Very like a fish

Why is it permissible for scientists to say whatever they like about the workings of the brain?

“The human brain is like an enormous fish,” intoned the doctor. “It is flat and slimy and has gills through which it can see.” But never fear—this was a Monty Python sketch, after all. We all knew it was a joke. I wish I could say the same for some recent theories about the brain. Two of them have come unstuck of late, and I’d be happy for a third to join them.

The first theory to run into problems is that mental illness is caused mainly by chemical imbalances in the brain that can be corrected by specific drugs. Marcia Angell, formerly editor of the New England Journal of Medicine, has assembled the case against this theory, and the reasons for its persistence, in the New York Review of Books (highly recommended and free at www.nybooks.com). Angell traces the theory back to the introduction of new psychoactive drugs in the 1950s. At first no one had a clue how they worked. Then they were found to affect the concentrations of certain chemicals in the brain. From these findings arose the theory that mental illness is caused by abnormal concentrations of these chemicals and that they can be countered by the right drug. For example, because certain antidepressants increase concentrations of serotonin in the brain, it was postulated that depression was caused by too little serotonin.

The inconvenient truth is that scientists have failed to find good evidence for the theory. But should we care that the theory is wrong if the drugs work in practice? Angell maintains that the drugs don’t work, either. Her key exhibit is a meta-analysis of the effects of selective serotonin reuptake inhibitors on depression (www.plosmedicine.org/article/info:doi/10.1371/journal.pmed.0050045). Including unpublished data in their analysis, the researchers judged that “the overall effect of new-generation antidepressant medications is below recommended criteria for clinical significance.” But this hasn’t inhibited the drugs’ triumphal advance.

In the United States the diagnosis and treatment of mental illness have exploded. Angell says, “The apparent prevalence of ‘juvenile bipolar disorder’ jumped forty-fold between 1993 and 2004 . . . 500 000 children take antipsychotic drugs.” She tells of a 4 year old who died from a combination of clonidine and valproic acid, which had been prescribed to her, along with quetiapine, to treat her attention deficit/hyperactivity disorder and bipolar disorder—diagnosed when she was 2.

Beside that, the recent enthusiasm for localising emotions by functional magnetic resonance imaging (fMRI) seems like harmless fun. Even the most complex emotions have now been localised to somewhere in the brain. The list, compiled by the sociologist Scott Vrećko, now includes altruism, empathy, fear, guilt feelings, hope, impulsivity, judgment, kinship identification, love, motivation, neuroticism, problem gambling, racial bias, trust, and religious zeal. I’m reminded of phrenology, the 19th century pseudoscience, and the porcelain phrenology head I have on my desk. If you travel medially from its ear you cross the locations of destructiveness, secretiveness, acquisitiveness, hope, and veneration.

I found Vrećko’s list in Raymond Tallis’s latest book, Aping Mankind. Tallis lambasts fMRI studies for the “almost laughable crudity” of their design and their “risible simplification of human behaviour.” In his support he cites a paper in Perspectives on Psychological Science, which concludes that “a disturbingly large, and quite prominent segment of fMRI research on emotion, personality, and social cognition, is using seriously defective research methods and producing a profusion of numbers that should not be believed” (http://pps.sagepub.com/content/4/3/274).

There’s a third theory about the brain that’s now so entrenched that even questioning it is difficult. It enshrines the belief that the left hemisphere differs qualitatively from the right, with the left brain “logical” and the right “intuitive.” It informs everything from advertisements for solicitors to political insults. The most florid manifestation I’ve encountered was a talk given at the 2008 TED (Technology Entertainment and Design) conference by Jill Bolte Taylor, a neuroanatomist who had bled from an arteriovenous malformation in her left hemisphere (www.ted.com/talks/jill_bolte_taylor_s_powerful_stroke_of_insight.html). Her TED talk became an instant internet sensation, catapulting her into Time magazine’s top 100 most influential people of 2008.

The following quotations come from her book, My Stroke of Insight. Establishing her scientific credentials early on, she cites a paper she had coauthored on the localisation of the part of the brain’s visual cortex that tracks movement. Yet later she lets rip with a cascade of extraordinary, unreferenced assertions. “To the right mind, no time exists other than the present moment, and each moment is vibrant with sensation.” Without rules and regulations, “our right mind is free to think intuitively outside the box . . . By its design, our right mind is spontaneous, carefree and imaginative.”

In contrast the left brain is obsessed by details, boundaries, and judgment. After her stroke Bolte Taylor “shifted from the doing consciousness of my left brain to the being consciousness of my right brain,” and preferred it there. “In the absence of my left hemisphere’s negative judgment, I perceived myself as perfect, whole, and beautiful just the way I was.” Her insight was that “peace is only a thought away, and all we have to do to access it is silence the voice of our dominating left mind.” She wholeheartedly believes that “the feeling of deep inner peace is neurological circuitry located in our right brain.”

Raymond Tallis would regard this as another example of how explanations of our emotions gain credibility by being grounded in the substance of the brain. Depression? Too little serotonin. Altruism? This spot in your cortex. Nirvana? Neurons firing off in your right brain.

Does it matter if these explanations are wrong? I’m uncomfortable with the notion that scientists can say whatever they like about the workings of the brain without the support of reliable evidence, as science usually understands the concept.