

book reviews

impairment to each of the cognitive sub-domains in question.

Uttal is well aware that “the brain is not homogenous but made up of regions that are differentiated by function”. And he is equally aware of some of the clinico-anatomical correlations that have been established in behavioural neurology. But he then proceeds to give “a totally different conceptualization of the localization problem”. This restatement “offers, in place of a specific function being precisely localized (that is, instantiated, represented or encoded) in a particular place, the idea of one centre contributing to the operation of a complex system of nodes and loci that are collectively responsible for the behaviour.” Well, yes: this is precisely what every behavioural neurologist and neuropsychologist has argued since (at least) Carl Wernicke’s fractionation of the ‘aphasic symptom complex’ in 1874.

Sadly, Uttal does not engage with the details of this literature, despite acknowledging how clinical evidence supports the claim that complex cognitive processes such as speech and calculation “involve widely dispersed regions of the cerebral cortex”. Rather, he rushes down the sexier path of functional neuroimaging to discuss such techniques as electroencephalography, positron-emission tomography and functional magnetic resonance imaging. Here he draws attention to failures of replication in which seemingly slight changes in experimental design, stimulus materials and task characteristics can lead to very different patterns of brain activation.

These are all genuine problems, but what needs to be debated here is the extent to which they reflect our failure to design good experiments rather than the brain’s failure to instantiate distributed localization of function. Uttal also notes, correctly, that individual differences in brain organization can undermine the reliability of associations between structure and function. Again, however, this is a challenge to discover the range and limits of variation rather than a cause for despair. A judicious conjunction of psychophysical experimentation, functional neuroimaging, and lesion studies will no doubt eventually elucidate the basic functional architecture of cognition. We can then start on the really difficult issue of showing how, not where, neuroanatomical and neurochemical structures and processes instantiate our best guesses about the organization of the mind.

Many of the problems of functional localization that Uttal outlines are real enough, but he offers no new ways of solving them and no convincing arguments that some other approach would resolve them. ■

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Science in culture

Rocket retrospective

Frau im Mond, directed by Fritz Lang, an eerily predictive tale of a journey to the Moon.

Heike Langenberg

A slender rocket, destined for the Moon, appears on the screen. Accompanied by cheering masses and ceremonial speeches, it makes its way from the hangar to the floating launch station. The tension builds, the countdown runs, and the rocket takes off into space.

This is not 16 July 1969, when Apollo 11 lifted off for the Moon. It is part of Fritz Lang’s last silent movie, *Frau im Mond* (“Woman in the Moon”), released in 1929 and long confined to the archives. The film has now been reconstructed from the original negatives in a cooperation between the German Federal Film Archive and the Friedrich-Wilhelm-Murnau Foundation in Wiesbaden, and was first presented in superb quality at this year’s international film festival in Berlin.

Back in 1929, German film critics were not impressed by the pompous opening night of *Frau im Mond*. The *Berliner Börsen-Courier* newspaper declared that Lang’s talents were wasted on his wife’s scripts, and the *Vossische Zeitung* dismissed the film as a movie for 14-year-old boys. Nevertheless, *Frau im Mond* became the year’s most successful film in terms of sales. And it caught the imagination of an unusual 17-year-old, Wernher von Braun, who was to become head of German rocket development during the Second World War and later one of the leading scientists in the US programme to develop the powerful Saturn rockets. It was a Saturn V rocket that lifted Apollo 11 to the Moon.

Von Braun was already interested in rocketry. In 1925 he had read Hermann Oberth’s 1923 book *Die Rakete zu den Planetenräumen* (“The Rocket into Interplanetary Space”). The book allegedly spurred young Wernher’s interest in mathematics, and shot him to the top of his class.

Von Braun was not alone in his enthusiasm for Oberth’s rockets. Rocket fever gripped the whole of 1920s Germany, and inspired Lang to make his film. Lang wanted his work to be based on the latest scientific knowledge, and so asked Oberth to act as technical adviser. The rockets created for the film sets are startlingly similar to later rocket design.

The plot of the film is a kitsch tale of love and adventure. The flight to the Moon is motivated by an old professor’s idea that gold is hidden in the lunar mountains, and the main participants in the journey — apart from the professor and his mouse — are three rocket engineers: two young men and Fräulein Friede, who is engaged to one of the engineers but loved by both. An 11-year-old stowaway and an evil representative of global finance compound the lunacy. Thea von Harbou’s film script may have had its weaknesses: the film is over-long at three hours. Nonetheless, the scenes featuring the rocket are magnificent — and, after all, the audience loved it.



Shortly after the début of *Frau im Mond*, von Braun joined the German Society for Space Travel, and assisted Oberth in his research on liquid-fuel rockets. Oberth had been contracted by Lang and the film company UFA (Universum Film AG) to build a man-sized rocket to be launched into the stratosphere as a gimmick for the film’s opening night. But the work was not finished in time. It wasn’t until 1931 that the liquid-fuel rocket was finally ready to be patented.

Money for rocket research was scarce — until the German army discovered the potential of rocketry for less peaceful ends. By 1933, Captain Walter Dornberger of the German Reichswehr had realized that rockets were potential weapons whose development was not regulated under the Treaty of Versailles. Von Braun received a research grant from the armed services, and it was not long before rocketry became classified research.

With the military takeover, funds were no longer a problem. But the scientists had sold their souls to the Nazis and the dream of flying to the Moon was abandoned — until the cold war provided a new backdrop for space travel. As a poignant reminder of the early years of enthusiasm, the first successful German V2, launched on 3 October 1942 and developed by von Braun and his associates, carried an emblem symbolizing *Frau im Mond*. ■

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