

A private residence, Downey, California, August 1953. A man — referred to in the literature as 'W.J.' or 'Case One' — is having a seizure. He grimaces, mutters and repeatedly exclaims a series of words. "Bail out. Bail out. Bail out. …" This 'aura' phase of the seizure produces in him a feeling of déjà vu and impending doom. His vision becomes distorted, apparitions obstruct his visual field.

W.J. is an American war veteran. In September 1944 he jumped from an aircraft over Eindhoven, his parachute failed to open and he fell into woodland, suffering severe head trauma and multiple fractures of his left leg. He awoke, apparently days later, in a German internment camp, where he was beaten and starved. Since he returned from Europe his condition has deteriorated. He suffers episodes of lost time — he recently found himself fifty miles from home with no recollection of how he got there. He experiences daily chronic convulsions. His skin is discoloured and disfigured from malnutrition and he has bruises and burns on his head and hands from falls during seizures. He is dependent on extensive medication to normalise daily life — Dilantia, Mysoline, Phenobarbital, Thorazine, Trimethadione, Zarontin.

After several disorienting minutes the aura progresses to a 'tonic' phase. The seizure spreads, producing a feedback across the two hemispheres of W.J.'s brain. He loses consciousness and momentarily stops breathing.

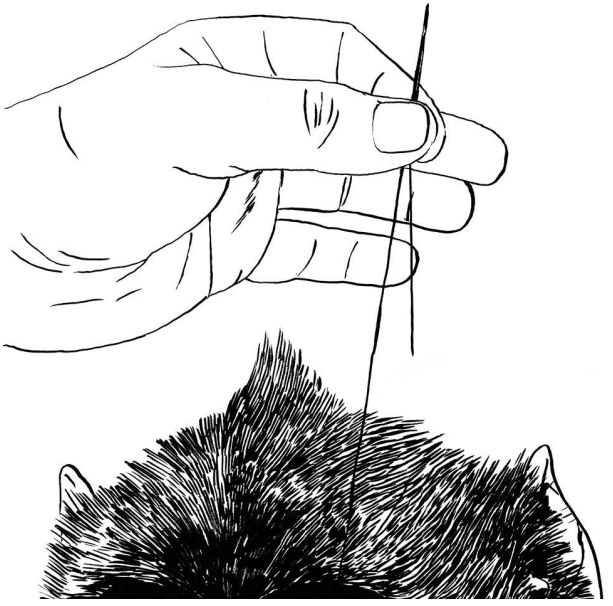




California Institute of Technology, Pasadena, June 1954. In a basement operating theatre with adjoining office, a group of young surgeons is engaged in an experimental research programme to split the two hemispheres of the brains of live mammals. Rats, cats and monkeys. A surgeon's assistant is clamping an anaesthetised cat into a head brace. He tightens the clamp and swings a wall-mounted dissecting microscope into place over the animal. He turns to arrange a set of tools on a stainless steel mobile table. The tools have an ad-hoc appearance: they are modifications of other surgical implements — blades, specula and suckers.

The surgeon enters the theatre, makes some routine preparations, and begins the operation. Using a dental drill, the assistant drills fours holes in the top of the cat's skull, in a square formation. These are connected with bone cutters and a section of the skull is snapped out, pulled back and secured. The surgeon parts the two hemispheres of the brain and inserts the specula. Almost immediately a seepage of fluid and blood occurs and clouds the surgeon's view. The assistant inserts a sucker, but this process takes too long and the cavity fills with fluid. Proceeding with the operation despite the reduced visibility, the surgeon mistakenly severs the third ventricle. This will result in a brain-damaged subject, of no use to the experiment, and so the operation is aborted. The assistant cleans the operating chair and disposes of the animal.





November 1960. In the operating theatre at Caltech, the assistant is carefully stitching closed the left eye of an anaesthetised monkey. As he works, he overhears a conversation from the office. The surgeon is speaking by telephone to a colleague at the White Memorial Hospital in Los Angeles.

