letters

continued from page 15

terial well-being and can be as free as possible to develop their potentialities as they wish) then a way must be found to free humankind from immediate, hard limits on energy, on materials, and on the usage of both within the human habitat. Every projection made so far of a stable society, living within the constraints of fixed land area, expensive energy, limited materials and tight limits on allowable energy flow into the biosphere, concludes that such a society must necessarily be coercive, with many rules and only limited options on behavior. I believe that space colonization, which can remove those limits, offers the best hope for a future that contains a high living standard for all human beings, together with the greatest opportunity for diversity and freedom in lifestyles. Nowhere in my article did I state that I desired a human population of some given size. Incidentally, there is no reason why "pollution and pillage" should characterize space colonization: With unlimited low-cost energy for recycling, and habitats small enough so that recovery of pollutants is easier than on Earth, there is every reason to suppose that a space-community could run forever (or at least for the several-billion year life of the Sun) without causing any pollution either internally or externally.

G. K. O'NEILL
Princeton University
Princeton, New Jersey

Three relative quanta

c plus *c* equals *c*
1 plus 1 equals 1
Bother me not with reason old man
The universe has its own logic.

Lambda equals *h* over *p* sheds light upon light
Uniting contradiction
Its existence forcing the world
To change its mind.

Delta *p* delta *x* equals *h* bar over 2 means I am not sure
Where I am, or how fast I am going where
But I think maybe I can guess
How far off course I am.

DAVID DAVIS
Tucson, Arizona

Record authorship

In the June issue (page 37) Steven Weinberg raises the question whether 55 names on a paper sets a record. The answer is no, it falls considerably short. The Bucharest-Budapest-Cracow-Dubna-Hanoi-Serpukhov-Sofia-Tashkent-Tblisi-Ulan Bator-Warsaw collaboration has published a series of papers in *Nuclear Physics* all of which surpass 55 authors. In volume **B52** 414 (1973) the number of participants is 89. Subsequently the strength of the group fell off, bottoming at 67 in **B79** 57 (1974).

VIRGIL L. HIGHLAND
Temple University

British education

I read with interest the review of the ten-volume Harper and Row series on "Solids, Liquids and Gases" by A. A. Strassenburg in the March issue (page 45). While I have not yet been able to look over the books I feel that the disappointment expressed in the review may arise, in large part, from the reviewer's failure to appreciate the not inconsiderable difference in emphasis between American and British educational curricula.

A typical British grammar-school student who intends to specialize in the sciences will start calculus at sixteen years of age. At age eighteen he or she will be presumed to be of such a standard that a typical college-entrance program was that of oblique impact between balls with non-unit coefficient of restitution. At the time when I attended Imperial College one had merely four months in which to attain final-degree standard in four mathematics papers—and in under two years one reached "special" (more usually termed "honors") level in one's major subject. The pace was indeed hot and furious—and some persons claimed that one had no time to assimilate the finer aspects of the material, or, indeed, to become aware of developments in related areas. While the above comments apply to honors degrees, they also apply to a lesser extent to the general-degree awards. In this context, some of the dismay expressed by your reviewer may be understandable.

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More on 1910

I noticed in your April issue (page 13) and in the October issue certain identifications of physicists who attended the 1910 meeting of The American Physical Society at the National Bureau of Standards. In the October issue, no. 29 was tentatively identified as Albert A. Michelson. I am confident that this is not Michelson, as it has no resemblance to any of the pictures of him that I have seen or have in my own files. Furthermore, it is unlikely that Michelson would have attended a meeting at the National Bureau of Standards at this time because he and Samuel Stratton, the Director, were very much at odds for many years due to the fact that Stratton had left the University of Chicago to accept the Directorship.