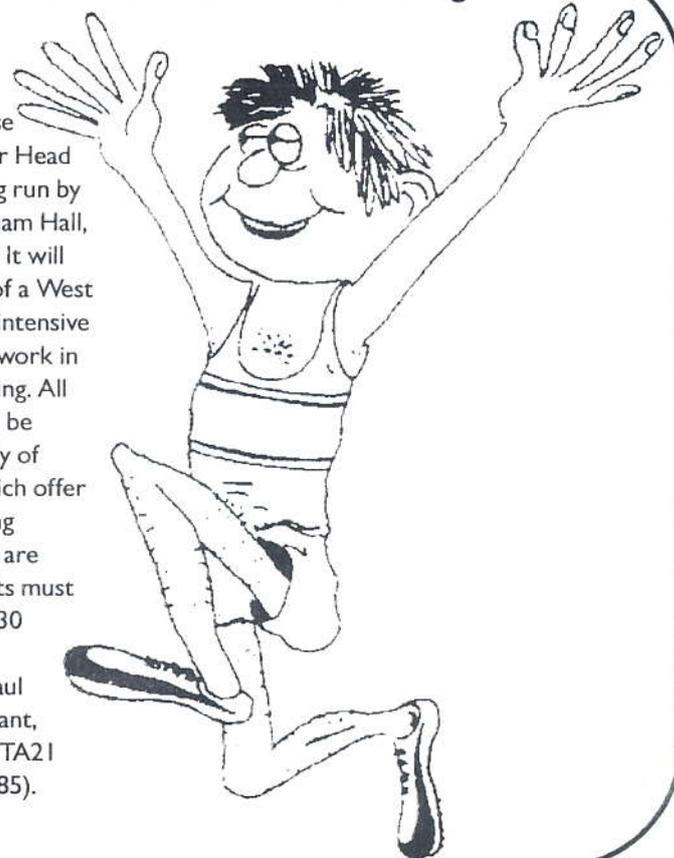
In closing, may I look at the experiments we have done from the point of view of dominant and sub-dominant brain areas. A factor which may have escaped your attention is this: the research which

has re-established the importance of the gifts of the right cortex has been done by persons who are predominantly left cortex. Some of the practical right cortex procedures which they have suggested only contribute to misunderstanding and misuse. As a musician who has really had to come to terms with the development, strengthening and refinement of the right cortex, as well as the practice and understanding of right and left co-operation (especially in the field of non-interference), I have to be amazed at the naivety of the left cortex specialists.

In the experiments suggested in this article, one is asked to develop the right cortex awareness of bodily position, movement, stress, etc., while at the same time using the conscious inhibitive powers of the left cortex in order not to interfere with the process. Over the years I've noticed that the intellectuals of our world will have no patience with this. They want the answer before the experiment! Never mind. We're all of us incredibly ignorant as to the use of ourselves. The slowing down and simplification required for the performance of my experiments will hopefully give you a few little windows and shed some light.

### Alexander and the Art of Running

Later this year a course especially for Use Your Head Club members is being run by Paul Collins at Greenham Hall, Wellington, Somerset. It will combine the delights of a West Country holiday with intensive Alexander Technique work in its application to running. All aspects of running will be covered, using a variety of beautiful locations which offer a wide range of running experience. The dates are August 1-4. Participants must be able to run 5km in 30 minutes. For further information contact Paul Collins, 4 Mount Pleasant, Wellington, Somerset TA21 8DA (Tel: 0823 - 667685).



# BRAIN CHILD

**Sarah Chang was a nominee for last year's Brain of the Year award. Here Andrew Kinsman reports on the celebrated musical prodigy.**

We could be in any hall in the country, waiting for a young musician to perform to an admiring audience. But this is not one of the thousands of school or church halls at which you would normally expect to see the flowering of a young talent. This is the Barbican Hall, one of the largest and finest auditoria in the country, and a couple of thousand people have paid anything up to £28 to see a twelve-year-old girl perform with the capital's leading orchestra of the moment, the London Symphony Orchestra, under the baton of the highly regarded American conductor Kent Nagano. Tickets sold out many weeks ago and could prob-

ably have been sold two or three times over - everyone knows this is an occasion that could not be missed. After all, the audience is not coming to see a prodigy taking her first steps up the musical learning curve: the soloist is already an experienced international star who has appeared with major orchestras around the world and drew rave reviews for her London debut a year ago: 'Chang's physical presence, and all the novelty value attached to it, soon became secondary to the presence of the music-making itself ... This was playing which transcended chronological age' (*The Times*). No, we have come to see Sarah Chang, the Korean-American violinist who was described by none other than Yehudi Menuhin as 'the

most wonderful, perfect, ideal violinist I have ever heard.'

