

## 2023 Royal Society of New South Wales and Learned Academies Forum: “Our 21<sup>st</sup> Century Brain”

### Opening Address

Her Excellency the Honourable Margaret Beazley AC KC

*Bujari gamarruwa*

*Diyin Babana Gamarada Gadigal Ngura*

In greeting you in the language of the Gadigal, Traditional Owners of these lands and waterways, I pay my respects to their Elders, past, present and emerging.

To all in this room and those watching online, it is a delight to welcome you all to Government House this morning for the 2023 Royal Society of NSW and Learned Academies Forum, “Our 21<sup>st</sup> Century Brain:” such an evocative title and timely topic.

In speaking of “our” brain, we speak, of course, of that wonderful and mysterious organ that makes us “us” — the individual we are, the architect of our intelligence and our emotional world.

Looking back, we can see how far we have come in understanding — or at least theorising about — the connection between the physicality of what we are as thinking beings.

In mid-nineteenth century in Massachusetts there was a woman named Lydia Folger, medical doctor, specialising in women’s health.

In 1844 she married. In many ways it was a backward step. In saying that, I must point out that I do not subscribe to the latest theory of marriage of which I read recently in a news article in *The Australian*. The by-line

for the article read “controversial feminist figure Clementine Ford has described marriage as ‘built on the oppression of women’ and compared wives to slaves.”<sup>1</sup>

The reason why I say that for Lydia Folger marriage was a backward step is because she married a phrenologist, Lorenzo Niles Fowler, and, as the second only medical graduate in medicine from an American University, an outstanding feat in itself, she too became a phrenologist and lectured widely on the topic. She wrote what she hoped would be the seminal text on the subject *Familiar Lessons on Phrenology*, which was published in 1847.

In following down this path of what today is classified as pseudoscience, Lydia Folger became a proponent of a theory of the brain promoted in Europe by the German physician Franz Joseph Gall in the late 18<sup>th</sup> century. It had continued acceptance into the 20<sup>th</sup> century, despite being debunked — in part — at the beginning of the 19<sup>th</sup> century by the French physician Marie Jean Pierre Flourens.<sup>2</sup>

Gall’s theory rested on the premise that the brain contained different discrete “organs” related to different discrete categories of personality and mind. The larger a specific “brain organ,” as it were, the more dominant was the relevant category of per-

<sup>1</sup> <https://www.theaustralian.com.au/breaking-news/clementine-ford-slams-marriage-as-an-institution-built-on-the-oppression-of-women-while-on-the-project/news-story/50c4d74356fad5db36fb75406911be6>

<sup>2</sup> Flourens disproved Gall’s assumption of the “organs” that underpinned his theory through experiments on the brains of pigeons that indicated that the loss of parts of the brain either caused no loss of function, or the loss of a completely different function than what had been attributed to it by phrenology.

sonality in the brain's owner. The size of these "brain organs" were discernible from a person's skull as bumps formed early in life while the bones were still soft and impressionable.

Some of Gall's early "research" was conducted on the inmates of jails and asylums. Gall contended that he could detect from the shape of their heads that a sufficient number of prisoners had criminal traits in common, such as murder, theft and the like.

I pause to allow you all to ponder in this eminent forum this morning how your colleagues seated beside and around you might have fared should the scientific world still adhere to the classification of mind and personality by reference to the shape of their heads.

It is, unsurprisingly, a discredited theory but it was not until 2018 that "An empirical, 21<sup>st</sup> century evaluation of phrenology"<sup>3</sup> was undertaken.

Using MRI scans to see if scalp bumps correlated with lifestyle and cognitive variables, this was then mapped against Gall's mental classifications. No evidence to support them was found.<sup>4</sup>

During the 19<sup>th</sup> century there were other conceptions of the relationship between the physicality of the body and mental states that, like phrenology, might have been dismissed during the 20<sup>th</sup> century as

quackery but that have, unlike phrenology, re-emerged recently in contemporary scientific discourse.

In particular, I speak of what has come to be known as the gut-brain axis.

Those at the forefront of 19<sup>th</sup>-century medical thought and practice took for granted that there existed a close connection between the gut and emotions.

