

Researchers are discovering how hallucination occurs

Something nasty on the brain

A POPULAR view of madness is of a person talking to himself. New research on the origins of auditory hallucinations suggests that this may be true. Auditory hallucinations, defined as hearing imaginary voices, sounds or music, are a fundamental symptom of mental disorder. Although hallucinations can occur in a variety of illnesses, such as delirium tremens, drug intoxication and severe depression, they are most often associated with the severest mental illness, schizophrenia.

The "voices" can take many forms. Sometimes the sufferers hear their own thoughts spoken out aloud, but more often the patient will report hearing one or more voices talking about him or herself, often in an unpleasant, derogatory or threatening fashion. The sufferer might hear two people saying "he's no good — he's a swine" or perhaps ordering him to do unpleasant or dangerous activities, reported as being against the subject's own will, such as "hurt him" or "stab yourself".

What is actually happening when someone with schizophrenia hears voices? Hallucinations must represent something happening within the brain, since by definition there is no auditory input — there is nobody actually talking. Recently, Dr Tony David, of the Institute of Psychiatry, has proposed an intriguing model of hallucinations. He suggests that schizophrenic voices represent an alteration of the normal process of inner speech. Hallucinations begin as normal thoughts, which in most of us are recognised as being internal and self-generated.

Dr David has outlined how normal thoughts progress via internal language into a form in which they can be articulated, finally becoming the spoken word, if so wished. Throughout, there is a "loop", which warns the next stage of



Paul Broca: identified speech areas

the process what is happening; warning us, in effect, that the inner speech that is being generated is our own.

But what happens if the process goes wrong? To some extent this is an experience we have all had, such as a thought that cannot be got rid of, or a tune that keeps going round and round for days. Curiously, like schizophrenic voices, the thought or tune is frequently displeasing or unpleasant — usually the "Birdie Song" and not Beethoven. In schizophrenia, David suggests that the feedback loop that tells us that even these unpleasant thoughts are our own is broken. Schizophrenics talk to themselves, but do not realise it.

AN ELEGANT theory, but is there any evidence? It has been observed for some time that when schizophrenics report hallucinations, microscopic movements can be detected in the vocal chords, invisible to the casual observer and far too small to make any sound, but, perhaps, mirroring the production of

inner speech. The most convincing support comes from a study published in *The Lancet* this month. Philip McGuire and his colleagues from the Institute of Psychiatry were able to measure blood flow to the brain in 12 schizophrenics when they were hallucinating and when they were not. They used a new scanning technique that uses radionucleotides to measure blood flow in various parts of the brain. It is already known that the more the blood flows, the greater the brain activity.

THE RESULTS showed that blood flow was greater on the left than the right side of the brain when the subjects were hallucinating. This was consistent with postmortem pathological studies showing an association between subtle, but important changes in certain left-sided brain structures in schizophrenia. A more detailed analysis revealed slight, but significant changes in one particular part of the frontal lobe, known as Broca's area. This area, named after Paul Broca, a 19th-century French neurologist, has been known for more than 100 years to play a vital role in the production of speech and language. This new research thus supports David's theory that auditory hallucinations are a disorder of inner speech.

Much remains unanswered. The changes were small, and need replication. The result also did not explain the peculiar characteristics of schizophrenia hallucinations. Why is their content so often unpleasant, frightening or obscene? To understand the content of mental disorder doctors may be irresistibly drawn back to the murky world of the unconscious. After all, Freud started life as a neurologist interested in language and the brain.

DR SIMON WESSELY