She is as slight as you would imagine her to be, but she somehow leaves Kent Nagano lagging far behind as she confidently strides to her place at the front of the stage. After a big smile to the audience and a quick tune-up, suddenly her mood seems to change as an intense concentration takes hold. As the orchestra begins she sways in time with them, impatiently waiting for her first entrance, but when it comes there is no hint of holding back, just half an hour of totally assured, dazzling violin-playing which has the audience in its spell. She takes the applause with more beaming smiles and the relaxed manner of a seasoned professional. But no-one is surprised by her performance, it is not a fluke, just the confirmation of a talent which has the classical music industry in its awe, as testified by the recent awards of Gramophone Young Artist of the Year 1993 and Classical Music Awards Newcomer of the Year 1994 at the age of thirteen.

The story begins around a decade ago, when Sarah was given a baby violin for her third birthday (she now has a cupboard full of discarded reduced-sized violins, some worth hundreds of thousands of pounds, having just recently started using a full-sized instrument for the first time). At the age of five, she was already playing with orchestras and at eight she was invited to play the fiendishly difficult Paganini Violin Concerto No 1 with maestro Zubin Mehta and the New York Philharmonic (even more remarkably, this performance was at two day's notice and without rehearsal!). A year later, still only nine and using only a quarter-sized violin, she recorded her first CD, for EMI, a collection of popular violin showpieces entitled *Debut*, demonstrating her virtuoso brilliance to a wider audience. The serious and normally taciturn journal *Gramophone* was glowing in its review: 'Her tone is pliant and imaginatively modulated, whilst every purely mechanical aspect of



her technique seems to be already fully formed ... Sarah Chang's playing will enthrall and captivate you in equal measure.'

Sarah chose the exciting Tchaikovsky Concerto, a piece which has always been a calling card of brilliant young violinists, as her first major recording of the core repertoire. This disc, recorded when she was eleven and recently issued by EMI coupled with Brahms's Hungarian Dances, has also entranced the critics: 'Truly breathtaking ... Her understanding of the work is that of a consummate artist ... Her technique is immaculate, her sound full and rounded, her phrasing always musical ... Five stars' (*BBC Music Magazine*); 'Here is a young artist who really does live up to the claims of the publicists, for from her first note onwards she compels attention with her poetic and imaginative treatment of each phrase, always sounding spontaneous' (*Gramophone*). But the real joy of her playing is such that children of her own age can delight in it as much as the most exacting of cognoscenti.

Her schedule of engagements over the past few years includes an appearance as soloist at the Philadelphia Orchestra's 90th anniversary gala concert, conducted by Riccardo Muti, and she has already appeared with most of the top American orchestras. This season she will be appearing for the first time with the Berlin Philharmonic, l'Orchestre National de France and the Leipzig Gewandhaus Orchestra. Her agent is currently taking bookings for 1997.

Whenever a young person achieves miraculous feats, there are fears that this may damage their long-term development as a person. In Sarah's case the busy schedule of rehearsing, performing and recording around the world obviously means that she has less time to spend in the classroom and 'doing the things that children of thirteen usually do'. However, although she has been attending music studies at the Juilliard School in New York every Saturday since she was six, during the week she attends the Germantown Friends School, a private school in Philadelphia. Despite the attentions of PR men, agents and record company executives, she is far from completely immersed in classical music and enjoys watching television, going to movies, rock music such as U2 and Genesis, reading, swimming, roller-skating and playing Nintendo Streetfighter 2. 'I love to practise my violin,' she says, 'I try to give it at least three hours a day but otherwise my life is a lot



Sarah Chang's latest CD

like other girls of my age.' She enjoys travelling to different countries and cities: 'It is something my friends can only dream about. I always make sure that my schedule gives me time for sightseeing so that I don't just travel from the airport to the hotel to the concert hall and back.'

