It's a long, long way to cloning humans

Q: Little lamb, who made thee?
A: A significant udder.
(Cloning joke making the rounds)

It took Ian Wilmut and Keith Campbell 276 attempts to get one Dolly. This is not quite yet science. It is making a round peg fit in a square hole with a hammer.

Review by
MICHAEL R. LeGAULT

THOSE suffering from anxiety about the implications of Dolly, the first mammal to be cloned om the cells of an adult, may find me solace by considering reality: he state of current cloning technol- gy is clumsily ineffective. It took Ian ilmut and Keith Campbell 276 at- mpts to get one Dolly. This is not ite yet science. It is the art of mak- g a round peg fit in a square hole ith a ball-peen hammer.

Still, in some quarters of the pub- 's imagination, the fact that we uld means we can, even though we e free to choose not to, and there is all distinction, even at this early ge, between one greyish-white Finn rset sheep and a world full of dupli- te designer people.

Gina Kolata, the New York Times porter who has covered the story of groundbreaking cloning event m the day it was announced on Feb. 1997, traces this preoccupation with ethics of cloning and the tendency ard emphasizing all the worst-case sequences of Dolly, to the rise of i-science feelings that, deservedly not, have come to the fore over the two decades.

Kolata acknowledges that Dolly is re symbol than sheep. To her dit, she remains neutral and objec- while heeding the moral and losophical questions raised by such a symbol. Many of these, she notes, are similar to those that confronted society when the atom was split, even though the destructive potential of that technology was far greater. Having played Prometheus, how will we use the fire of our new knowledge? With the theoretical barriers of cloning an animal genetically similar to ourselves removed or disproved, should we succumb to the temptation to do "the next obvious experiment"? By cloning ourselves, will we also destroy the notion of what it means to be human?

CLONE
The Road to Dolly and the Path Ahead
By Gina Kolata
William Morrow, 276 pages, $30.50

Kolata deftly sprinkles the reflections of writers, scientists, theologians and philosophers through the text, weaving a point/counterpoint cloning thematic thread. Fortunately, it is a background pattern that doesn't overwhelm. Her compelling narrative is what keeps the reader turning pages.

Conceptually, the basic method of cloning an animal has been understood by scientists since the 1930s, when German embryologist Hans Spemann proposed a "fantastical experiment." The idea was to add an isolated nucleus taken from a cell to an egg whose nucleus had been removed. The egg, implanted in a surrogate mom, would then begin dividing and form an embryo genetically identical to the animal from which the cell was taken. It wasn't until the 1950s, however, that laboratory technique caught up with theory, enabling Robert Briggs and Thomas King to carry out the first successful cloning of an animal — a frog — from the cell of an embryo.

This was the catch. The donated nucleus came from a very young, "undifferentiated" cell, neither liver nor skin nor, like Dolly's mother cell, udder. Between Briggs and King and Wilmut and Campbell lay a great, long, bumpy road stalked by brilliant risk-takers and false prophets, and strewn at intervals with the flaming carnage of once-promising careers.

If there is a point in this tale, it is respected developmental biologist Davor Solter's 1984 claim, based on his work with mice, that "the cloning of mammals, by simple nuclear transfer, is biologically impossible." After this, the focus of cloning research shifted from higher-status, publicly funded institutes to lower-status, privately financed organizations, such as Wilmut's Roslin Institute, which is mainly concerned with various forms of agricultural research. Cloning research, usually in combination with some form of genetic engineering, became less a scientific tool for answering basic questions about development and more a means to make money.

The birth of Dolly would cause Solter to revise his estimation of cloning mammals from adult cells from "impossible" to "considerably harder." Considerably hard it remains. No one, including U.S. researchers responsible for the cloned and genetically engineered calves George and Charlie shown to the press last week, have successfully duplicated on other animals the method Wilmut and Campbell used to clone Dolly. Still, experts tell us, it is only a matter of time before we will need to decide if and how to use safe cloning technology with humans. Kolata's analysis shows, in this respect — as with other forms of bio-manipulation currently used — that at least several options offer potential benefits too promising to pass over.

By paring scientific jargon to a minimum and letting the story tell itself, Kolata bestows a taut, entertaining element on a genre conventionally thought dry and weighty. A bachelor's degree in microbiology undoubtedly helps her decipher and relate technical details in a way readers can appreciate. Kolata's most valuable quality, however, is her sympathetic connection with the ambitions, battles and causes of scientists. It is a quality, more typically, that does not compute in the minds of many journalists contracted to write on science.

Michael LeGault is the editor of a technical and business trade journal in Toronto and writes a regular science book-review column for The Washington Times.

Related Reading

Remaking Eden: Cloning and Beyond In a Brave New World, by Lee Silver (Avon Books, 315 pages, $32). Silver picks up where Kolata leaves off. The Princeton professor offers an unrepentant view of the possibilities of cloning technology, including a more extended and personal discussion on the ethics. Technophobes will find ammunition in such chapters as Could a Father be a Mother?