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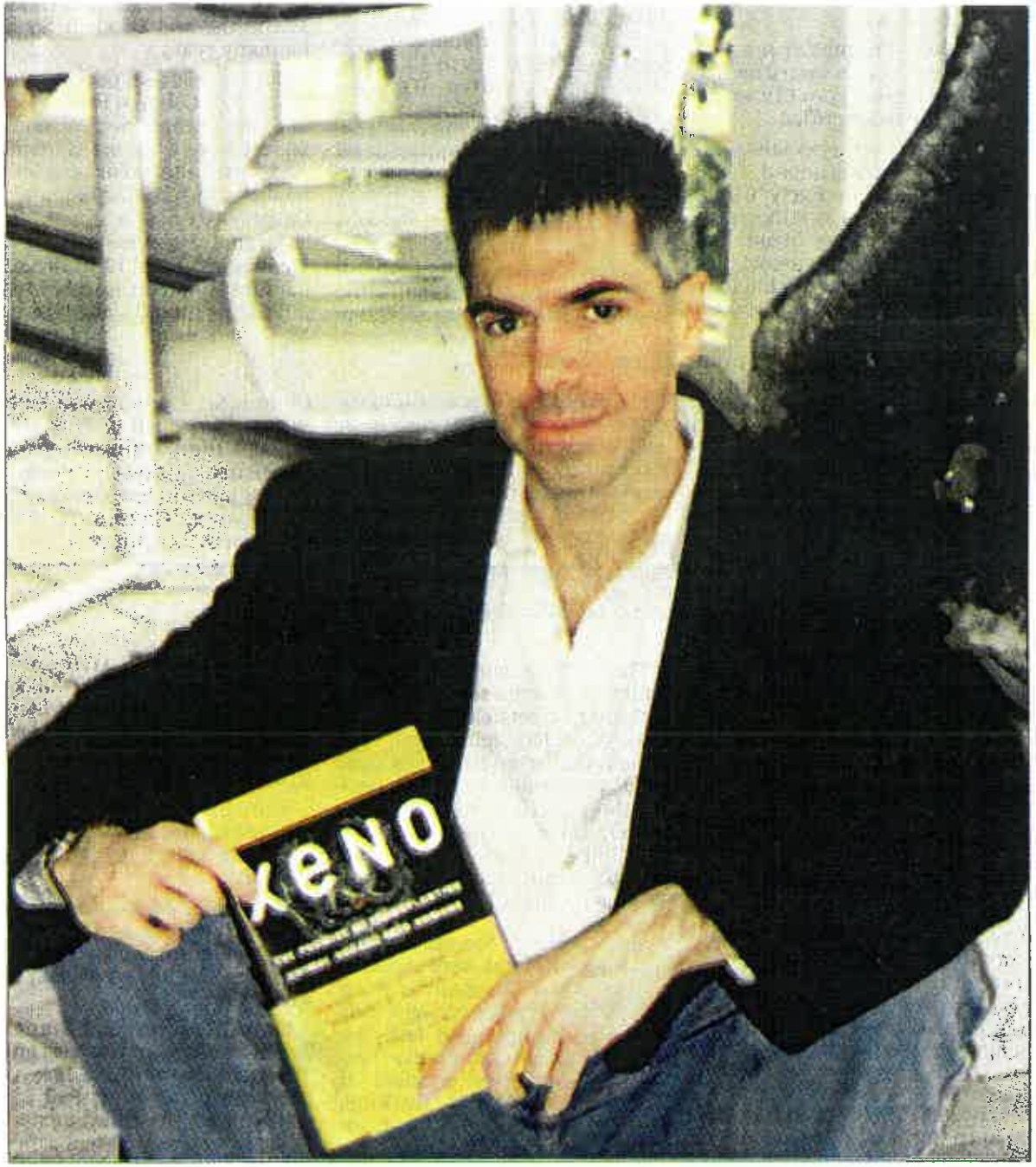

Clinton's Robert P. Lanza's work in biomedical science began in his parents' basement while he was still in high school. His most recent book is *XENO: The Promise of Transplanting Animal Organs into Humans.*

Lanza heralds 'profound' changes

"A vision without a task is a dream. A task without a vision is drudgery. A vision with a task is the hope of the world."
--unknown writer, XENO

By Chanc E VanWinkle
ITEM CORRESPONDENT

CLINTON — Deep in the heart of Clinton's South Meadow Pond Island lives an endangered species. No, it's not a Great Panda or a Cheetah; it's just a simple man.

