



Editorial

E Pluribus...?

Few questions divide philosophers and historians of science more than that of the unity of science. Is it proper to speak of science with its numerous branches, or of a set of independent but loosely affiliated sciences, plural? Is there a single scientific method, or many, or none? If science is disunified, how does it manage to be productive and trustworthy?

The dynamics of unity and disunity in science are not just played out in the broad and across disciplines but pervade all of its levels, right down to its fine details: institutions, experiments, detectors, and even experimenters. An example is presented in an article in this issue—“CERN’s Balancing Act,” by Grigoris Panoutsopoulos and Theodore Arabatzis—which looks at the productive dynamics of two experiments at CERN’s Large Electron–Positron Collider (LEP) in connection with a single discovery, that of the W and Z bosons.

CERN, of course, was conceived as a diverse institution when established by European nations, and it is now even more diverse, with twenty-three member states, a few associate members, and several non-European countries with observer status. The laboratory was also born in a cutthroat climate, having to compete with American laboratories. But even though CERN’s members sometimes quarreled, the laboratory has functioned as a world-class institution able to make key discoveries, including in particular that of the W and Z bosons.

These discoveries, Panoutsopoulos and Arabatzis show, were the result of the work of two experiments, called UA1 and UA2, whose interplay helped secure not only lab but international consensus for the discoveries. The diversity of these two experiments went all the way down, from the contrast between the personalities of the experimental teams’ two leaders, to the aims, design, and structures of the two detectors. And it was novel in this period too; one could call it an institutional experiment. But Panoutsopoulos and Arabatzis also detail the mechanisms of integration by which the laboratory managed to secure consensus about the results. Following Ian Hacking, they show that the lack of one form of unity—the singleness or lack of heterogeneity within an enterprise—need not imply the lack of a second form of unity—the smooth articulation of distinct and sometimes quite different internal parts.

This historical evaluation of how unity functions in its integrative mode shows us that the practice of science can sustain diversity of opinion, disagreement, and even dissent while still remaining unified in a meaningful sense. But the conflation

of these two forms of unity in popular discussions of science can often muddy the waters. From the outside, displays of disunity—in the sense of a lack of a unitary voice and identity—can lead to distrust, the image of weakness, and suspicions of malpractice in science, even in practices that are otherwise well integrated, and therefore unified in the second sense of the term.

We recall a later instance in 1997, when experimenters at Brookhaven National Laboratory discovered a rare type of subatomic particle called an “exotic meson,” of interest for what it meant about the fundamental structure of matter. But ten of the collaboration’s fifty members refused to sign the final paper, having found faults in the analysis that convinced them that the conclusion not as clear-cut as the paper stated. These members wrote a “minority report.” Such disagreements are common in large collaborations, but are generally worked out internally; this was one of the rare cases where such a dispute went public. It hit the newspapers, and the publicity had the effect of shaking the lab’s reputation among the public.

But as the argument advanced in this essay shows, such disputes need not reflect a weakness in science. They might instead indicate the ways in which its diverse components are integrated, and how they continue to navigate and renegotiate that integration—signs of a healthy epistemic practice. Science would not proceed as productively or carefully without either internal diversity, or the tools for integrating it. When we see dissent and disagreement in science, therefore, we should ask whether it represents discord, or whether it is an indication of a community working to maintain its unification.

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