Although there may be difficulties in interpreting the reports of human stereotactic surgery from the 1950s through the 1970s, because of the absence of postoperative imaging to identify the exact lesion and stimulation sites, the data should not be disregarded. Credit must be given to the scientists and surgeons who first reported and studied the physiological pathways involved in head movement and torticollis.

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Response

KISS ACCURATELY SUMMARIZES THE SEMINAL work of Hassler, Hess, and colleagues. We reported results that could be described as a quantitative confirmation of some of those classic observations, i.e., that unilateral electrical stimulation of the midbrain interstitial nucleus of Cajal (INC) produces torsional (roll) rotations of the head. We thank Kiss for pointing this out, and we intend to provide a more detailed historical review in a more specialized journal. [Enormous credit is also due to the work of K. Fukushima and colleagues, who have published extensively on the role of the INC in eye and head movements in the cat and their relation to oculomotor deficits in the human (*1*).]

But to focus only on the results mentioned by Kiss would be to miss the main point of our work and the advance that it represents. This advance is that the INC appears to be a neural integrator—not only for eye orientation, as we showed previously, but also for head orientation. The idea of neurally integrating velocitylike movement commands (in the mathematical sense) to produce postural commands, as first proposed by D. A. Robinson (*2*), is well established in the oculomotor literature but previously had not been demonstrated for head control. This is shown quantitatively in our report by the temporal pattern of head motion induced by INC stimulation and, more importantly, by the pattern of head motion induced by inactivating the INC—results that Kiss does not mention.

The concept of a neural integrator—working through a system of balance across the two sides of the brainstem—provides a simple but powerful framework for thinking about head control and torticollis. As Kiss points out, the midbrain has long been implicated in some forms of torticollis, but this disorder has recently received more scientific and clinical attention in the context of basal ganglia dysfunction. Given our findings, it indeed seems important to reexamine the work of Hassler, Hess, Sano, and others in thinking about the etiology and treatment of torticollis.

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Are U.S. Patents Too Broad?

IN HIS ARTICLE "DUPONT UPS ANTE ON USE of Harvard's OncoMouse" (News of the Week, 17 May, p. 1212), Eliot Marshal focuses on the demands made by DuPont on the basis of its exclusive license for Harvard's famous OncoMouse patent. The legitimacy of the company's policy choices in licensing the patent out is discussed, but this discussion is incomplete without questioning whether the patent system functioned properly in issuing this patent.

The Harvard OncoMouse strain was developed by inserting a known oncogene into a preexisting strain of mouse using an already known technique. That any gene could be inserted (in theory) into any life form was already obvious; if the OncoMouse's developers invented something, it was a matter of details. Yet the 1988 U.S. patent covers inserting any oncogene into any mammalian species—arbitrary boundaries that extend far beyond what was invented by producing this strain. Putting aside the larger question of whether aspects of living organisms should be patented, and the practical question of whether strains of organisms should be patented, this patent as issued is absurd.

The U.S. patent system is not a natural phenomenon, nor is it sacred; it is an artificial system of incentives created by legislation. Under the U.S. Constitution, its purpose and justification are to "promote the progress of ... the useful arts" (*1*). If the Patent Office and courts behave in ways that do not serve this goal, the system can and should be changed. The patent system need not allow such broad patents; it also need not allow patent holders such power that they can impose conditions incompatible with the customs of scientific cooperation. Such interference does not "promote progress."

In the meantime, researchers and industrialists who find this patent chafing might consider publicizing the absurdity of the patent, because the Patent Office may then reconsider it. The Patent Office has responded in the past to public outrage. If this patent is made narrower, it could open the door to independent development of other strains and thus to competition; the competing companies may then not feel bold enough to interfere with research. This is no substitute for reforming the system, but it may still be worth the effort.

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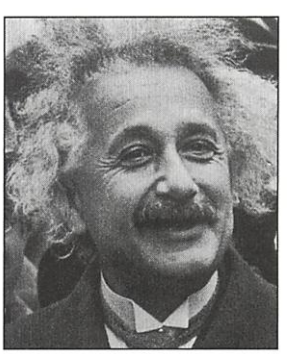
References and Notes

1. The text says "promote the progress of science and the useful arts," but that covers copyright as well as patents; it is often held that "science" applies only to copyright, whereas "the useful arts" applies only to patents.

Einstein and the Orbit of Mercury

IN "THE INTELLIGENT NONCOSMOLOGIST'S Guide to Spacetime" (Spacetime Special Issue, News, 24 May, p. 1418), Charles Seife states, "Shortly after Einstein unveiled it, scientists realized that this gravity-as-curvature-of-spacetime theory explained a mysterious anomaly in the orbit of Mercury." This was not first realized by unnamed scientists, but by Einstein himself. As Abraham Pais writes, "his theory 'explains ... quantitatively ... the secular rotation of the orbit of Mercury, discovered by Le Verrier, ... without the need of any special hypothesis.' This discovery was, I believe, by far the strongest emotional experience in Einstein's scientific life, perhaps in all his life. Nature had spoken to him. He had to be right." (*1*, p. 253).



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