Robert P. Lanza is a rare individual whose life reflects a tradition of pioneers such as heart transplant surgeon Christiaan Barnard and the naturalist James Audubon. His work in biomedical science began in his parents' basement while he was still in high school and for the next 28 years evolved from heart transplant and diabetes work to cloning endangered species. The animals that make their home in South Meadow Pond are indebted to his efforts to preserve their habitat. To defy extinction, Lanza collects fossils and

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dinosaur bones so that natural history will live in Clinton.

When Robert Lanza was in medical school at The University of Pennsylvania, he would become attached to his patients — some of which never left the building alive.

"I could spend my entire life doing hundreds of heart transplant operations, and still not change anything," mused Lanza in retrospect of his decision to focus on research instead of medical practice. "I wanted to cure these diseases, not just treat them."

Lanza's search for the cure lead him to Oxford University to study with Nobel laureate immunologist Dr. Rodney Porter, then to La Jolla, Calif., to study with Dr. Jonas Salk at the Salk Institute. Lanza endeavored several trips to Capetown to work with Christiaan Barnard — Barnard was the first to establish human-to-human heart transplantation in 1967 in South Africa, and he and Lanza wrote the first textbook on heart transplantation and over a dozen papers together.

Finally, Lanza returned to his homeland — Massachusetts — where he went to work for the biomedical company BioHybrid.

During his eight-year tenure at the Shrewsbury-based BioHybrid, Lanza was able to cure diabetes in dogs, rabbits and mice by placing insulin-producing cells from pigs or cows into specially-designed, semi-permeable capsules that could be injected into the suffering patient. Humans are complicated animals, though, and his capsules were never fully accepted by the finicky human immune systems.

Then, in 1997, biomedical lightening struck. Dolly, Ian Wilmut's dorset sheep, was cloned in Edinburgh, Scotland. Lanza saw potential medical applications, not

Photo for The Item

Robert P. Lanza of Clinton is a scientist and naturalist who founded the South Meadow Pond and Wildlife Association

human replicants.

"For many years, much of my medical career was spent trying to figure out how to cure these various diseases. The problem, over and over and over, was human rejection," he said. "Then, when Dolly arrived, it was like something just dropped out of the sky, something that was considered impossible — a technology that will just revolutionize all of human transplantation, all of human medicine."

Cloning technology has advanced remarkably since 1998. Just weeks ago, five genetically identical piglets were born in PPL Therapeutics' laboratories in Blacksburg, Va. These pigs can be genetically altered during the cloning process to not express a particular sugar, galactose, normally found on the surface of pig organs. The sugar, whose particular shape allows human antibodies to easily bind to it and destroy it, is the primary reason for the human body to say "no" instead of "yes" to the new tissue.

For Lanza, the genetically-engineered pig clone is a scientific milestone.

"All that has happened in human medicine has become obsolete, now we can go in and change the genes and cure these diseases," he said.

> 'It's very important that the public and policy makers know what the issues are.'

The potential of using genetically-altered pigs as organ donors is evident even in the little piggies' names. One is called Christie — after Christiaan Barnard. Dr. David C. Cooper, who ran Barnard's heart transplantation facility in the '70s and '80s, is the co-author of Lanza's most recent book, *XENO: The Promise of Transplanting Animal Organs into Humans,* which, in March, hit bookstores across the country.

The book covers the basics, such as how this technology works and xenotransplantation efforts of the past, but also delves into more controversial territory, such as changes in health care that this technology will provoke and social and ethical questions associated with the use of animal organs in humans.