Sarah's mother is a composer and her father, once principal violinist with the Korean National Symphony Orchestra, is now a music professor. Dr Chang denies that he has ever pushed his daughter: 'Believe it or not, I have never once told Sarah to practise ... She has normal friends. They have slumber parties and horseback ride together. That's very important.' Sarah attributes her success to a combination of a rigorous acquired technique, together with some inherent flair for interpretation: 'I think anyone can become technically good. It's just hard work. The instinctive feel is something you are born with ... My parents have always told me I can do what I want so long as I am happy ... I think I am very lucky.' Her teacher at the Juilliard School, Dorothy DeLay, has no doubts about her talent: 'Of course, she doesn't have technical problems, so one goes immediately to what she has to say about the music.' And she should know - her past pupils include Itzhak Perlman, Midori and Nigel Kennedy.

# Drawing is Natural

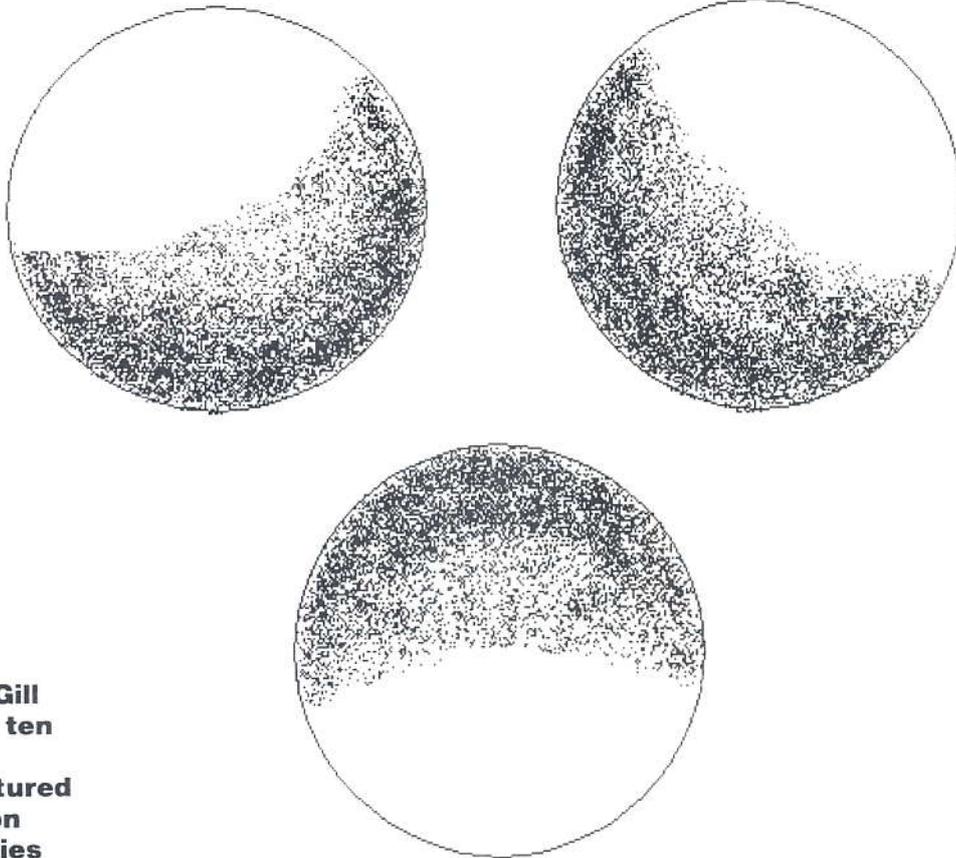
## Shading

In previous issues we have looked at perspective and the lines governing three-dimensional perspective. In this issue we shall add to the previous lessons the art of light and shade.

