

Contrary to the trend toward many authors on a paper, as also bemoaned by Wyatt, I point out that there were only two authors on that groundbreaking 1996 Göttingen paper.

References

1. W. Schöllkopf, P. Toennies, *J. Chem. Phys.* **104**, 1155 (1996).
2. J. Slater, *Phys. Rev.* **32**, 349 (1928).

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■ **Philip Wyatt's** commentary was an enjoyable read. The vista he describes is, unfortunately, exactly where the publish-or-perish culture has brought the physics community.

I wholeheartedly agree with Wyatt's opinion on the authoring of papers, but I must object to one specific statement in his commentary: "When a recent PhD in a physical science said that helium formed diatomic molecules, I knew we were in trouble!"

Helium and all other rare gases indeed form diatomic molecules, albeit in excited states commonly referred to as excimers. Radiation (around 60 nm) resulting from decay of He₂ to the dissociative ground state was discovered in 1930 and is referred to as the Hopfield continuum.¹ Then again, maybe the student was indeed referring to ground-state He₂.

Reference

1. J. J. Hopfield, *Astrophys. J.* **72**, 133 (1930).

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■ **Wyatt replies:** Hassel Ledbetter's suggestions and criteria for authorship are excellent and should be read carefully by all pending authors of a scientific paper, especially the principal contributor to the work. Purportedly, Ledbetter is writing a book that addresses those important matters in greater detail.

Mark Brandon's praise of the journals *Nature* and *Science* for attempts to handle scientific coauthorship is noble and reasonable, but it seems to miss the main problem with the current plethora of authors. The basic objective for many papers nowadays is to generate citations—which are important for getting funding and even finding a job. It would be quite surprising to see each article followed by a statement specifying what each listed author actually did. It will never happen. Nevertheless, I have never heard of either of those

journals confirming or rejecting the presence of any listed author.

The belief that scut work—making and confirming measurements; collecting, processing, and reviewing data; or reviewing and correcting the manuscript—represents a "significant intellectual contribution" worthy of coauthorship has never struck me as doing anything to encourage creativity. Apparently, *Science* has now partially resolved the matter for some multiauthor articles. For several such works published each week, *Science* adds an asterisk, usually to two author names, with the statement, "These authors contributed equally to this work." But what about the remaining gaggle of authors? Since their contributions are not even weighted by *Science*, perhaps the "equally contributing" authors should relegate their names to an acknowledgment list at the end of a two-author article!

Brandon also raises a different type of authorship issue—based perhaps on greed, envy, or ego—that might occur with single-author papers such as Robert Millikan's. There can be little doubt that Harvey Fletcher's suggestion of using oil, and later his innovative electrode design, made the measurements much easier or even possible. Yet hadn't Millikan come up with the single-particle idea that started with water and ended up with oil? Nevertheless, I agree with Brandon. An even more egregious example was the case of Selman Waksman and his purported discovery of streptomycin. His graduate student Albert Schatz most certainly should have shared the Nobel Prize. As it was, he had to pursue litigation just to be recognized as a co-discoverer and to receive a share of patent royalties. In Millikan's defense, though, he did get Fletcher a fine position at Bell Labs, where he contributed great physics.

Tomek Kott's assertion that my commentary implies that "as measured by the number of authors on a paper, creativity and scientific knowledge have decreased over time" is not correct. The number of authors per se has nothing to do with the decrease of creativity; rather, among the plethora of authors, probably only a few are the creative entities. Perhaps a better metric would be the creativity per author listed. I don't recall focusing on "success," either. An important observation was that so much effort seems focused on writing papers just to secure funding or a job that many fundamental building blocks needed as tools to spur creativity in our young scientists are lost in the process.

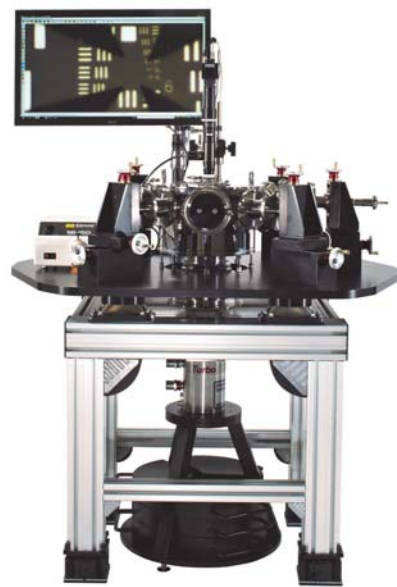
I agree with Kott that multiauthor

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