HORRIBLE SCIENCE

Science with the squishy bits left in!

Bulging Brains will blow your mind! Get your brain cells buzzing as you discover...

- what a fresh brain really *smells* like
- why chopping your brain in half needn't be fatal
- whether girls or boys are smarter.

If you think you can stomach the *sick* side of Science, then read on as we put *your* grey matter under the spotlight. Find out how to perform brain surgery with our beginner's guide, what the heck an electroencephalograph is and whether you're left or right-*eyed*. With fantastic fact files and curious quizzes, teacher tests and crazy cartoons, *Bulging Brains* will leave your head spinning!

Science has never been so horrible!

HORRIBLE SCIENCE

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HORRIBLE SCIENCE BULGING BRAINS Nick Arnold

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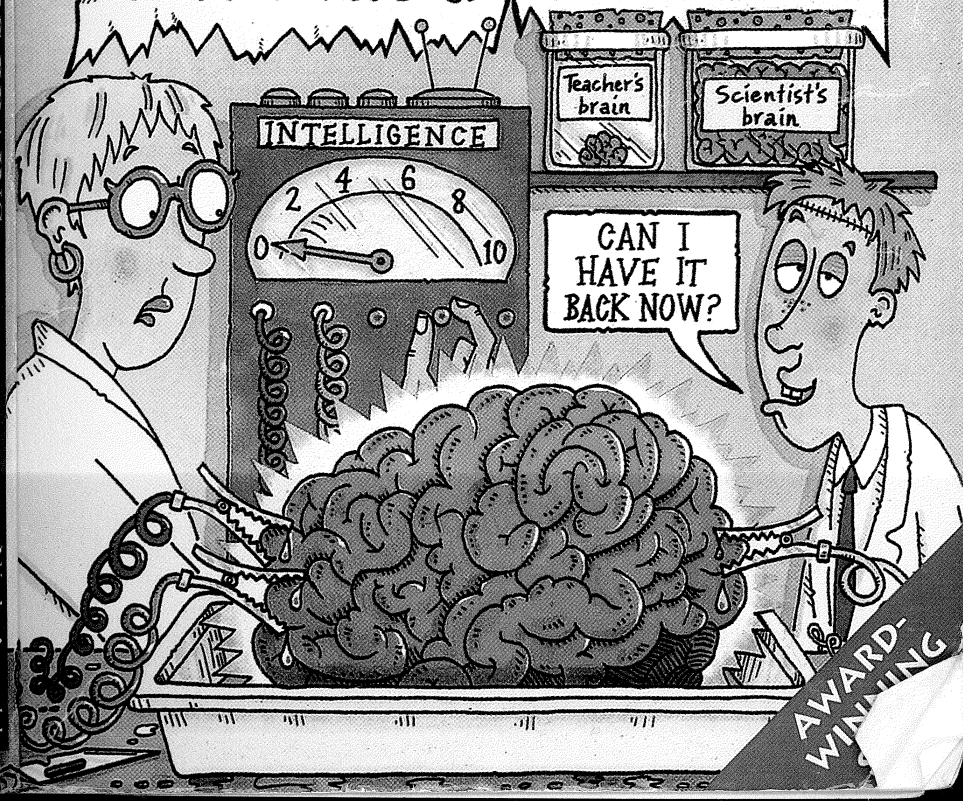
BULGING BRAINS