Light is the nature of how we see, whether natural, artificial, candlelight, etc. It can come from one direction or from several. For this issue's exercise we take one direction of light (the sun) and create vol-

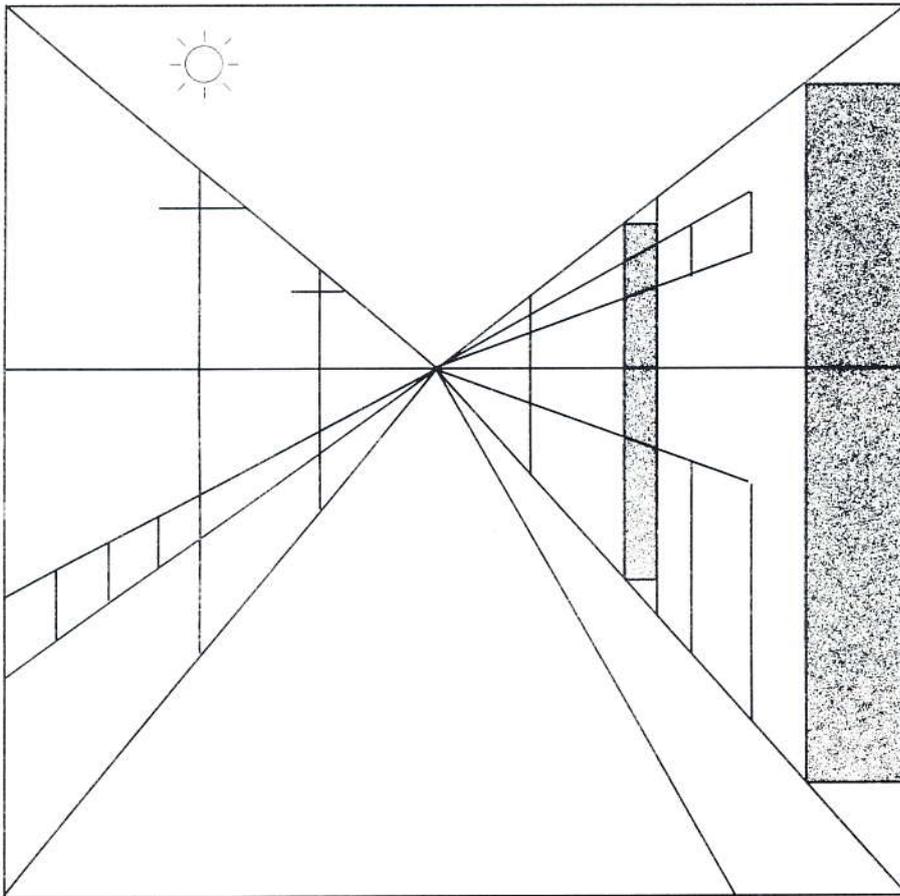
ume out of two-dimensional circles.

First draw three round circles on a sheet of paper. Then add suns from different angles as a source of light. The opposite of light is dark; the opposite of sun is shadow, so shade in the far side of your circles. To draw your shading, just gradually scribble (with a soft pencil) from lighter marks closer to the sun to darker marks furthest away from the sun. Your final drawing should look something like this:

