Albert Einstein was not just a patent clerk when he began his career in physics, a reader emphasizes. A leading researcher in the field says that work on vertebrate craniofacial patterning and the origin of jaws can best be understood in the context of seminal discoveries made a decade ago. The posting on the Web of a report of an asteroid that is potentially hazardous to Earth is discussed. "Within the next 12 months we shall learn just how interconnected and interdependent the institutions of contemporary societies have become," says a reader about the year-2000 problem. And three papers are retracted because the work is not reproducible.

Einstein: "All but the Dissertation"

A NetWatch item of 30 April ("Popular physics?," p. 707) describes a Web site that publishes physical theories by nonphysicists. The originator of the site, James Siepmann, is quoted as referring to "a patent clerk" in the course of explaining the site's purpose. The intended reference is no doubt to Albert Einstein. This is an image I regularly encounter in conversation and in print. It may be charming, but it is incorrect. Yet another attempt to set the record straight may be in order.

Einstein was hired at the patent office in Bern, Switzerland, in 1902 as a technical expert third class. In 1900, Einstein had received a diploma from the Federal Institute of Technology in Zurich, which indicated that he was qualified to teach physics at the university level. Although the Swiss academic system at the time was quite different from the current U.S. system, there is an appropriate analogy. In effect, Einstein was an ABD ("all but the dissertation") in physics. His first scientific paper appeared in *Annalen der Physik* in 1901; he published further papers in 1903 and 1904. In 1905, along with the better-known accomplishments, Einstein's thesis was accepted by the University of Zurich and he received his Ph.D. In 1906, he was promoted to technical expert second class (*1*).

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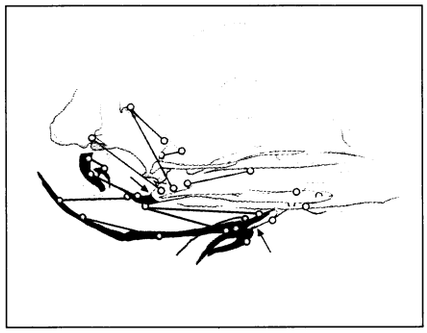
References
1. A. Pais, *Subtle Is the Lord: The Science and the Life of Albert Einstein* (Oxford Univ. Press, Oxford, 1982).

Jaw Origins

The recent article by Elizabeth Pennisi about my work on vertebrate craniofacial patterning and the origin of jaws (News Focus, 23 Apr., p. 577) requires clarification. The discovery that rhombencephalic neural crest segmentation is maintained throughout ontogeny in the pattern of skeletomuscular connections (*1*) was made when I was a graduate student at the University of London. Furthermore, it can only be understood in the conceptual framework of the seminal discoveries that the vertebrate hindbrain is segmented (*2*) and that it elicits neural crest streams in a segmental fashion (*3*). These findings (reviewed in *4*) allowed workers to make a first functional link between *Hox*-mediated gene regulatory networks and rhombomeric segments as autonomously specified cell-lineage restriction and signaling compartments. My contribution just extended these findings by assessing the significance of neural crest segmentation for craniofacial morphology and the evolution of head ontogenies, thus trying to remarry two previously alienated areas of research.



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Head structures (beige, pink, or purple) derived from the same parts of the developing hindbrain that help maintain the appropriate bone-muscle connections in the head of a chick.

In addition, the figure legend on page 577 should have read, in part, "colors...denote *head* structures derived from the same parts of the developing hindbrain" (italics mine).

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References
1. G. Koentges and A. Lumsden, *Development* **122**, 3229 (1996).
2. A. Lumsden and R. Keynes, *Nature* **337**, 424 (1989).
3. A. Lumsden, N. Sprawson, A. Graham, *Development* **113**, 1281 (1991).
4. A. Lumsden and R. Krumlauf, *Science* **274**, 1109 (1996).

Asteroid Report

The paper that I found on the Web by Andrea Milani and colleagues about asteroid 1999 AN_{10} ("Deep impact: The sequel," ScienceScope, 23 Apr., p. 565) was posted as a distinctly separate file and was listed below and unconnected to the authors' preprints section.