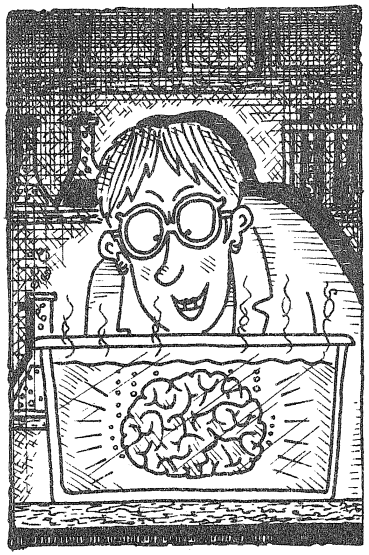
Nick Arnold

ILLUSTRATED BY TONY DE SAULLES



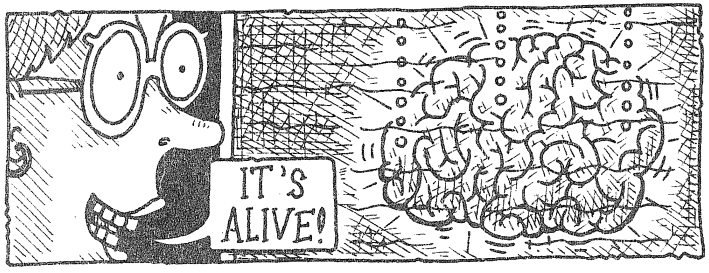
AWARD-WINNING

BULGING BRAIN BASICS



Dr Funkenstain felt a rush of excitement as she gazed into the glass tank. For five years she had been planning this experiment. Now she had done it and she was looking at the result. The tank was bathed in an eerie light. And floating ghostlike in the tank's centre was a strange and horrible looking object. It was pink like a sausage and wrinkled like an old walnut. And it gave out the faintest whiff of blue cheese.

Could it be an unknown creature from the depths of the ocean? Or perhaps an alien from another world? Dr Funkenstain knew better. She was gazing at a real human brain. A very special human brain because...



Dr Funkenstain whispered excitedly. Peering closer she could see the tiny wormlike blood vessels criss-

crossing the brain's surface. Dr Funkenstain had done it. She was the first scientist in history to keep a brain alive outside the body.

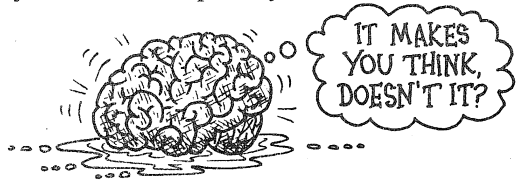
DON'T PANIC! It's only a story. Scientists can't keep human brains in tanks – yet. But this technique might be possible in the future. Perhaps you'd like to become the first brain surgeon to keep a brain in a tank? If so beware: it's a bad idea to rush into brain surgery without getting to know a bit about your subject. Important facts like...

What's your brain for?

The brain is the part of your body that tells you what's going on around you. You can use your brain to order your body around and even to order everybody else around. But there's much more to your brain. Much, much more.

Inside your brain are your precious memories, your dreams, your hopes for the future and the knowledge of everything you love and care about. In your brain you can sense lovely smells and tastes and colours. Your brain helps you feel great and happy about life and that's the good side. But your brain also creates horrible fears and worries that can make you miserable.

Your brain makes the thoughts and feelings that make your personality. Your brain turns your body from a living object into *you* the person. Without a brain you'd be as dead as a dodo's tombstone, so it's good to know that you've got your very own bulging brain right now between your ears ... hopefully.



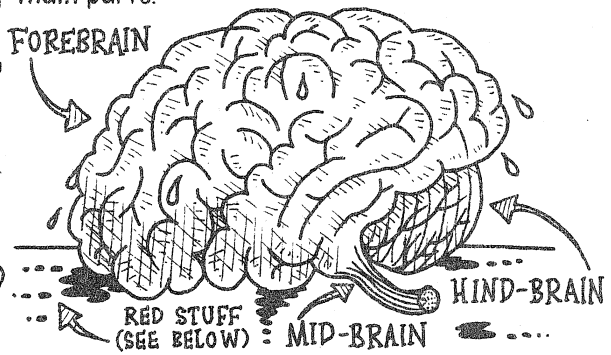
Inside the bulging brain

Still want to be a brain surgeon? Excellent. Now you've found out a bit about what the bulging brain does, you're ready to check out how it works...

Bulging fact file

NAME: The brain

BASIC FACTS: The brain is made up of three main parts:



Each area is made up of smaller bits with different jobs. (For more details see page 32-35.)

DISGUSTING DETAILS: The brain needs energy from the sugar and oxygen carried in the blood. So it sucks in about 750 ml (one pint) of the red stuff every minute. All this hot blood gives out lots of heat – that's why your brain is the hottest part of your body.

Bet you never knew!

