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Hélène Mialet, *Hawking Incorporated: Stephen Hawking and the Anthropology of the Knowing Subject* (Chicago, IL: The University of Chicago Press, 2012) 272 pp., \$95, £58.00. ISBN 9780226522265 (cloth), \$35, £18.50. ISBN 9780226522289 (pbk).

The word ‘genius’ connotes a transcendent, off-scale intellect, with an uncanny, extraordinary, and deeply personal source of creativity. In the science and technology studies (STS) literature, ‘genius’ tends to be placed in scare quotes or avoided altogether, perhaps because of its associations with hyperbole and hagiography. Hélène Mialet’s (2012) masterful treatment of Stephen Hawking and his retinue in *Hawking Incorporated* is a notable exception. Instead of dismissing ‘genius’ as an illusion – an illusion that some scientists as well as many popularizers have helped to sustain – Mialet treats genius seriously as a worldly phenomenon, though not in the usual way (also see also Mialet, 1999, 2008). While treating Hawking as a perspicuous case of a genius, she treads a fine line between dismissing Hawking’s genius as a mythic attribution (a *mere* social construction) and accepting it as an intrinsic cognitive attribute. Unlike those who turned Einstein’s brain into a posthumous mystery story, she has no interest in Hawking’s mind-brain, but instead writes in great detail about the material (communal, practical, technological) enablement of Hawking’s body, communication, and reputation.

The disabling disease that Hawking has suffered for most of his life – amyotrophic lateral sclerosis (ALS) – has required almost constant attention to his bodily and communicative needs by a network of assistants, students, and colleagues. Far from incidentally, Hawking’s position and reputation have given him extraordinary access to such resources. Mialet argues that the care of Hawking’s embodied and communicative actions has become integral to the disembodied intellect and otherworldly mystique associated with his public persona. But, rather than dismissing his singular identity as a

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collective myth, she describes in great detail how Hawking's genius is an active, unremitting, communicational, and material production. Her treatment of Hawking is broadly consistent with Bruno Latour's (1988) treatment of Pasteur and his laboratorium. As Annemarie Mol (2010) concisely summarizes, in reference to Latour's Pasteur: 'journalists, farmers, technicians, vets were involved in the discovery/invention of anthrax and the inoculations against it ... As against the implied fantasy of a masterful, separate actor, what is highlighted is the activity of all the associated actors involved' (p. 256). This summary not only suggests a conception of distributed cognition, it also promotes a distinctive variant of distributive justice, extending symbolic credit not only to historically invisible and silent members of the Pasteurian collective, but also to the mute things and inscription devices that constituted and disseminated the laboratory network. However, Mialet's attention to the collective enterprise does more than imply that Hawking's remarkable individuality is a fantasy: Hawking does not necessarily lose what the collective gains, because collective attention to his singularity is a constant that runs through the expansive and expensive ministrations.

Besides expressing appreciation of Mialet's interesting book here, I make two suggestions: (1) that Mialet's treatment of Hawking offers an alternative to both attributional and realist theories of genius, and (2) that her exemplary treatment bears upon recent debates about the concept of expertise.

## From attribution to assemblage

Social attribution theories have appeared in many fields of study, perhaps most prominently in the 'societal reaction' theories of deviance that had their heyday in the 1960s (e.g. Becker, 1963; Goffman, 1961; Lemert, 1962). Using styles of argument that later became familiar in constructivist studies of science, societal reaction theorists questioned the objective reality of phenomena such as mental disorders (paranoia, schizophrenia, mania, etc.), and emphasized the historical and biographical contingencies that eventuate in the labeling and treatment of individuals as intrinsically deviant. As Goffman (1961) famously expressed the idea, mental patients 'suffer not from mental illness but from contingencies' (p. 135). Goffman did not simply dismiss specific categories of mental disorder as mere subjective attributions; instead, he questioned the biomedical etiology of the condition-categories that were assigned to particular individuals and emphasized the contingent relations through which such categories arose and were stabilized in the lives of such individuals. One of the first to adopt this way of thinking for science studies was Augustine Brannigan (1981), whose *The Social Basis of Scientific Discoveries* developed what he calls an 'attributional theory' of discovery. Brannigan also drew upon Wittgenstein's later philosophy to criticize a circular form of popular explanation in which a very big discovery, or series of major discoveries, qualifies a discoverer as a 'genius'. Instead of attributing discoveries to brilliant individuals and their cognitive feats, Brannigan focused on public recognition in contingent historical circumstances.