Lanza feels that the book, which features a forward by the best-selling author of *Coma and Chromosome 6,* Robin Cook, will be informative and understandable to both the layperson and the medical community.

"It's very important that the public and policy makers know what the issues are. There are a lot of pros and a lot of cons. It's very important that the public is educated on these issues so that they can understand them," said Lanza.

In 1999, Lanza became the senior director of tissue engineering and transplant medicine for Advanced Cell Technology in Worcester. Not only was Advanced Cell Technology open to stem-cell research that Lanza felt was vital to the advancement of tissue engineering, but they also had the broadest patent for cloning in existence. Today, he is the company's vice president of Business and Scientific Development.

"Applications for what I want to do to cure these diseases were right in front of me, they were right in my hand," enthused Lanza about his move to the company. "Who would've thought that a tiny biotech company in Worcester would be the top company in the world with regard to this research?"

Lanza's focus on xenotransplantation is short-term, however. The ultimate goal is to eliminate the need to use animals entirely through the use of stem cells. Stem cells are cells that can be found early in human development and have the potential to become any type of cell in the body. Isolated in a laboratory, these cells can be influenced to become neurons that could treat Parkinson's and Alzheimer's diseases, myocardial cells for heart disease, and beta cells for diabetes.

According to Lanza, xenotransplantation is just a temporary solution, but necessary because stem cell research is preliminary, as well as mired in bioethical controversy.

Lanza has a passion for the natural world as well as for the world of medicine. His nature writings have appeared in magazines such as *Pacific Discovery,* the *Humanist,* and New England's *Yankee.* This passion is channeled into research at Advanced Cell Technology. The company has been working on techniques to clone endangered species. Using cells taken from a rare Asian ox — the gaur — Lanza's group was able to clone the gaur using a cow ovum as the acceptor for the gaur's genes. The successful technique is hoped to appear in the scientifically peer-reviewed journal, *Nature,* in the next few months.

The success of the gaur clone is just the beginning. The group has also started work on the use of house cat eggs to clone an endangered desert cat. Giant Pandas and Cheetahs will follow once an appropriate egg-donor species — typically one that is closely related with regards to reproductive physiology and genetic compatibility — is identified.

Nature's influence continued to shape Lanza's life when he discovered South Meadow Pond Island. He was drawn to South Meadow Pond because of its serenity and wildlife. Later, when Lanza became more involved in the community, he was attracted to the people, who were "very wonderful." After six years here, Lanza is "attached to this place and wants to call it home."

Lanza feels as strongly about his local habitat as he does the endangered species he wants to save using cloning technology.

"It's an awful shame to have this place around South Meadow Pond, where all the people in town grew up and swam and played, to ever be destroyed. It's a wildlife habitat here and it needs to be preserved," he said.

With this in mind, Lanza founded the South Meadow Pond and Wildlife Association and had it incorporated in 1998. He was on the Conservation Commission for two years, and was also on the Open Space Committee from 1997-1999.

"It's important to me to know that children growing up here will know what it's like to walk around a pond and catch a frog," said Lanza.

Lanza's vision for Clinton residents extends beyond the local environment, though. On his 10-acre island he collects dinosaur fossils and intends to turn his current home into a museum that would be open to the public. Inside his home, a nest of 70- to 135-million-year-old dinosaur eggs nestle in a box near a wall-mount of a dinosaur trackway. The trackway, a dusky-brown, eight-foot slab of rock, is dotted with fossilized tracks of Coelophysis bauri, a dinosaur that lived about 180 million to 220 million years ago B.C.

Lanza is currently making arrangements for the delivery of a 6-foot-long Brontosaurus femur bone that will also grace his collection. The 700-pound bone is about 100 million years old.

The dinosaurs missed Robert Lanza by a few million years, but this century, the century of "biology and the life science," will see a different type of extinction.

"We have the ability, literally, within our lifetimes, to see the third leading cause of death — diabetes — to no longer exist on this planet. Everything that is theoretical now will, in the next few decades, become a reality," Lanza said. "It is going to impact everyone's life profoundly; profoundly."