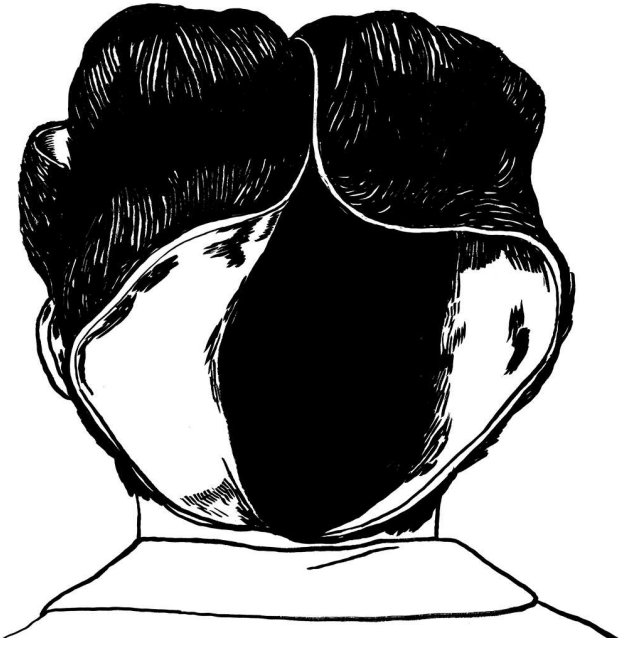
"Joe, the surgery has developed considerably and our survival rate is improving. The testing phase is well underway and several papers have been published on our animal work." "You've seen them? Great."

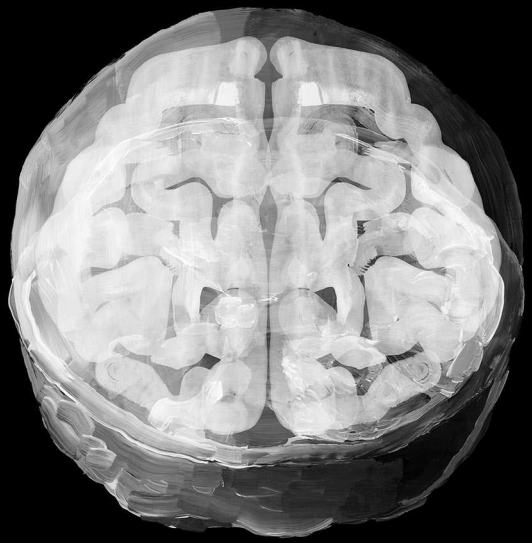
"We know that stimulation received by the right eye is processed in the left hemisphere, and vice versa. But after the corpus callosum connecting the two hemispheres is sectioned, it is as if the animal has two separate brains, isolated but both apparently functional. A subject can be taught to perform an elementary pattern-recognition exercise with its right eye open and its left closed. With the sensory reception reversed — left eye open and right closed — the animal has to completely relearn the exercise."

