NAS "could open a floodgate to people whose science isn't spectacular." Well! I suspect that not all of the 1647 active members plus 287 foreign associates and 83 voluntary emeriti of the NAS have done "spectacular" science, if "spectacular" is taken to mean a major scientific innovation that has opened a new field or shaken the foundation of an established one.

That the NAS election process may be faulty is indicated by the observation that out of a total of 178 living American scientists deemed sufficiently prominent to be included with the great scientists of the past in the *Concise Dictionary of Scientists* (2) and in *Asimov's Biographical Encyclopedia of Science and Technology* (3), 44 (25%) are not even members. Because the NAS is so large (2017 total are affiliated), one can conclude that the vast majority of these members have done less "spectacular" work than at least some, if not most or even all, of the 44 nonmembers.

In order to improve the NAS election process and eliminate any "old boys" syndrome, the election of new members could be run by an external body, perhaps consisting of scientists whose original work may not have been of major significance (and who therefore would not qualify for membership), but who dedicate themselves to writing about science with some sophistication. Such persons are generally up-to-date as to what is cooking in science and should be reasonably impartial: it's part of their job. The NAS could also consider an age limit (say, 65 years) in order to make room for younger people and move the elders into the nonvoting emeriti category.

Cesare Emiliani
Department of Geological Sciences,
University of Miami,
Miami, FL 33124

REFERENCES

1. *The World of Learning* (Europa, London, ed. 42, 1992), p. 2021.
2. *Concise Dictionary of Scientists* (Cambridge Univ. Press, Cambridge, 1989).
3. I. Asimov, *Asimov's Biographical Encyclopedia of Science and Technology* (Doubleday, New York, 1992).

■

Fetal Tissue Supply

Although there has been extensive debate over the expected number of fetal specimens suitable for transplantation that would be available from spontaneous abortions and ectopic pregnancies, little relevant data have been presented (News & Comment, 29 May, p. 1274; Letters, 17 July, p. 310).

From 1974 to 1986 we attempted to obtain tissue from all spontaneous abortion specimens in a large Manhattan hospital as part of an epidemiologic study of karyotyped spontaneous abortions (*1*). Morphology was routinely assessed and an attempt was made to karyotype all specimens. We did not test for maternal or fetal infection. To estimate how many specimens might have been suitable for transplantation research, we recently examined data from the final phase of our study, when retrieval of specimens and the rate of successful karyotyping were optimal (*2*). To avoid confusion, we point out that the data referred to in a letter by Julianne Byrne (17 July, p. 310) derive from an earlier phase of this study (from January 1977 through August 1981), when Byrne was a doctoral student working on our project.

National Institutes of Health (NIH) guidelines (*3*) specify that at least 100 fetuses per year of 8 to 16 weeks gestation be available for screening from a fetal tissue bank. Our data indicate that this would require access to about 1250 spontaneous abortions. Of the expected 100 fetuses, there would be at most about 14 with no visible signs of maceration (autolysis) that could be considered possible candidates for transplantation.

A population of at least 10,400 pregnant women (*4*) is needed to yield the numbers required to participate in the tissue bank feasibility study. In most locations, therefore, ascertainment will require the collaboration of several medical centers, compounding the challenges of rapid identification of emergency admissions and screening before women have left the hospital or physician's office. This herculean effort is projected to cost $500,000 in each of six banks—all to yield 14 specimens per bank which may or may not prove acceptable for transplantation research.

Allowing the induced abortion debate to influence issues of fetal tissue research comes at great cost. We believe that the present NIH plan cannot be expected to produce sufficient numbers of usable specimens. There will be a significant loss of time in advancing transplantation research and of funding dollars that might be used for other research proposals with significant public health implications.

Jennie Kline
Ann Kinney
Zena Stein
New York State Psychiatric Institute and
Sergievsky Center,
Columbia University,
New York, NY 10032
Mervyn Susser
Sergievsky Center,
Columbia University

Dorothy Warburton
Department of Genetics and Development,
and *Department of Pediatrics,*
Columbia University

REFERENCES AND NOTES

1. J. Kline *et al.*, *Epidemiology* **2**, 409 (1991); J. Kline, Z. Stein, M. Susser, *Conception to Birth: Epidemiology of Prenatal Development* (Oxford Univ. Press, New York, 1989). The investigators of the project were J. Kline, Z. Stein, M. Sussar, and D. Warburton. The study drew on three Manhattan hospitals over a 12-year period. We identified all spontaneous abortions (defined as less than 28 weeks) and collected and attempted to culture the products of conception for karyotyping. In total, 5065 specimens were collected; 3315 yielded a karyotype.
2. Over the 42-month period from December 1982 through May 1986, we identified 1706 patients who had spontaneous abortions before 20 weeks of gestation. We retrieved 1682 specimens, most consisting of only placental tissues, fetal membranes, or embryonic remnants. Of 138 with an intact embryo or fetus of a length corresponding to 8 to 16 weeks of gestation, only 19 (14% of these specimens and 1.1% of total spontaneous abortions) were judged to exhibit no maceration. Eighteen were karyotyped; all were chromosomally normal. There were also eight unmacerated specimens of more than 16 weeks of gestation. Maceration was judged by appearance only, that is, tissue color, integrity, and tone. Criteria for successful transplantation are certain to be much stricter. Thus our numbers estimate the upper limit of the proportion of cases that might meet transplant standards.
3. *NIH Guide* **21** (no. 22) (12 June 1992).
4. The estimate of 10,400 pregnancies assumes a 12% spontaneous abortion rate and the unlikely event that all women with spontaneous abortions seek medical care.

Corrections and Clarifications

Figure 1, D, E, and F, on page 1564 of the report "Calcium entry through kainate receptors and resulting potassium-channel blockade in Bergmann glial cells" by T. Müller *et al.* (12 June, p. 1563) was printed incorrectly. The correct figure parts are printed below.