tive in structural genomics is much broader than described in the article. Structure determination, by crystallographic or nuclear magnetic resonance techniques, is a crucial component of this structural genomics initiative, but the program supports all components of this new field, including high-throughput sample preparation and computational studies. The recently announced NIGMS initiative is intended to support three to six research centers, each costing up to $3 million annually. These research centers will contain the facilities to perform all the experimental and computational tasks of structural genomics and to test strategies for high-throughput operations, and they will serve as pilots for large-scale research networks of the future. In addition, methodology and technology development of individual components of structural genomics will be supported through individual research grants, program projects, and small-business innovation research awards. More information can be found on the NIGMS Web site at www.nih.gov/nigms/funding/psi.html

Regarding the discussion of synchrotron support, the NIGMS has long supported individual research projects involving synchrotron data collection, but has not supported beamlines directly. This year, however, the NIGMS has provided supplementary funds ($7 million) for five U.S. synchrotrons to increase beamline staff and to purchase detectors and x-ray optics in order to serve the growing needs of scientists in structural biology. In addition, the NIGMS and the National Cancer Institute are currently planning the future development of new beamlines at the Advanced Photon Source at Argonne National Laboratory for general users in this field.

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Conserved Ecological Niches

In their report "Conservatism of ecological niches in evolutionary time" (20 Aug., p. 1265), A. T. Peterson *et al.* demonstrate that geographically isolated sister taxa show little differentiation in ecological niche. Their results imply that ecology diverges slowly in allopatry (the geographic isolation of species), and the authors therefore conclude that speciation most commonly occurs without significant ecological change. However, this conclusion seems to contradict the observation that sympatric sister taxa (species living in the same or overlapping locations) generally do show divergent ecology. Indeed, many sympatric ecological races are so closely related that hybridization still occurs regularly (*1*).

We suggest two possible explanations for this discrepancy. First, as mentioned in the News of the Week article by Bernice Wuethrich (20 Aug., p. 1190), the analysis considered only four physical factors in defining the niche of each species. Certainly, biotic factors such as feeding strategy, host plant use (in the case of butterflies), mutualisms, and predation are also important in defining the niche of a species. Thus, it may be that the analysis was simply too crude to show ecological divergence over a relatively short time scale.

Alternatively, if Peterson *et al.* are correct and ecological divergence does in fact proceed rather slowly in allopatry, then we need another explanation for the frequent occurrence of sympatric, ecologically divergent sister taxa. Sympatric speciation, when it occurs, is likely to proceed rapidly because disruptive selection plays a direct

role in driving divergence (*2*). In contrast, models of allopatric speciation do not generally invoke a direct role for natural selection and might thus be expected to proceed more slowly. By showing that allopatric divergence does not lead to rapid ecological change, Peterson *et al.* may have provided some of the best evidence that sympatric sister species have evolved in situ.

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Oldest Printed Star Charts

That "Albrecht Dürer's woodcuts of the constellations (1515) were the first printed star charts" (Kevin B. Marvel, CD-ROM Review, *Science*'s Compass, 20 Aug., p. 1216) may well be true for the European cultural sphere, but charts published in China in a woodcut edition around 1094 by the polymath Su Sung predate Dürer's by more than 400 years and are generally considered the oldest printed star charts in the world. Su Sung's charts, like Dürer's, depict stars arranged into constellations as they appear to a terrestrial observer. Although no examples of the original edition of Su Sung's work [entitled *Xin yixiang fayao* (New method for an armillary sphere and celestial globe)] are known to have survived, the transmission of the text is well documented (*1*), and star charts in later editions, such as those illustrated by Needham (*2*), are considered close copies of the originals.

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How a Geologist Finds the Truck

In his News of the Week article "GPS's 'dress rehearsal' for year 2000 problem" (6 Aug., p. 816), Richard A. Kerr uses the example of the field geologist mapping in Nevada who needs his global positioning system (GPS) receiver to determine the shortest distance back to his truck. I can assure you that any geologist who has just finished mapping doesn't need a GPS receiver to tell him where he is in Nevada. Since he is mapping, he has to know exactly where he is or else his maps are worthless trash. As far as finding the shortest distance to his truck at the end of the day, a geologist does not use a GPS receiver for that purpose because evolution has already solved that problem. Every geologist who has worked in the desert instinctively knows that the shortest distance to the truck is the route that is the shortest distance to the nearest cold beer.

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To Be a Good Teacher

In the Random Samples item "Glenn Commission launched" (30 July, p. 661), Deborah Lowenberg Ball, a professor of education at the University of Michigan, is just plain wrong when she states that "'almost none' of what you learn as a math major 'has anything to do with the K–12 curriculum.'" (Her statement was made to caution the Glenn Commission to not recommend that every teacher have a major in a content area.)

The topics that students learn and review in college courses such as calculus, statistics, geometry, and modern algebra can be found throughout the K–12 curriculum (although more at the secondary level). For example, the learning of calculus requires an understanding of many concepts of high school algebra, along with the application of basic geometric ideas that are featured in the K–12 curriculum. The elementary, secondary, and undergraduate mathematics curricula are connected in both obvious and subtle ways.

The philosophical implications of Ball's statement are also questionable. The reason many universities, including mine, require prospective teachers to select a major is to ensure that the teachers are masters of the subject matter they are teaching. It is not enough that teachers just have the gist of the subject: they need to be experts. Proper training in a content area means that teachers will be more flexible intellectually and therefore better able to take the risks necessary for effective teaching. These teachers will be better prepared to advise students and parents about curricular issues and college plans, and they will also be more effective leaders in their schools. Although a major in a content area is not necessary for someone to be a teacher, it is vital if he or she is going to be a *good* teacher.

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