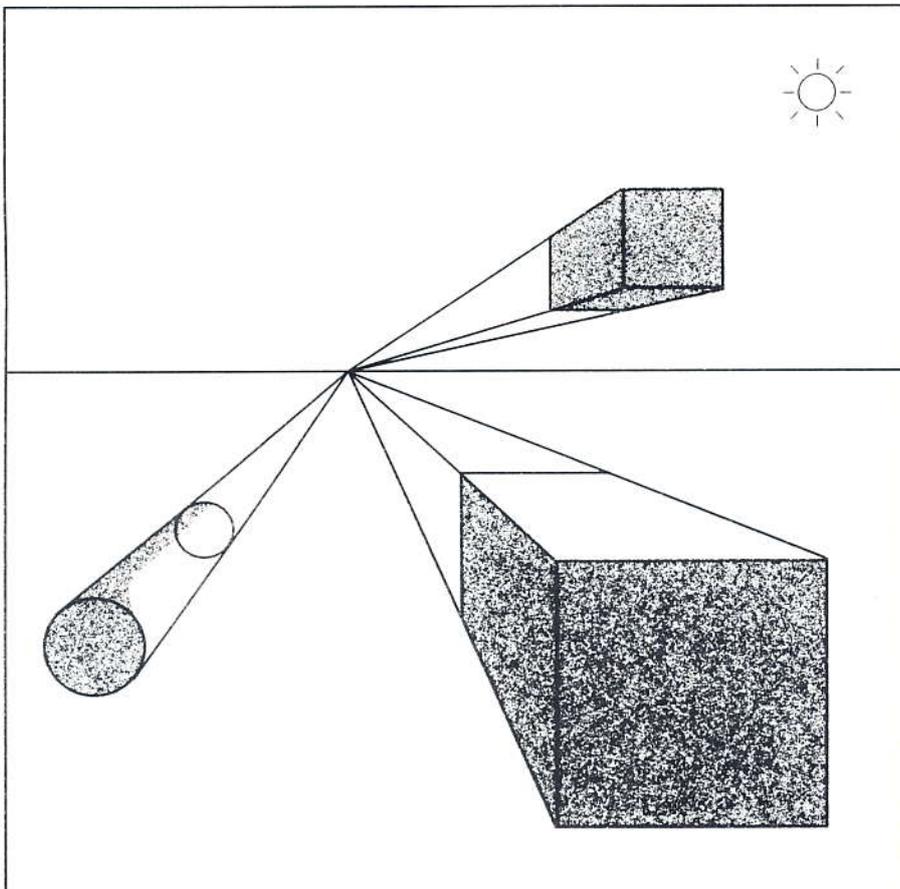


**Artist Lorraine Gill has already had ten one-woman art exhibitions, featured in three books on great personalities and artists, appeared on BBC Television in a programme on Sir Henry Moore and has written two books: *The Nature of Perception* and *How to Draw*.**

We can now add to the previous law of perspective to give greater dimension to our drawings.



*Creating blocks and cylinders from a simple horizon line and vanishing point.*



*Creating perspective with lines relating to a vanishing point.*

Using the examples on the following page as a basis, create your own vanishing point and perspective lines, put your suns wherever you wish and shade away!

# UNLOCK THE POTENTIAL OF YOUR BRAIN

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with Barry Buzan

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### Seize the Day

Dear Sir,  
 First of all may I take this opportunity to say how fascinating, intriguing and inspirational I find *Use Your Head* magazine - I look forward to every issue. And I've decided to put forward a contribution, a poem entitled *Seize the Day!*

*Seize the day!  
 Give it Life,  
 for it will come no more,  
 See the beauty  
 amidst the strife,  
 And be happy forever more.*

*Live for today!  
 And you will improve tomorrow  
 and make a happier yesterday.  
 But live for tomorrow  
 or long for yesterday,  
 and you will have lost ...  
 As your life drifts away.*

*Each day well lived  
 each seed sown  
 Looks after the future,  
 so we can blossom ...  
 Like the flowers have grown.*

*Seize the day!  
 Seize it now!  
 Be grateful you have it at all,  
 And every night  
 as you lay to rest ...  
 You may say:  
 'I'm happy, I gave it my ALL'*

Sean M. Kelly (UYHCM 859)

### Reader's Requests

Dear Sir,  
 How about a pen pals page in *Use Your Head* magazine? Members could list the particular aspects of learning how to learn, self-development or whatever they are interested in at present, and then other members could contact them if they are also interested in that area.

Warren Day (UYHCM 149)

*We are always happy to put members with similar interests in touch with each other via the magazine. Here is one such request - Ed.*

Dear Sir,  
 I have a specific problem which you may possibly be able to help me with. I have spent a great deal of time learning to play the guitar but have always found it difficult to memorise musical notation and chord and scale constructions. Can you suggest anything that might help?

Iwan M. Jones

*Please send your suggestions c/o the magazine - Ed.*

**The editor welcomes correspondence on any topic. Please send your contributions to: Byron Jacobs, Use Your Head Magazine, 23 Ditchling Rise, Brighton, Sussex BN1 4QL, or fax on 0273 - 675486**

# GREEK ISLAND UNIVERSITY

Picture the bluest blue shown up against brilliant white buildings, sandy coves and clusters of small houses. Wafting on the gentle, warm Aegean sea breeze comes the aroma of grilled fresh fish and seasoned local vegetables. The only sounds, the lap of the waves tickling the shore line and quiet conversation and laughter between friends.