Ascriptions of genius are made in virtually any field in which extraordinary creativity is recognized, but Brannigan (1981) focuses on the public attributions made by members of scientific fields. He argues that the recognition of a discovery, and of the discoverer(s) credited with making it, depends upon historical and communal contexts in which

'criteria of intelligibility' are used to establish what counts as a discovery. Such criteria are not unlike the formal criteria used by patent examiners for deciding the status of a patent claim: significance, novelty, non-obviousness, and usefulness. Absent communal recognition for priority, novelty, significance and validity, creative products do not count as discoveries. Although rival claims to a discovery never are exactly alike, if we imagine that a scientist 'discovers' a novel kind of astrophysical phenomenon (a pulsar, for example), but then learns that another astronomer had officially recorded the 'same' discovery a week or two earlier, the second 'discovery' would fail to meet the relevant criteria for priority and thus would no longer count as a discovery, despite substantive and procedural similarities with the one announced earlier. Rather than give up without a fight, the astronomer might choose to contest the priority assigned to the earlier claim, but Brannigan's communal criteria of intelligibility would continue to apply to the adjudication of the dispute (also see Collins, 1983).

Unlike Goffman, Mialet does not question the etiology of Hawking's disease, but like Brannigan she respecifies the extraordinary qualities attributed to his individual agency. In Mialet's revision of Hawking's popular image, his disability is not a severe disadvantage that he managed to overcome; instead, it has become the epitome of his seemingly transcendent intellect. Mialet is aware that Hawking is far from a disembodied genius, but unlike Britt Robillard (1999), who gives a phenomenological account of the lived experience of a person with ALS, Mialet treats Hawking as a vortex of activities accomplished by a network of attending persons and mechanisms. Virtually all that Hawking is and does requires the assistance of others.

In Brannigan's theory, criteria of intelligibility are logical requirements rather than causal antecedents of successful attributions of discovery/genius, and they have no clear material relationship to the phenomena discovered or the personal attributes in the discoverers. Nevertheless, proponents and critics alike frequently misunderstand attribution theories as arguments against the reality of the phenomena in question. Accordingly, a superficial reading of Mialet's book might lead one to conclude that Hawking is not really a genius, and that the nurses, secretaries, students, research assistants, technicians, collaborators, and machines who monitor and facilitate his daily life, communicative activities, and legacy deserve all the credit for constructing Hawking's mythical genius. A more thorough reading should disabuse readers of this impression. Mialet does not, and makes clear that she cannot, specify what is at the core of Hawking Incorporated, isolated from all of the activities performed by an assemblage of human and technological facilitators. While her treatment of genius de-individuates Hawking and re-connects him to his staff, his equipment, and his body, Mialet neither affirms nor dismisses Hawking's intrinsic contribution to his own singular reputation; instead, she invites us to reconsider what is 'intrinsic' to 'his own' being.

## Expertise

In the remainder of this essay, I want to compare Mialet's treatment of Hawking, not with realist or attributional theories of genius, but with current debates about *expertise*. In a much-cited article published in this journal, Harry Collins and Rob Evans (2002) proposed to treat expertise 'as something more than the judgement of history, or the

outcome of the play of competing attributions' (p. 237). Instead, they proposed 'to treat expertise as "real", and develop a "normative theory of expertise"'. When characterizing attributional (or 'relational' theories, they seemed to have in mind a similar treatment to that of Brannigan, only with 'expertise' rather than 'genius' or 'discovery' as the phenomenon in question. There are, of course, major differences between the concepts of genius and expertise. In contrast to the stereotypical genius, an expert possesses mundane, specialized skills. The particular basis of expertise can be quite variable: experience acquired through diligent practice, or a qualification or credential that comes with a course of training, passing an exam, and entering a profession. Like 'genius', though in a more restricted way, 'expert' is a term of appraisal that in some contexts confers privilege. By reputation, an expert knows more about something (or about how to do something) than a non-expert or layperson, and commonplace activities are not usually credited with being domains of expertise, even when their performance requires skills that would have been unimaginable a century or two ago. For example, passing a driver's test does not qualify a person to be an expert; it qualifies the person to be an ordinary driver.