For instance, James Johnson, physician extraordinary to the Royal Family, wrote in 1827, that "strange antipathies, disgusts, caprices of temper, and eccentricities, which are considered solely as obliquities of the intellect, have their source in corporeal disorder."<sup>5</sup> And that corporeal disorder occurred in the stomach, and specifically in the nerves surrounding it.

The idea of any prominent relationship between the gut and the brain diminished somewhat during the middle of the 20<sup>th</sup>-century but has been gaining significant traction again since the 1990s; it is now well-documented and, indeed, a rather hot topic of research.<sup>6</sup>

Today, however, it is conceived as articulated not through nerves — as had been assumed in the 19<sup>th</sup> century — but through the microbiome occurring in the gut.

As recently as August this year, a paper<sup>7</sup> was published by researchers at the University of British Columbia's Faculty of

---

3 O. Parker Jones, F. Alfaro-Almagro, S. Jbadi (2018) An empirical, 21<sup>st</sup> century evaluation of phrenology. *Cortex* 106: 26–35. Available: <https://www.biorxiv.org/content/10.1101/243089v2.full.pdf>

4 "The present study sought to test in the most exhaustive way currently possible the fundamental claim of phrenology: that measuring the contour of the head provides a reliable method for inferring mental capacities. We found no evidence for this claim." *ibid*, p. 10.3

5 Quoted in Ian Miller (2018) The gut-brain axis: historical reflections, *Microbial Ecology in Health and Disease*, 29(2); available: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6225396/>

6 *Ibid*.

7 Sebastian Hunter, Erica Flaten, Charisse Petersen et al (2023) Babies, bugs and brains: How the early microbiome associates with infant brain and behaviour development, *PLOS ONE*, 9 August; available: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0288689>

Medicine that showed that levels of certain types of microbes in babies' guts were associated with performance levels in certain tests of early cognitive development.

The idea that the way our brains develop as infants, and therefore the ways we might think, may be determined, at least to some extent, by our gut flora is perhaps an unsettling thought. As one of the researchers involved in the study noted, when the possibility of making direct connections between specific bacteria and specific personality traits might be made: "I woke up in a cold sweat one night," he said. "We're going to find IQ bugs."<sup>8</sup>

This hasn't come to pass; the direct relationship between gut flora and the brain is undoubtedly far more complex than this. Nevertheless — and to use an awful pun — it is food for thought.

Perhaps an even more startling claim that unsettles our idea of "us" — the person, the individual — is one made in a book published last month by the eminent neuroendocrinologist Robert Sapolsky.<sup>9</sup>

In *Determined: Life without Freedom*, he argues that moment we make what we might call a choice of free will, given the sequence of causal events leading up to that decision,

there is, in fact, no space for that free will to interpose itself.

When asked where the genesis for his ideas came from, Professor Sapolsky, in an interesting echo of the researcher I quoted earlier, said "[I] woke up at around two in the morning and say, 'Aha, I get it. There's no God, there's no purpose, and there's no free will,' and it's been, kind of, like that ever since."<sup>10</sup>

But this Forum's focus gives us a lot to think about.

I offer the warmest of thanks, as always, to the Royal Society and the Learned Academies for continuing this important tradition of facilitating informed and enlightening discourse, and the opportunities for enrichment — abstract *and* concrete — it promotes.

I give special thanks to all the contributors to today's sessions. Your insights, considerations, and generosity of spirit in sharing your knowledge is inspirational and priceless.

It is my privilege that I now open the 2023 Royal Society of NSW and Learned Academies Forum, "Our 21<sup>st</sup> Century Brain."

Thank you.

---

8 Brett B Finlay, quoted in Joseph Brean (2023) "It turns out we have a second brain — and it's our gut," *National Post*, 19 October; available: <https://nationalpost.com/feature/gut-brain-axis-how-the-mind-is-connected-to-the-belly>

9 Robert Sapolsky (2023), *Determined: Life Without Freedom*, Random House.

10 Timothy Revell, Why free will doesn't exist, according to Robert Sapolsky, *New Scientist*, 18 October 2023; available: <https://www.newscientist.com/article/2398369-why-free-will-doesnt-exist-according-to-robert-sapolsky/>