You are surrounded by history, the Kyklades (meaning ring, the shape made by the 34 islands) are where Leto fled to give birth to Zeus's offspring; Artemis and Apollo. Our island, Paros, mined for its beautiful marble, was the chosen home of Archilochos while fleeing from battle. His actions, and subsequent poetry, gave rise to the quote 'Live to fight another day', a philosophy which has helped Parians to survive. Later Paros was a part of the Roman Empire; invaded by Arab pirates; ruled by Venetians; then invaded by Turkish pirates who took and sold 6,000 Parians as slaves. Life is calmer nowadays, the only invasion being that of the Brain (aka Use Your Head) Club 4th annual University!

The Greek Island University will combine local discovery with lessons on the exploration and development of mental abilities, game-playing (chess, go etc.), swimming, discussion of worldly matters, relaxation and reading. A typical day might be:

7.30-8.30 general exercise - stretching and swimming

8.30-9.30 breakfast

9.30-1.00 morning session - mental training

1.00-2.30 lunch and discussion

2.30-7.30 free time including optional small group or individual activities

7.30-9.00 dinner and discussion

9.00-??? evening celebrations

Come to Paros to relax your body, inspire your mind, warm your heart and refresh your spirit.



## ANNUAL USE YOUR HEAD CLUB CONFERENCE 1994

### Animal Intelligence - London, 25 June

The annual Use Your Head Club Conference is to be held in London again this year, at the Naval and Military Club in Piccadilly. The main theme will be Animal Intelligence (particularly appropriate following our recent adoption of Layang Layang, the Asian elephant from London Zoo), with a wide range of speakers including Tony Buzan, who will lead the meeting with 'Animal versus Human Intelligence'.

**Venue:** Naval and Military Club, Piccadilly, London W1 (close to Green Park Underground Station).

**Date:** Saturday 25 June 1994.

**Times:** 10.00am till 5.00pm (registration and coffee from 9.15am).

**Tickets:** £45 (paid-up members), £55 (guests), £35 (full-time students). This includes an excellent buffet lunch with wine or soft drinks, and morning and afternoon refreshments.



The Use Your Head Club Conference is renowned for being extremely interesting and memorable and is an event open to everyone. If you would like to attend, please contact the Use Your Head Club (0628 477004). We look forward to seeing you there.

#### Quiz Answers (from page 31)

1. Nessus appears in Greek mythology; he was a centaur killed by Hercules when he had tried to violate the latter's fiancée. Centaurs had six legs and so was probably a species of insect.
2. No, it wasn't 'Shiver me timbers'; the Captain Flint that appeared in *Treasure Island* - not the one mentioned in the memory of some of the pirates, but the living, breathing character - was a parrot prone to repeating the phrase 'pieces of eight ... pieces of eight'.
3. Hispaniola - Spanish for 'Little Spain' approximately - is the name of the island which is divided fairly equally between Haiti and the Dominican Republic.
4. This is very much like the hunter and bear problem, but a totally different scenario. With equal length trips south, east and north, it is said, the origin has to be the north pole - so the bear was white - a polar bear. Unfortunately the usual answer is not accurate. There are an infinite number of points on the earth where you can make the trip: not only at the north pole, but all the places in many latitudes very close to the south pole. For example starting a little more than 100 miles north of the south pole, you can travel 1000 miles south, then circle the pole (once, or any number or times) for 1000 miles, and then return to the same place on the final 1000-mile leg. If the hunter sees only one species it must have been some kind of penguin in Antarctica, for he couldn't fail to see all kinds of animal life a thousand miles from the north pole.
5. Blackpool, Dublin, Chernobyl and Nicaragua all mean (in different languages) 'Blackpool'.
6. The Greek prefix meaning 'one-and-a-half' is SESQUI-. It isn't seen much, I admit, but you may have come across it in chemistry

('sesquisulphide' is the remains of a wrong impression of how many atoms were in some molecules) or in history and protocol (an organisation's 'sesquicentennial' celebrates its 150th anniversary).