A person can make a project of becoming an expert at something, and of course, there is the risk of failure, but the stakes are higher in the case of the self-fashioning genius. In fact, the stakes are so much higher that people rarely acknowledge that they are engaged in the project of becoming a genius. It is not immodest to acknowledge being an expert or wanting to be an expert at something, but genius is another matter. It is imaginable – in fact, likely in academic contexts – that there are people who fancy themselves as actual or potential geniuses, and who work hard to get recognized as such, but without such recognition a would-be genius runs the risk of being exposed as pretentious or even insane. To be a genius means to be recognized as such, even if recognition comes very late in the game. In many fields, recognition of expertise involves more routinized procedures than it does for genius, but formal and/or informal recognition also is inseparable from the social reality of expertise.

Though 'expert' is a far more mundane category than 'genius', it too involves criteria, though often the criteria are performance criteria rather than criteria of intelligibility. Different fields administer their own tests and criteria for distinguishing and ranking experts and degrees of expertise. Even within the restricted domain of legal testimony, extensive debate and successive decisions by the US Supreme Court in the 1990s concerned the criteria for the admissibility of testimony by representatives of scientific and technical specialties (Jasanoff, 1995). In its landmark decision in 1993, *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, the Supreme Court famously listed four 'factors' or 'considerations' (they hesitated to use the word 'criteria') to guide judicial decisions about admissibility: testability, peer review, error rate, and general acceptance in the relevant field(s). Although the Court qualified its recommendation with caveats about the need for judicial discretion, the justices were criticized for imposing a one-size-fits-all conception of expertise on the immense range of specialties that can find their way into the courtroom (Risinger, 2000). Following Brannigan, however, we can observe that attributions or denials of expertise have real consequences, regardless of how they are made or justified. Miallet's exemplar allows us to take a further step beyond attributions and the criteria supporting them: the identity

and authority of an expert is not a consequence of verbal attributions made in isolation. Instead, it is a continual project, involving many participants working in organized, embodied, and intimate ways within specific institutions. Collins and Evans, writing about the general 'reality' of expertise, are far too distant from such networks and singular circumstances to have much say about how 'real' expertise is constituted, except perhaps in specific cases such as the gravity wave field that Collins has studied for decades. For the most part, their stated intention to treat expertise as real is a general position statement rather than a demonstrable finding, and they hold out the prospect of supplying criteria for ascertaining such reality in particular cases. Mialet steers clear of demarcation criteria, and instead delves into the distinctive *way* in which Hawking's extraordinary reality is assembled and maintained through collective practice.

## Conclusion

The first point I addressed in this review essay was to specify how Mialet's treatment was an alternative to an attributional or realist theory of genius. If, however, we agree that attributions of genius in Brannigan's sense do not conflict with the reality of genius, but instead frame that reality with a different logic than the customary mentalistic version, we should then see that there is no opposition. Nevertheless, Mialet's account of the material, technological, and communicative production of a singular 'genius' offers an alternative to a conceptual framing of that category.

The second point involved a lateral move from conceptions of genius to those of expertise. If we are no longer caught up in oppositions between 'attributions' and 'reality', then we should appreciate that a treatment of expertise as 'real' can ignore neither the 'criteria of intelligibility' that operate in specific practices and institutions nor the relational networks that sustain and recognize expertise. Consequently, a general theory of expertise that puts aside singular relations and institutionally specific criteria of intelligibility is likely to be very thin.

It is consistent with Mialet's treatment of Hawking that she does not in the end pronounce upon the 'reality' of Hawking's genius. Certainly, she does not take his genius at face value, but instead goes into great detail about the production and maintenance of 'face value' (including the maintenance of Hawking's face and its expressions). One may still wonder: if Mialet were able to understand Hawking's conceptual and mathematical writings, and if she were writing in dialog with the very tight group of readers who are at ease with Hawking's technical contributions, would she be able deliver an appraisal of Hawking's 'real' achievements as a genius? Not being among those in such a hypothetical network, I am not able to say, but my guess is that the answer would be 'No'. If the story were to get very technical, the circle would no doubt tighten around Hawking and a few key colleagues and critics, but it would not ever isolate Hawking as a singular intelligence. Indeed, the very effort to get access to that inner 'core' would itself be an interactional production.

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Michael Lynch is a Professor in the Department of Science & Technology Studies at Cornell. His research is on discourse, visual representation, and practical action in research laboratories, clinical settings, and legal tribunals. His most recent book, *Truth Machine: The Contentious History of DNA Fingerprinting* (with Simon Cole, Ruth McNally & Kathleen Jordan) examines the interplay between law and science in criminal cases involving DNA evidence. He was Editor of *Social Studies of Science* from 2002 until 2012, and President of the Society for Social Studies of Science from 2007 until 2009.