Contrary to the ScienceScope piece, I did not issue a press release. The information about the existence of the Web paper was posted on the Cambridge Conference Network, which focuses on near-Earth orbit research and impact studies.

That the paper on 1999 AN_{10} is "potentially explosive" appears to be the authors' own view. In their paper, they come to the conclusion that asteroid 1999 AN_{10} might have to be "deflected and/or destroyed" in the foreseeable future. This is the first time, to my knowledge, that such an actual intervention has been suggested for any of the currently known 171 Potentially Hazardous Asteroids (PHAs). Why this option should be considered at all, given the extremely low impact probabilities for this PHA, remains unclear. Whatever the reasons, such impact-threat data, I believe, should in the future be released in an unambiguous way.

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Y2K: An "Autopsy" of Modern Society?

The Policy Forum "The Y2K problem" by Robert F. Bennett (*Science*'s Compass, 16 Apr., p. 438), was an excellent follow-up to the special issue of *Science* on Complex Systems (2 April). Within the next 12 months we shall learn just how interconnected and interdependent the institutions of contemporary societies have become.

Consider the fact that a major manufacturing firm such as General Motors (GM) has thousands of suppliers. Each of the companies supplying parts or services to GM also has suppliers. And those suppliers in turn have suppliers. Suppose that GM is completely year-2000 compliant and the majority of its suppliers are as well. But, for whatever reason, GM cannot obtain 5% of the parts needed to build automobiles. What will GM do? They will

have to stop building cars. And all of the compliant companies shipping parts to GM will lose an important customer.

In terms of complexity theory, an interesting question is, What fraction of the companies in an interconnected society need to fail in order to cause the failure of nearly all of the organizations in the society? The Gartner Group has estimated that in many countries around the world, 50% or more of the companies in the country will have at least one mission-critical system failure. These countries include Russia, China, India, Indonesia, Japan, Germany, Turkey, Saudi Arabia, South Africa, Venezuela, and Argentina (gartner5.gartnerweb.com/public/static/aboutgg/pressrel/testimony1098.html). That is a lot of countries, a lot of people, and a lot of supplies shipped to the United States.

Also, according to the Gartner Group, the countries most prepared for dealing with the year-2000 computer crisis include the United States, the United Kingdom, Canada, Australia, and the Netherlands. In these countries, 15% of companies are expected to have at least one mission-critical system failure. Which societies will be least affected or will recover most quickly—less-developed societies with less dependence on computers and automated equipment or advanced societies that have been working hard to repair date-sensitive equipment?

Another "complexity" issue involves the many chemical plants, refineries, nuclear reactors, and pipelines we have constructed. All facilities that handle hazardous materials are designed with back-up systems. How many programmed logic controllers within these facilities need to fail in order to cause a spill? Will some societies shut down their dangerous equipment and others not?

It seems that we are about to witness an "autopsy" of modern society. As one system or company fails, we shall learn what other systems, companies, and countries depend on it. The year ahead will present unique opportunities for education, research, and public service, as we help the public understand what we are experiencing.

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The Web and Conflict of Interest

The role of ethics-oriented Web resources in scientific education and research has grown remarkably, as noted in an item in NetWatch ("Weighing in on bioethics," 23 Apr., p. 551). This brief piece presented a helpful description of the University of Pennsylvania Health System Bioethics Internet Project. As Project Director of that site, I would like to clarify, however, the following statement attributed to me: "Some bioethics sites are funded by large companies, but the center is independent. In bioethics, conflict of interest is everything."

In fact, in an interview, I noted that our site has been funded by several grants and contracts and that we actively seek relationships with companies and foundations that have an interest in bioethics. While I stressed the importance of lines of accountability and disclosure of funding for medical and scientific Internet materials, I in no way suggested that corporate funding taints bioethics on the Internet. I did not describe our Web site or center as "independent." No Internet site, bioethics center, or scientific lab can exist without support, and all funding comes attached to the purposes and contexts of the funding organization. Conflict of interest is important, and much of the work of bioethics consists of debating and making explicit conflicts of interest in science and medicine. However, support from industry