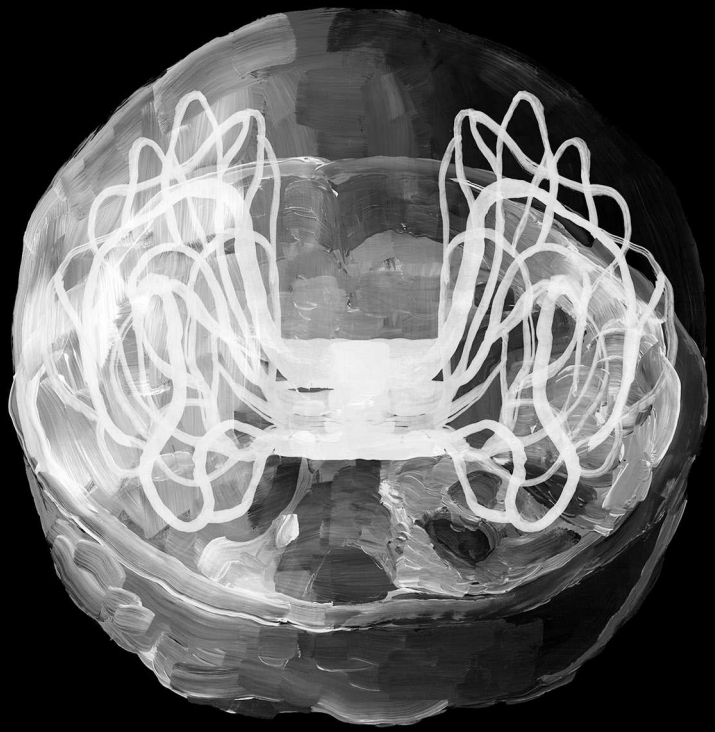
"We want to expedite the human trial. We have a candidate. His epilepsy is the result of specific trauma. He is an otherwise normal, intelligent and alert individual. No other solution has been found to control his seizures."

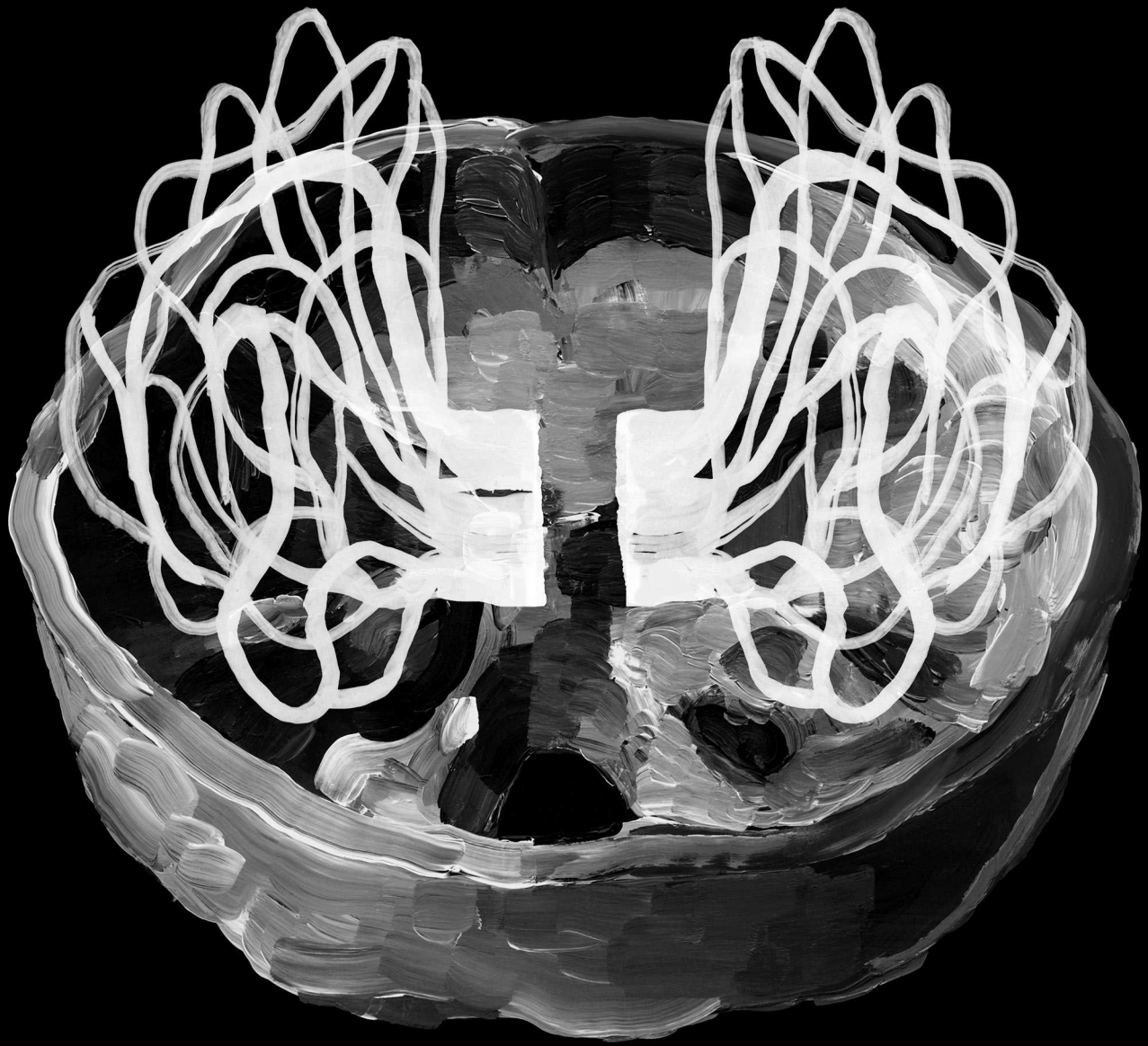
"Yes. Wonderful, we will organise a pre-operative testing and counselling programme for him."