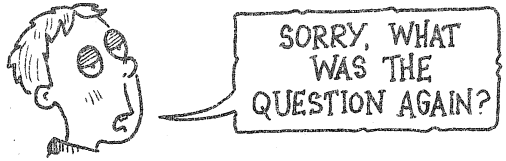
Your brain weighs less than 1.3 kg – that's a little less than the weight of a large bag of sugar or the weight of all the germs swarming in your guts. In fact, the brain is only one-fiftieth the weight of a grown-up man and it's far lighter than your guts, your blood, your skin or your bones.

Have you got a bulging brain?

So just how clever is your brain? Well, if you're going to be a brain surgeon you'll need to know all the answers to this brain-teasing quiz:

1 What happens if half your brain is damaged?

a) It doesn't half hurt, ha-ha. No, seriously, you can't remember anything.



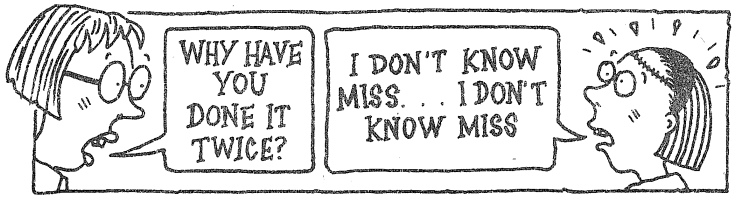
b) You die. No one could survive such a terrible injury.

c) You can live normally although you have to re-learn vital skills such as talking.

2 What happens if someone cuts your brain in two?

a) Your brain becomes twice as clever.

b) Your brain functions normally but you may find yourself doing your science homework twice.



c) Each side of your brain behaves like a separate person.

3 Imagine you were born without 97 per cent of your cortex (cor-tex) – that's the wrinkly part of your brain at the top where you do your thinking. You're left with a tiny slice of brain in this area. What would happen to you?

a) You'd be left with the brains of a half-witted stick insect.

b) You'd be as brainy as anyone else ... but only for five minutes a day. The rest of the time you'd blunder around like a zombie in a horror movie.

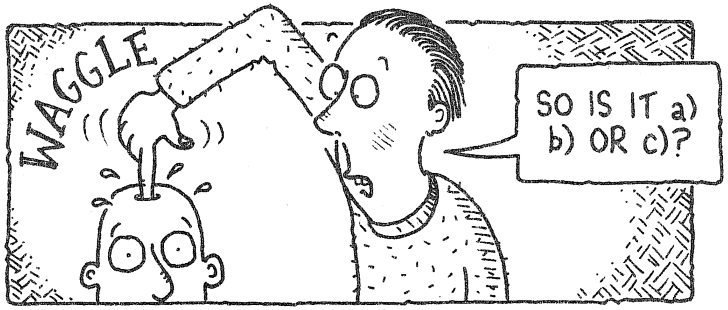
c) Your brain would work normally and you could be as brainy as your science teacher. (Yes, teachers are said to be intelligent.)

4 What would you feel if someone stuck a finger into your brain and waggled it about?

a) Unbearable agony – the worst pain in the world.

b) You'd feel hot and cold shivers all over your body.

c) Nothing because the brain cannot feel touch.

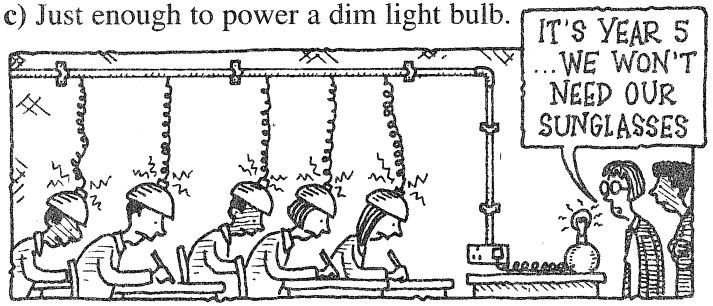


5 How much energy does your brain use in a science test?

a) Such a small amount that it can't be measured (especially if you don't know the answers).

b) Enough to light up the classroom. No wonder the test makes you light-headed, ha-ha.

c) Just enough to power a dim light bulb.



