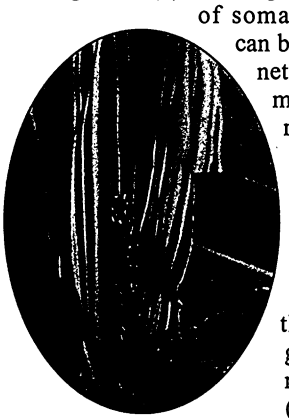
"It comes as no surprise to plant biologists that attempts to clone mammals from single somatic cells are plagued by high frequencies of developmental abnormalities and lethality." A form of Lamarckian transmission of acquired traits to the next generation, specifically mutations in antibody genes, is mentioned. And the risk of emerging infectious diseases in threatened species as a consequence of certain conservation measures is discussed.

Cloning Problems Don't Surprise Plant Biologists

It comes as no surprise to plant biologists that attempts to clone mammals from single somatic cells are plagued by high frequencies of developmental abnormalities and lethality (News Focus, "Clones: A hard act to follow," E. Pennisi and G. Vogel, 9 June, p. 1722). The relative ease with which plants can be cloned from somatic cells belies the substantial developmental and morphological irregularities observed in populations of these plants (*1*). This phenotypic variability—termed somaclonal variation (*2*)—often thwarts efforts to obtain uniform populations of plants by asexual propagation (*3*).

Even when outwardly normal plants are regenerated from cultured cells, developmental problems at later stages can appear unpredictably. Examples are the fruit and floral abnormalities observed in cloned oil palms after a decade or more of growth (*4*). Although a certain amount of somaclonal variation can be attributed to genetic changes (point mutations, DNA rearrangements, chromosome numerical changes) incurred during cell or tissue culture, it is increasingly appreciated that a strong epigenetic component is involved (*5*). Developmentally acquired epigenetic modifications that are normally erased during sexual reproduction are not always reset properly during asexual propagation, leading to stable silencing of the genes involved (*6*). Although somaclonal variation is a problem for applications requiring clonal uniformity, it can also be viewed as an opportunity to study the types of epigenetic and genetic changes that occur at the single-cell level as development unfolds.



A corn plant grown from tissue culture with a leaf-striping mutation.

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Support for the National Science Education Act

In the ScienceScope item "Late hit" (26 May, p. 1313), the chances of passage of Representative Vernon Ehlers's (R–MI) bill, H.R. 4271, the National Science Education Act, are described as "slim." But such a description is contrary to what the American Association of Engineering Societies (AAES) sees as strong momentum for this vital legislation, which strives to close the gap between current teacher skills and future student needs in science, mathematics, engineering, and technology education. AAES believes that this bill is a critical first step in improving education.

In our meetings at many congressional offices, AAES and member-society staff have found a broad base of support for H.R. 4271. Furthermore, there are already 42 cosponsors, ranging from conservative Republicans to progressive Democrats. Members of the House leadership have expressed interest, and some, including Congresswoman Deborah Pryce (R–OH) and Congressman Martin Frost (D–TX), have agreed to cosponsor the bill. Also, Senator Pat Roberts (R–KS) has recently introduced companion legislation in the Senate, creating momentum in both houses of Congress.

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Lamarck and Antibody Genes

In his News Focus article "Was Lamarck just a little bit right?" (7 Apr., p. 38), Michael Balter reviews some of the research on methylation-based epimutations (inherited changes in gene expression that are not associated with mutations of the DNA), which constitute a form of Lamarckian transmission of acquired characters in animals and plants. A role for these epigenetic phenomena in evolution was outlined in 1994 in a book by Jablonka and Lamb (*1*). However, Balter does not discuss the possibility that selected, adaptive changes in gene sequences in somatic cells can be fed back to germ cells and transmitted to progeny animals, thus contributing in a Lamarckian and Darwinian manner to evolution. This concept, based on evidence from the immune system of vertebrates and the feedback of reverse transcripts of mutated antibody genes from lymphocytes to germ cells, was elaborated more than 20 years ago (*2*). Reports of uptake by mammalian sperm of DNA and RNA and of reverse transcriptase activity in sperm provide a mechanism for movement of somatic gene sequences to the germ line (*3*). Data from the immune system consistent with somatic to germ cell movement of antibody genes has been reviewed in the scientific literature (*4*), in a book for nonspecialist readers (*5*), and in brief form in *HMS Beagle* (*6*).

Jean-Baptiste Lamarck's idea that acquired traits could be passed on to progeny appears to apply in the case of antibody genes.

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