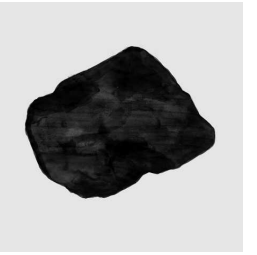


July 1965. The assistant reverses a van into the driveway of W. J.'s residence. Installed in the back of the vehicle is a custom built neurological testing apparatus. Its main device is a console with a movable display screen. Slides can be projected onto the screen in such a way that they are visible only to a patient's left or right eye. Beneath the screen, hidden from the view of the patient, but accessible to their hands, is a platform onto which small objects can be placed. Opposite the patient is a second seat, with access to the slide projector and a keyboard to record the results of the test.

W. J. emerges from the house, the surgeon supporting him by the arm as he walks gingerly across the driveway. W. J. carries his daily newspaper under his other arm. The two are in the middle of an intense discussion as they enter the van through the large sliding door at its side. W. J. and the assistant exchange greetings, and the assistant gestures towards the console, but W. J. has already turned to resume his conversation with the surgeon. "The detail is extraordinary. You can really decipher the landscape up there. I was reading in the newspaper about the camera that they are carrying aboard that thing. Apparently it weighs 50 pounds."

The surgeon nods in response. He opens the window at the back of the van as W. J. continues. Eventually W. J. is seated at the console, the assistant adjusts the screen to his position and the test begins.

A series of images is projected to W. J.'s right eye:







After each image has disappeared, the surgeon asks W. J., "What did you see?"

"A rock."

"A die."

"A cat."

Now I am seated in the front row, attending the lecture. I raise my hand and ask a question. If we accept that our brains are a material fact in a deterministic world does it follow that our actions are predetermined?

"That's good," the surgeon says, "all correct, as usual." The assistant stands and reaches over to move the screen into position for W. J.'s left eye.

"How have your seizures been recently, Walter?" the assistant asks. "A brief one last month. Nothing major. That's over three years now." "And how is life generally, have you been having any other problems, anything unusual?" the surgeon adds. Patting his right leg with his right hand, W. J. says "I have tremors on this side. A few times every day. And the twitchy hand." The surgeon glances at W. J.'s left hand. "Yes, the alien hand. I noticed you have a new scar. How did you get that?" "Slicing an apple. I wanted to cut it, but this hand picked it up to take a bite." "You can't control it consciously?" "Sometimes I lose control of it, like an interference in the signal."

