laboratories of pharmaceutical firms are the 'last havens' for professional chemists seeking solutions to numerous maladies. This last view no doubt comes as a surprise to chemists at universities, government laboratories, institutes, and other nonindustrial research facilities."

The fact is that of 79 products patented in the United States, as listed in Table 38 ("Listing of drugs according to place of discovery") of *Senate Report No. 448* (27 June 1961), the vast majority originated in the laboratories of the pharmaceutical industry. One, bacitracin, resulted from work done under a government military contract; so far as we have been able to ascertain, none resulted from government nonmilitary health research.

This seems to support our contention that the most congenial climate for the creative development of new remedies exists in the laboratories of the pharmaceutical industry, while the universities very properly have emphasized other aspects.

The central point of the stand taken by the American Institute of Chemists, however, is this: any weakening of patent structure will reduce the monetary value of what the chemist creates; therefore, it is bound to reduce funds available for research and for the remuneration and reward of creative chemists. For this reason, any reduction of patent protection is contrary to the interest of the membership of the American Institute of Chemists and, we submit, also contrary to the interest of other creative scientists.

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My intention was not to deprecate, in any way, the considerable achievements of the pharmaceutical laboratories, but rather to point out that it was perhaps inaccurate to describe them as the "last havens" for chemists interested in drug research.—D.S.G.

Newton and the Spectral Lines

Bisson and Dennen [*Science* **135**, 921 (16 Mar. 1962)] wonder why Newton did not see and report the absorption lines in the prismatic solar spectrum, since they find the lines reasonably clear in a duplication of his apparatus. They suggest that Newton might have thought of the lines as separating the different colors. That

could indeed be a reason for ignoring the lines, for (i) Newton did not place great confidence in his own ability to see correctly the extent of the different colors, and (ii) he was so predisposed by his conviction that, after the analogy of the musical scale, there should be seven colors that he was able to interpret the observations of a friend (a more "critical" observer) as indicating that the positions of the colors correspond closely to the positions of the notes of the octave. It is interesting that so good an observer as Newton could have made so wrong an observation, one in line with his predilection.

The relevant account is not in the *Opticks* but is quoted by Thomas Birch [*History of the Royal Society of London* (1757), vol. 3, p. 262 ff.]:

> And possibly colour may be distinguished into its principal degrees, red, orange, yellow, green, blue, indigo, and deep violet, on the same ground, that sound within an eighth is graduated into tones. For, some years past, the prismatic colours being in a well darkened room cast perpendicularly upon a paper about two and twenty foot distant from the prism, I desired a friend to draw with a pencil lines cross the image, or pillar of colours, where every one of the seven aforenamed colours was most full and brisk, and also where he judged the truest confines of them to be, whilst I held the paper so, that the said image might fall within a certain compass marked on it. And this I did, partly because my own eyes are not very critical in distinguishing colours, partly because another, to whom I had not communicated my thoughts about this matter, could have nothing but his eyes to determine his fancy in making those marks. This observation we repeated divers times, both in the same and divers days, to see how the marks on several papers would agree; and comparing the observations, though the just confines of the colours are hard to be assigned, because they pass into one another by insensible gradation; yet the *differences* of the observations were but little, especially towards the red end, and taking means between those differences, that were, the length of the image (reckoned not by the distance of the verges of the semicircular ends, but by the distance of the centres of those semicircles, or length of the strait sides as it ought to be) was divided in about the same proportion that a string is, between the end and the middle, to sound the tones in the eighth.

Newton may have believed that he had not communicated his thoughts about this matter to his friend; nevertheless he had told him to look out for seven colors and to bound them. To the observing scientist, hypothesis is both friend and enemy.

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