blocks [*a b c d*] and sequence B of blocks [*w x y z*]. Suppose that the best alignment of portions of the two sequences is *b*:*x*. SW will report it. However, other close (but less close) matches (for example, *z*:*d*) will be overlooked by SW. Further, the SW algorithm does not detect self-matches within a sequence. Thus, one reason Barton's approach is so fast is because it does not yield an exhaustive matching.

Finally, the practicing biochemists among us are always impressed by the power of modern computers. We are more impressed, however, when this power is applied to solve interesting problems. Predicting de novo the folded structure of proteins (*4*), designing de novo proteins that fold and catalyze reactions (*5*), and constructing models for ancient forms of life (*6*) are activities that can benefit from our exhaustive matching. Perhaps the most important point of Barton's note is that neither these activities nor the exhaustive matching itself came from those using the most advanced computers.

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## Yeast Biology

I read with interest the Research News article "Yeast biology enters a surprising new phase" by Michelle Hoffman (20 Mar., p. 1510). The article states that "*Saccharomyces* was believed to have only the unicellular phase. Until now." The authors of the *Cell* paper discussed in the article (*1*) describe pseudohyphal growth, a dimorphic transition in the life cycle of *Saccharomyces cerevisiae*. Although they refer to earlier work in which pseudohyphal growth was noted (Guilliermond, 1920; Brown and Hough, 1965; Lodder, 1970; Eubanks and Beuchat, 1982), they classify these as anecdotal references. It is surprising to me that in the *Cell* article no mention was made of the work done by Lindegren and others on the genetics of yeast in the 1950s. Townsend and Lindegren (*2*) described growth patterns of different members of a polyploid series of *Saccharomyces*. There are also any number of botany textbooks that refer to the pseudohyphae in *Saccharomyces*. Dittmer's text *Phylogeny and Form in the Plant Kingdom* (*3*) states, "in a colony of actively growing yeast it is quite common to find chains of cells with hyphalike characteristics."

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In contrast to the statements in the article to this effect, it has been known for more than 70 years that *Saccharomyces cerevisiae*, among many other yeasts, may form pseudomycelium under special conditions. In fact, this property is a major determination characteristic in yeast taxonomy and identification. The phenomenon is well documented for *Saccharomyces* species (*1*). The media used to obtain pseudomycelium reproducibly (or true mycelium for other yeasts) have been described in detail in the taxonomic handbooks. While we agree that a molecular study of the formation of pseudomycelia in *Saccharomyces cerevisae* has not been carried out before, we stress that the occurrence of pseudomycelium in baker's yeast is well known to almost any yeast physiologist or taxonomist.

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Hoffman writes that "[w]hile many related molds, such as the human pathogen *Candida albicans*, exist in two phases (a unicellular yeast and a multicellular filamentous phase) . . . *Saccharomyces* was believed to have only the unicellular yeast phase. Until now." The article proceeds to elaborate on the "news" that *Saccharomyces* can also produce a filamentous phase.

In 1886, E. C. Hansen described *Saccharomyces cerevisiae* Hansen (*1*), and in 1890, W. Zopf wrote (*2*) (Fig. 1) (roughly translated)

> E. Chr. Hansen had first reported that the Saccharomyces-like yeasts, in general, are capable of producing another shape, that is, a typical chain-like mycelium. This is found in a particularly distinct form in the beer yeasts, for example, in *Saccharomyces cerevisiae* Hansen. From this it is clear that the view found in all books, that the yeast fungi are "one-celled" growth forms, is to be dismissed as erroneous.

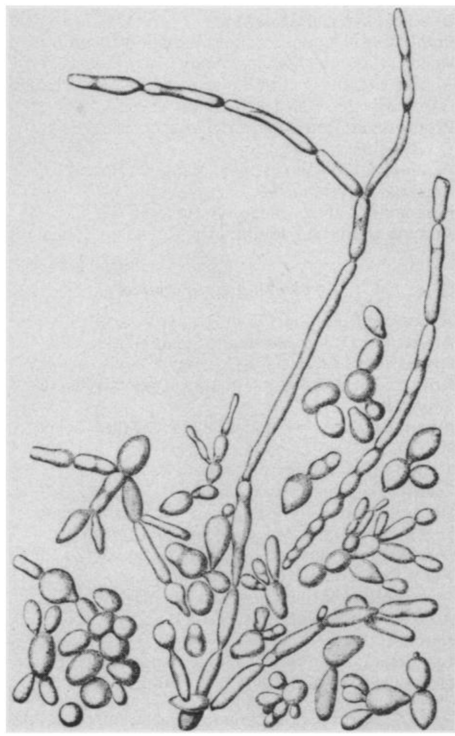

**Fig. 1.** Drawing of *Saccharomyces cerevisiae* from Hansen's description, reproduced by Zopf (*2*), showing the filamentous growth of the species. [From (*2*), figure 113, p. 421)]

Elsewhere in Hoffman's article and in the original *Cell* paper by Gimeno *et al.* are aspects of the yeast-filament switch that are truly newsworthy. Gimeno *et al.* went far beyond Zopf in considering the switch from single-cell to filamentous growth form in relation to ploidy, in looking at polar versus nonpolar growth, and in considering its potential infuture investigations into developmental biology.

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## Women in Neuroscience

Recent discussions about gender parity in science note the decline of women in the academic pipeline sometime before attainment of the Ph.D. (Letters, 19 June, p. 1610; "Women in Science," 13 Mar., p. 1363; AAAS Presidential Lecture, 30 Sept. 1988, p. 1740). In my field, neuroscience, I have been struck by the contrast between the relatively high percentage of women receiving Ph.D.'s and anecdotal accounts of highly qualified women foregoing tenure-track faculty careers ("Women in Science," 13 Mar., p. 1366).

To quantify these impressions, I have analyzed female representation nationwide at different steps on the neuroscience career ladder between 1985 and 1990 (*1*). The results indicate a slight attrition among women working toward the Ph.D.; women constituted 43% of the student members of the Society for Neuroscience and 36% of neuroscience Ph.D.'s (*2*). Women were just as likely as men to continue on to a postdoctorate, and they received 38% of postdoctoral fellowships (F32) awarded by the National Institute of Neurological Diseases and Stroke. Moreover, women were no more likely than men to relinquish a fellowship before its full term had expired.

The largest attrition occurred at the next step, when postdoctoral fellows applied for a faculty position in neuroscience. Women comprised only 18% of the applicants for such positions and 12% of the individuals hired. Remedial actions should be taken at this crucial step.

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2. "1989 survey of doctorate recipients" (National Research Council, Washington, DC, 1989); supplementary 1990 data provided by National Research Council staff.

### Corrections and Clarifications

The last two sentences of the second paragraph of the report by Peter R. Buseck *et al.* (10 July, p. 215) should have read, "We subsequently confirmed the presence of $C_{60}$ and $C_{70}$ by mass spectrometry. They occur within fracture-filling films in shungite, an unusual carbonaceous rock found near the town of Shunga in Karelia, Russia."