"You must be very familiar with these tests by now," the assistant jokes. The surgeon interjects in an earnest tone: "That first test, and the next two, you'll recognise. These establish the localised functions in your two hemispheres. We expect to see your speech responses localised to the left hemisphere, and your tactile responses localised to the right. Because of your surgery there should be no exchange between the hemispheres. You recognise objects seen with your left eye, but your right hemisphere cannot express the recognition verbally, as that would require relaying information to the left hemisphere to make a spoken response. Impossible for you."

The presentation is reversed. A series of images is projected to W. J.'s left eye:







After each slide the surgeon asks again, "What did you see?" W. J. responds hesitantly.

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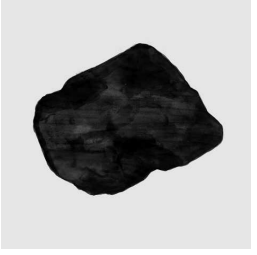
"There was a flash of light."

"I saw nothing."

Apparently undisturbed, the surgeon repeats the process. A series of images presented to the left eye:







As each image appears, the surgeon directs W. J. to use his right hand only to identify the objects by touch, from the selection out of view on the platform.

W. J. identifies the die.

W. J. identifies the key.

W. J. identifies the rock.

"That's good, Walter," says the surgeon. "Let's move right along to the interesting part." The assistant adjusts the screen. Two images are presented in quick succession, one to the left eye:



And with the screen immediately moved to the side, a second image to the right eye:



Following this, a single slide showing numerous objects is presented to W. J.'s right eye. The assistant asks, "Walter, can you see an object that you can relate to what you saw?" W. J. pauses for a few seconds.

"A door."

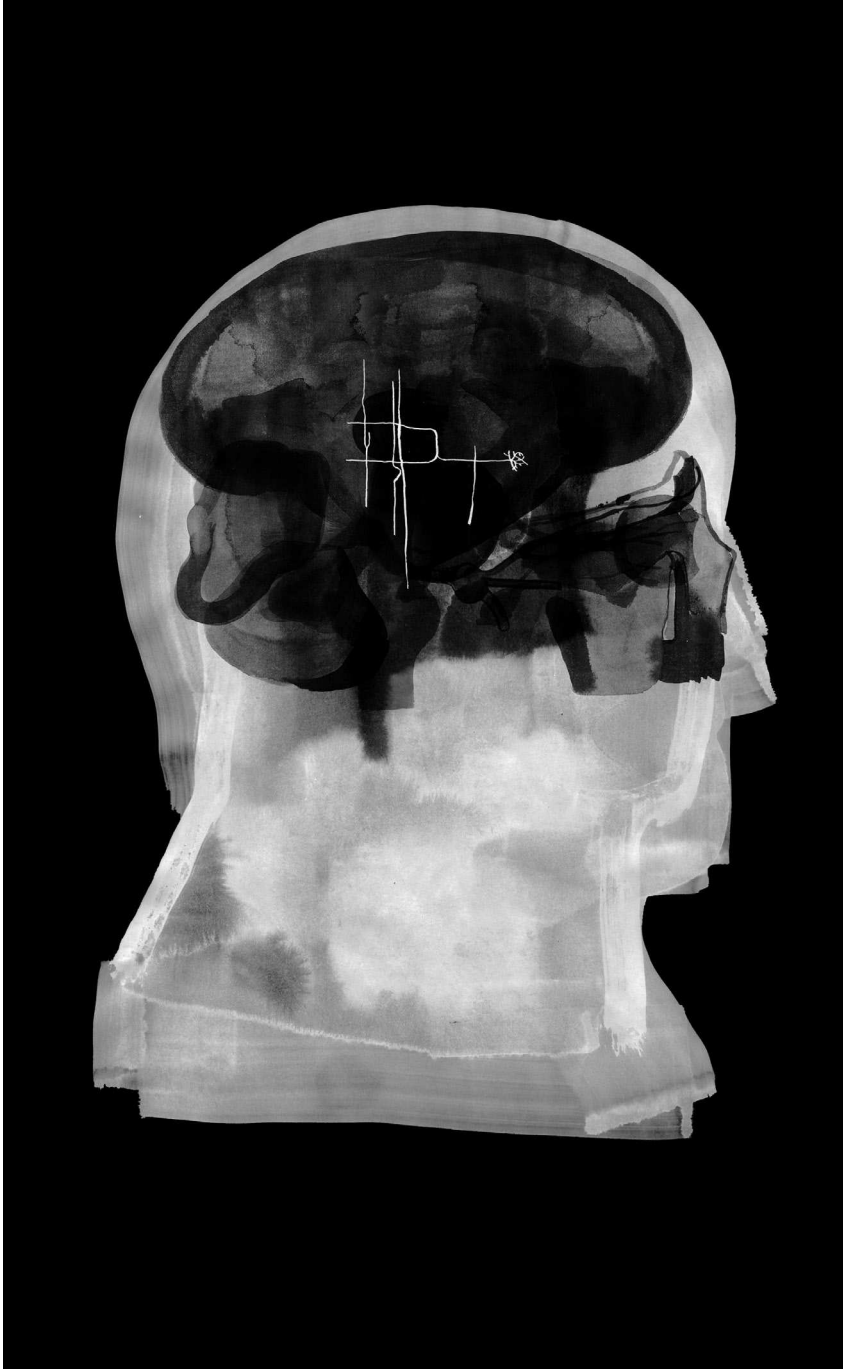
The assistant then directs W. J.'s right hand to the platform and asks him to identify an object to relate to the image he has just seen through his left eye. W. J. handles each of the objects in turn.

