LETTERS

Material Girls

In his article "Are chemists girl crazy?" (News & Comment, 10 July, p.158), Ivan Amato discusses the "myth" that chemists have more girl babies than boy babies and his difficulty in finding data to confirm or repudiate it. The Washington State Department of Health has noted parental occupation on birth certificates since 1980 (*1*), and these data are available for analysis with regard to vital issues such as this one. From 1980 to 1990 there were 555 births in our state in which the occupation of the father was coded as chemist or chemistry professor. Of these births, 273 (49.2%) were girls, a proportion that is hardly different from that of all girls (48.8%) born in the state. For the 178 births where the mother was a chemist, the results were almost the same: 87 (48.9%) were girls.

The myth is not as farfetched as it might sound, however. In aluminum manufacturing, carbon setters work with high exposure to heat, chemicals, and magnetic fields. Milham (*2*) found that, in Washington State, fathers in this occupation have an excess of girl babies, with a ratio of girls to boys of about 3 to 2.

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Amato reports that the Census Bureau would charge a hefty search fee and take a year to report on the sex of chemists' children. If the 1990 census were used, it would not be able to tell us about the sex of all the offspring of chemists. However, it could tell us about the sex of people reported as children of a householder where the householder is a chemist. Chemist householders may have offspring who are no longer in the household, of course.

Table 1. Sex ratios in 1980.

	Census population (no.)	Children of householder (no.)
Total	94	110
Under age 20	105	106

Census data for 1980 may be as useful as those from 1990. A printed report of the 1980 census provides data to calculate the sex ratios (males per 100 females) (Table 1) (*1*). If children in the households of chemists are like children in all households, we would expect a sex ratio of somewhere between 106 and 110.

International Data and Development, Inc. (IDD), used the 1980 Public Use Microdata Samples (PUMS) (*2*) to calculate sex ratios for "children of householder," where the householder's occupation seemed related to chemistry (chemists, except biochemists; chemical engineers; biological and life scientists; and chemical technicians). The occupations listed in the census do not provide an unalloyed "chemist" category (*3*). For economy, a 1/1000 sample of 1980 PUMS records was used. The sex ratios for children of these householders did not fall in the range for children of all householders. The chemist households have more girls than expected, but the householders with other occupations related to chemistry have more boys than expected. However, the sampling error is too large to make conclusions.

The 1/100 1980 Census PUMS is an inexpensive alternative. It has about 3.2 million records, and the sampling error is small enough that calculations of sex ratios for children by occupation of householder might reveal statistically significant differences between chemist households and other households. A grant enables IDD to offer the 1/100 PUMS on a CD-ROM at no cost, as long as the supply lasts.

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Pleistocene Paleotemperatures

M. Stute *et al.* (Reports, 15 May, p. 1000) state, "The inconsistency of the oceanic and continental paleorecords indicates that there are still gaps in our understanding of fundamental climatic processes" (*1*). In 1955, when I discovered the cyclicity of glaciation by isotopic analysis of deep-sea cores (and in the process exhumed Milankovitch from terminal oblivion), I estimated that 60% of the variance resulted from the glacial-interglacial temperature change and 40% resulted from the concomitant change in the oxygen isotopic composition of seawater, which is related to the sequestering of ice in glacial ice caps (*2*). I further estimated that the temperature change at low latitudes was about 6°C (*2*). In 1967, N. J. Shackleton concluded that the entire isotopic signal resulted from the sequestering of ice on land (*3*), which entailed no temperature change in the surface water of the oceans. This conclusion has been almost universally (and uncritically) adopted, although it does not account for dramatic changes in marine planktic microfossil faunas that clearly relate to temperature change (*4*).

Shackleton's conclusion received support from the CLIMAP (Climate: Long-Range Investigation Mapping and Prediction) group (*5*, *6*), who related the composition of planktic foraminiferal microfaunas from core tops to the surface temperatures and salinities of water directly above. They believed the presence of *Globorotalia menardii* indicated that core top sediments were deposited during the postglacial time because this species was absent from the Atlantic Ocean during the last ice age. The CLIMAP group stated that "large areas of the tropics and subtropics within all oceans had sea-surface temperatures as warm, or slightly warmer, than today" (*6*, p. 9).

