letters

▶ a claim that Harter and Chris Patterson "devised the rotational energy (RE) surface."
In this four-page news story largely devoted to Harter and Patterson, there is a one-sentence mention of our work.

In a comment on a letter by Philip R. Bunker, Harter (January 1985, page 13) says, "References to the paper by Dorney and Watson are included in all our publications on the subject of clustering," but apparently this does not inhibit him from making false statements about what "anyone had ever dreamed" or what "had been anticipated" by the mid-1970s. Harter also claims that the one-sentence mention of our work "overstates" our contribution. Inasmuch as the topics listed above are treated in our paper and not acknowledged in the PHYSICS TODAY story, I disagree. I will not here discuss the other matters raised by Bunker's letter and the comments of Harter and Eric J. Heller, but I wonder why PHYSICS TODAY continues to publish Harter's claims. The opportunity should have been taken in January to correct some of the errors of the July 1984 article, rather than to allow Harter to claim that a one-sentence mention in a four-page story "overstates" the contribution of other workers.

Reference

1. J. K. G. Watson, A. J. Dorney, J. Mol. Spectrosc. **42**, 135 (1972).

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2/85

WILLIAM G. HARTER REPLIES: Bertram Schwarzschild's story implies that the semiclassical theory of angular-momentum tunneling mechanisms and resulting superfine energy-level structure was put forward[1] by Anthony J. Dorney and J. K. G. Watson's work. Because those details were not discussed by those authors the story does, therefore, overstate their contribution to that subject. However, in my reply to Philip R. Bunker (January 1985, page 13) I did not mean to downgrade Dorney and Watson's contribution to the problem of understanding fine (as opposed to superfine) structure through arguments based on classical mechanics. I apologize for this misunderstanding.

The cluster problem put forward by the Los Alamos theoreticians in 1976 focused heavily on the superfine structure. They noticed that only certain arrangements of species A_1T_1E, T_2T_1, ET_2A_2, $A_2T_2T_1A_1$ or T_1ET_2 were allowed in particular orders with integral superfine splitting ratios of 2:1, 1:1 and so on. These and similar puzzles were emphasized[2] in an article by K. Fox, H. W. Galbraith, B. J. Krohn and J. D. Louck, and are not discussed in any previous paper known to me. The explanation of superfine structure was made later using a semiclassical action and tunneling integral method.

Nevertheless, the authors of the Los Alamos article were unaware of discussions of fine structure by Dorney and Watson and by K. R. Lea, M. J. M. Leask and W. P. Wolf. Later a referee noticed the connection in one of our first papers and we then informed Los Alamos. In my opinion this is understandable because Dorney and Watson's paper, "Forbidden rotational spectra of polyatomic molecules—Stark effects and $\Delta J = 0$ transitions of T_d molecules," is not devoted to the clustering effect; indeed, there are only a few paragraphs about it. The paper by Lea and his coworkers is from another field entirely. The history is further complicated by the fact that one of the Los Alamos authors was involved in a proprietary dispute with Watson over forbidden-transition theory. (See the first footnote in Dorney and Watson's paper.) So while he may have known about their paper, the relatively obscure facts about fine structure could easily have been overlooked.

It was in this context, then, that the Los Alamos group noticed "fewer lines than had been anticipated." The *experimental* discovery of the prevalence of clustering and superfine structure certainly belongs to the Los Alamos group, and they were the ones who emphasized their importance. The observation of superfine, hyperfine and superhyperfine structure by the Bordé group is the next story, and it has already shown the importance of understanding the details within the clusters. It is one thing to notice an effect, but it may be quite another to notice the importance of it.

References

1. A. J. Dorney, J. K. G. Watson, J. Mol. Spectrosc. **42**, 135 (1972).
2. K. Fox, H. W. Galbraith, B. J. Krohn, J. D. Louck, Phys. Rev. A **15**, 1363 (1977).

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9/85

Value of physics

In reading the letter about the value of a physics education by Mark Mandelkern (June, page 13), I would remark that education in physics has helped me in my mathematics teaching. I teach both mathematics and physics on the high-school level. My education in physics helps me sort through many of the wasteful and unnecessary topics given to elementary and high-school

students in mathematics texts. Algorithms that will never be used, topics in number theory that waste the student's time and number lines that serve no useful purpose are some of the things my physics education has taught me to eliminate from the year's course. Students have only so much math time, and so it is valuable to implement a pragmatic approach to mathematics topics—if it is useful in physics or in life, it is worth presenting. Many of my fellow mathematics teachers have no physics or science background and simply present topics as they occur in the mathematics texts without any real understanding of their usefulness. Also, my physics education allows me to present topics in terms of the mathematical interpretation of nature—orbits of planets as circles, the prediction of the future using formulas, and algebra used in all manner of physical events—to show what use mathematics has to students of all levels, excellent to poor. It is my opinion that there is a great need for people who have physics backgrounds in mathematics teaching at all levels.

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6/85

Aiding Latin America

In mid 1984 the US National Science Foundation awarded a $300 000 grant to aid Latin American physics to The American Physical Society; principal investigators are Leo Falicov (University of California at Berkeley) and Leon Lederman (Fermilab). The grant was in response to an appeal formulated during the Second Symposium on Pan American Collaboration in Experimental Physics, held in Rio de Janeiro in July and August 1983. This appeal was stimulated by financial crises resulting in severe restrictions on hard currency in many Latin American countries, which adversely affected their physicists. APS set up a grant-oversight committee with close connections to its International Physics Group, and Fermilab was designated to administer the grant. The funds were to be used for physics in Argentina, Brazil, Chile, Mexico and Venezuela in four areas: library subscriptions to US scientific journals; payment of page charges for articles by Latin American authors in refereed US journals; spare parts and maintenance items for existing equipment in Latin American physics laboratories; and per diem support for short visits by Latin American physicists to the United States.

Representatives in each of the five countries were selected to ascertain the