W. J. identifies the toy cat.

The surgeon asks W. J., "Why did you choose this pair, Walter? What's the connection?" W. J. hesitates for a few seconds and then offers, "The cat scratches at the door to be let in." The surgeon and the assistant exchange a furtive glance. "And Walter, why did you open the window in the van earlier?" "Oh, I wanted some fresh air," W. J. replies.

Their session concluded for the day, the three men are seated around a table of drinks in W. J.'s yard. The surgeon is speaking, "Walter, you actually chose the door because it relates to the key that we showed your left hemisphere." W. J. nods. "And you chose the cat because it relates to the milk bottle that we showed your right hemisphere." W. J. seems puzzled. "But because your split hemispheres can't share the information that motivated their choices, you are faced with a confusion."

"Your left hemisphere invented the story about the cat scratching at the door to compensate for that confusion." "And do you remember that I asked you just now why you opened the window?" "Sure," W. J. says. "Well you didn't open it, I did. But because your left hemisphere is masking the disconnection in your perception, it invents a motivation for the action that it believes you took." W. J. is silent. He frowns and stares at the table. The surgeon continues in a positive tone: "We've seen these phenomena in your tests before, but now we think we have enough insight on the data to publish."



"We're calling it the 'interpreter'," declares the surgeon. "We think it exists only in the left hemisphere of the human brain, and its function seems to be to decide which of the many streams of sensation that the brain receives should be used in its mental image of reality. This happens unconsciously. Before we are even aware of what we are experiencing, our brains are filtering and processing, constructing an impression of reality to comply with our identity and personal narrative." The assistant looks reassuringly at W. J., who appears fascinated by what he is hearing.

"It's very hard to say how it evolved," the surgeon continues. "My theory is that it's a by-product of memory. Our ability to recall events in our lives is amazing, but it's impossible for our brains to record every detail of every moment of experience. So we need a way to decide what's important, a filtering mechanism to translate the noisy streams of sensations into our perception of reality as a continuous and believable narrative. I think the interpreter comes from that. It produces the thread to connect each of our memories of the outside world together."

W. J. reaches over to the newspaper on the table and holds the cover in front of his face so that the surgeon and assistant can see it. A photograph is printed large across the full width of the page. It shows the far side of the moon, and was taken from the Russian Zond spacecraft. He jokes, "So we are the storytellers of the universe!"