More recently, climate modeling (*7*) and geochemical analysis (*1*) have revealed a glacial-interglacial temperature range at low latitudes of 5°C that is markedly at variance with the conclusions of CLIMAP. I submit that the observed discrepancies result not so much from gaps in our understanding but from the foundation upon which the CLIMAP studies were built.

D. B. Ericson and I have shown (*8*) that, in core tops demonstrated to be modern by oxygen isotope analysis and shallow enough not to exhibit postdepositional solution, the relative abundance of *G. menardii* does not fall below 5%. In the tropical Atlantic Ocean and the Caribbean Sea, between the core top and about 30 cm, the abundance of *G. menardii* drops from 5% (or more) to zero (*9*). The gradient is steep, which means that, if a few centimeters of sediment from the top of a column are missing because of submarine erosion or losses during coring, a core top could likely include sediments (and microfossils) from below, deposited when surface temperatures were lower. Indeed, half of the core tops used by CLIMAP to calibrate their method of assessing paleotemperatures contained only 0.9 to 3.6% *G. menardii* (*5*), which indicates that these core tops are not representative of modern conditions but of earlier, cooler times. This calibration may be why CLIMAP underestimated the glacial-interglacial temperature range.

It has been argued that the range derived by CLIMAP may be a result of their use of the entire planktic foraminiferal fauna, which includes species (the globorotalids) that do not live close to the surface, but as deep as 200 meters, where temperature is significantly lower. However, the globorotalids begin their shell growth near the surface, as demonstrated by oxygen isotopic analysis (*10*). Their abundances in the microfaunas, therefore, should be indicative of sea-surface temperatures.

Ericson and I have assessed (*8*) both the isotopic and the micropaleontological evidence and have concluded that the glacial-interglacial temperature change in the surface ocean was at least 5.6°C in the Caribbean–Equatorial Atlantic Ocean, 3.6°C in the Northern Indian Ocean, 2.6°C in the Equatorial Pacific Ocean, and possibly as high as 7.8°C in the Caribbean–Equatorial Atlantic, 5.5°C in the Northern Indian Ocean, and 3.6°C in the Equatorial Pacific. We estimated that the area-weighted average was 5.0°C for the entire topical-subtropical belt. This value is close to the original estimate (*1*) and is in agreement with the findings of climate modelers and geochemists (*6*, *7*). We also showed that the temperature of the ocean bottom has cooled by 1.2° to 2.5°C since the postglacial temperature peak of 6000 years ago, which suggests that the next ice age may already be under way.

Because the CLIMAP database is valid, I believe it would be worthwhile for the CLIMAP leaders to embark on a recalibration, using only core tops demonstrated to be modern by oxygen isotope analysis at 1 to 2 cm intervals [for example, (*1*), figures 7 through 10], or by ^{14}C accelerator analysis, or both. The CLIMAP database could also be reanalyzed using a method (*11*) that is more sensitive to variations in the significant, stenothermal, and stenohaline species, or by a ratio method (*12*) that was shown to amplify the micropaleontological signal.

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Patents and Indigenous Rights

Like much of the other media coverage of the biodiversity treaty controversy, Richard Stone's article "The Biodiversity Treaty: Pandora's box or fair deal?" (News & Comment, 19 June, p. 1624) ignored an important player in this field: the indigenous people who have been the source of nearly three-quarters of our plant-derived medicines and who could in many ways hold the keys to much of the rest of the genetic resources embodied in the biodiversity of tropical forests.

Unfortunately, the biodiversity treaty also bypasses the indigenous people and their rights. That is why, at a meeting before the summit, indigenous people took a stand against the treaty. Indigenous delegates said that when their knowledge is used for profit they should have just as much of a right to a patent and royalties as the pharmaceutical companies. Instead, the treaty would give those rights to governments of states, such as Brazil, that have seldom honored either patents or indigenous rights.

Although the United States delegation stood up for one half of the equation—the patent rights of biotechnology companies—it was not the only one opposing the treaty and calling for respect for "intellectual property rights."

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