THIS WEEK

Mismeasure for mismeasure

A critique of the work of Stephen Jay Gould should serve as encouragement to scrutinize the celebrated while they are still alive.

It is impossible to libel the dead, but equally impossible for them to defend themselves. That alone is reason for caution when it comes to questioning the work of scientists who are no longer with us.

Such questions have grown into a fascinating cottage industry, with reports and papers taking issue with historical research, sometimes centuries after the fact. Notable examples include the 1978 critique by Gerald Holton, a physicist and historian at Harvard University in Cambridge, Massachusetts, of data selection in the reporting of the electric charge on oil droplets by Nobel-prizewinning physicist Robert Millikan in 1913; and historian Richard Westfall's 1973 exposure of mathematical fudging by Isaac Newton in the seventeenth century.

Sometimes, such critiques are themselves questioned, such as in 2007, when Harvard biologist Daniel Hartl and Daniel Fairbanks, a biologist at Utah Valley University in Orem, came to the defence of Austrian monk Gregor Mendel, who was criticized by British statistician Ronald Fisher in 1936 over data that demonstrated genetic inheritance patterns in pea plants just a little too neatly.

This month sees the latest episode: an assault on the work of US evolutionary biologist and celebrated author Stephen Jay Gould, who died in 2002. Although the critique leaves the majority of Gould's work unscathed, it carries a special sting because it deconstructs a posthumous attack that Gould launched on nineteenth-century physician Samuel Morton. In a 1978 paper (S. J. Gould *Science* **200,** 503–509; 1978) and in his 1981 book *The Mismeasure of Man*, Gould argued that Morton's measurements of the cranial capacity of hundreds of skulls from worldwide populations, reported in works published between 1839 and 1849, were unconsciously biased, by what he claimed was the physician's prejudice that caucasians were more intelligent, and therefore would have larger skulls. As Gould was canny enough to realize, a charge of unconscious bias sticks faster in science than one of fraud.

BLIND MEASUREMENT

Now, in a paper published on 7 June, Jason Lewis, an anthropologist at Stanford University in California, and his colleagues test Gould's assertions in detail (J. Lewis *et al. PLoS Biol.* doi:10.1371/journal.pbio.1001071; 2011). They remeasured the volume of some 300 skulls in Morton's collection, which survives at the University of Pennsylvania's Museum of Archaeology and Anthropology in Philadelphia, while taking care to blind themselves to knowledge of the population that each skull came from. Comparing their measurements to Morton's, they find no evidence that his were distorted by bias. Still, because they couldn't measure all the skulls, they do not know whether the average cranial capacities that Morton reported represent his sample accurately. (Cranial capacity varies mostly as a function of overall body size and stature, which is related to climate and nutrition, and there is no clear evidence of a link between cranial capacity and intelligence.)

Lewis and his colleagues also claim to find errors in Gould's statements about Morton's data. For example, Gould claimed that Morton manipulated his grouping of samples to give the results he wanted, arbitrarily amalgamating Native American populations, while breaking down those of people of European origin into subgroups. Yet, Lewis and his colleagues say that Morton reported average cranial capacities for subgroups of both populations, sometimes on the same page or on pages near to figures that Gould quotes and therefore must have seen. Furthermore, they say that Gould misdefined the Native American samples, falsely inflating the average he calculated for that population, which Gould had used to show that Morton's average was erroneously low.

Although the new paper does not accuse Gould of intentionally misrepresenting Morton, some of its authors have raised this possibility in interviews, noting that Gould's oversights would be less troubling were he known to be a less meticulous scholar. At a minimum, Gould's staunch opposition to racism, and desire to make an example of Morton, may have biased his interpretation of Morton's data, opening Gould to charges of hypocrisy.

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Of course, Lewis and his colleagues have their own motivations. Several in the group have an association with the University of Pennsylvania, and have an interest in seeing the valuable but understudied skull collection freed from the stigma of bias (although, as for many nineteenth-century museum collections, its ethically dubious assembly will remain an issue). Second, their paper makes clear that they oppose the view, espoused by Gould and trumpeted by some social scientists, that the scientific method is inevitably tainted by bias. Third, in contrast to others who may have taken Gould's politically correct message at face value, at least two authors have expressed the view that scientists must be free to establish the scientific facts even when the message may be misinterpreted by those with repugnant social goals.

But these motivations are not a reason to discount the group's critique. By documenting their methods and data, as they argue Morton did, the paper's authors have made it possible for others to scrutinize their claims. Transparent documentation should allow science as a whole to be objective, even if individual authors are not.

Just as important is the readiness of the scientific community to undertake such studies, and to see them through the sometimes difficult publication process. The criticism of Gould was rejected by the journal *Current Anthropology*, and spent eight months in the review process at *PLoS Biology*. And although an undergraduate did publish a more modest study scrutinizing Gould in 1988, it is remarkable that it has taken more than 30 years for a research group to check Gould's claims thoroughly. Did Gould's compelling writing and admirable anti-racist motivations help to delay scrutiny of his facts? Quite possibly, and this is regrettable. Although future historians will be happy to scrutinize our most persuasive and celebrated luminaries, today's scientists should not leave the job to them. ■