6 Why do you feel tired after the test?

a) All that mental effort strains the brain.

b) During the test your brain drew extra energy in the form of sugar in your blood. After the test your body feels tired because it lacks this vital blood sugar.

c) You were so tense your muscles bunched up and used up energy. And your muscles feel tired – not your brain.

7 How much of your brain is water?

a) About 5 per cent

b) 32 per cent

c) About 80 per cent

Answers:

All the answers are **c)**, so you can check them without taxing your brain too much. And here are a few more details to get you thinking.

1 A bump on the head can injure the brain (see pages 129-139 for the grisly details). Yet the brain can survive dreadful injuries. If one half of the brain is injured, the half that's left learns how to do the work of the damaged half.

2 This operation was performed in the 1960s on patients suffering from violent fits. The operation stopped the fits from spreading through the brain. But

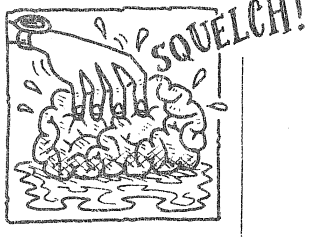
afterwards the two sides of the brain acted like separate people. One woman tried to put on a different shirt with each hand. She ended up wearing two shirts.

3 People can be perfectly intelligent with very little cortex. This condition is caused by a disease called hydrocephalus (hi-dro-cef-al-us). This results in too much fluid sloshing around the skull, so there's less room for the brain.

4 Your nerves take signals from elsewhere in your body to your brain. This means you actually experience pain, touch, taste, smell, sound and vision in your brain. But oddly enough, there are no touch sensors on the brain itself. (You'll find the low-down on senses on pages 45-64.)

5 Yes, in light bulb terms we're all rather dim. Scientist Louis Sokoloff of the US National Institute of Mental Health has found the brain uses the same amount of energy gazing dreamily at a sunset as it does in a tough science test. So what would you rather do?

6 If the questions were really easy, and you managed to relax in the science test, you wouldn't feel so whacked.



7 That's why when you become a brain surgeon and get to touch a brain it'll feel like squidgy blancmange or a soft-boiled egg. The brain needs water for vital chemical reactions such as sending nerve signals. Without water, a brain begins to overheat and starts to see things that aren't there. Ultimately it will die.

Bulging brain secrets

Psst – wanna know a brain secret? There's more to your brain than water. For example, your brain's made up of millions of cells and each one is so small you need a microscope to see it. (No, these aren't cells that people get locked up in.) Read on, your brain might learn something...

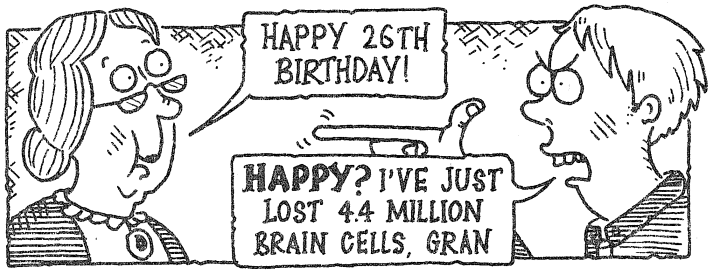
Bulging brain cells

1 Your brain is bulging with 100,000,000,000 – that's 100 *billion* – nerve cells or neurons. These are special cells used for sending signals inside the brain. If you don't believe it, try counting them yourself.

2 Each cell is a living blob and some are so tiny that you can fit 25 on to this fullstop. (You'll need a steady hand for this.)

3 If you laid the cells from just one brain in a line they would stretch 1000km – a quarter of the way across the USA.

4 Unborn babies grow new brain cells at the rate of 2,000 every *second.* And all your brain cells were already in place when you were born. But after you get to 25, about 12,000 cells die each day (that's 4.4 million a year).



Don't worry! You can lose cells at this rate for a lifetime and still have 98 per cent of them left.

5 Your brain cells are desperate for oxygen. Starve a brain of blood for just seven seconds and it goes on strike and switches itself off. You might call this fainting. Scientists aren't quite sure how this fascinating process takes place.

Yep – even now scientists are baffled by the mysterious brain. But not quite as baffled as the people who first probed the brain's grisly secrets. Check out the next page and prepare to be baffled, bewildered, bemused and ... *horrified.*