7. The Michelangelo virus was named by a virus researcher who found it; like many viruses it triggers itself to do its destructive work on a particular date. The one chosen by its creator was 6th March - which the researcher recalled (or looked up?) is the artist's birthday.
8. The inventor of the phrase 'the road to hell is paved with good intentions' was a clergyman - whether you trace it back to St Bernard (12th century) or John Wesley (18th century) - who both said something like this: St Bernard talked of hell and good intentions, and Wesley added the road and its paving.
9. CANTON: Canton, Ohio is the home and burial place of President William McKinley (assassinated 1901); a canton is a geographic and governmental division of Switzerland and a subdivision of an Arrondissement in France. (An Arrondissement is itself a subdivision of a Department). Also there is Cantonese - the language, cuisine and culture of south China.
10. The only remaining death penalty applicable under Federation law by Stardate 44000 (four years into the Next Generation's mission) is ignoring General Order Seven, which prohibits entry into the quadrant in the vicinity of Talos IV. The three remaining Talosians are supreme telepaths against whom there is no defence; they appeared in the pilot episode of *Star Trek* over 25 years ago - before Captain Kirk arrived on the scene! It seems that the show's creators came up with too effective a trio of opponents.

# USE YOUR HEAD CLUB NEWS

## Headboard

### SOUTHWEST SCENE

The South West Use Your Head Club, which meets twice monthly at Greenham Hall, Somerset, started 1994 with a bang, writes Caro Ayre. Tony Buzan and Vanda North, kindly led the January meeting, setting us all off on an enthusiastic note for the New Year. Tea and scones were followed by a short but memorable surprise celebration fireworks display detonated by Tony! A brain bloom filled the sky and echoed across the valley. Paul Collins, the highly regarded Alexander teacher, generously agreed to give us another talk, which gave us an insight into The Eye and Consciousness. Then Sean Adam, the world speed-reading record holder, had us all enthralled with information about Alphalearning, and how techniques previously used to help businessmen become more efficient, are now proving beneficial for brain-damaged people (see the last issue of *Use Your Head* for more information). Our last visiting speaker was Andrew Winter-Taylor, who enlightened us on the subject of Neuro-Linguistic Programming.

If you would like to attend one of the very friendly South West Club's meetings, please contact Lynn Collins on 0823-667685. Greenham Hall also offers very reasonable B&B rates, please call Caro Ayre on 0823-672603 for further details - Ed.

### BRAIN TRUST DRAW

The first Brain Trust Draw was held at the Thames Valley Use Your Head Club meeting on April 28. Tickets were drawn by Tony Buzan and Brian Lee, the sponsors of this initiative in aid of the Brain Trust. Prizewinners were Mike Kemp, Peter Barrett, Sophie Breeze, Josephine Weir, Nicky Thompson, Iain Moodie and Phil Egging. Congratulations to you all, and thank you for your support.

### FORTHCOMING ISSUES

The next *Use Your Head* magazine will appear in September, when our special theme will be Mental World Records. The final edition this year will focus on Mind Sports and Mental Games and will be arriving on your doormat before Christmas. If you would like to contribute a piece on one of the featured subjects, or an article or letter of general interest, please contact the editor as soon as possible. Copy for the Autumn issue is required by 22 July and for the Winter issue by 15 October. *Use Your Head* is your magazine!

### BRAIN OF THE YEAR 1994

Nominations to date for Brain of the Year 1994 include David Attenborough, Sir Francis Crick, Dr Marion Tinsley, Anatoly Karpov, Bill Gates, Michael Gelb, Steven Spielberg and Judith Polgar. The Brain Trust welcomes further nominations.

### USE YOUR HEAD CLUB EVENTS

Forthcoming events include the Duck Race (see inside front cover), Paul Collins running course (see p. 25), the Greek Island University (see p. 33), the Use Your Head Club Conference (see p. 34) and Memoriad '94 (see back cover). For further information on any of these, please contact the Marlow office (0628 482765).

Can this  
man be  
beaten?

**MEMORIAD '94**

**6-7 August**

Simpson's-In-the-Strand

