

science



Dr. William Pierce and John Pennock implant the Penn State pneumatic heart in Robert Cresswell on March 17, 1985.

Heart

Continued from Page 1.
... is a tugging on the line. Sometimes (the tubes) stay clean, and other times they don't."

Anthony Mandia, the first recipient of the Penn State heart, lived for 11 days with the heart before receiving a human donor heart. He died 17 days later from complications linked to an infection.

Doctors at Hershey have made it clear that the pneumatic heart is used only as a temporary bridge until a transplantable donor heart can be found for a patient. However, if no suitable donor heart can be found, the patient must remain on the heart. "There's no other choice," Pennock said.

"When we first embarked on this program, people asked what happens if a patient ends up on the device for a long period of time — we don't consider that ideal," Pierce said. "The nicest thing is to be able to put the device in for a period of a few weeks or a month and then be able to do the transplant."



Drs. William Pierce and John Pennock, shown here, are the attending physicians of pneumatic heart patient Robert Cresswell.

Heart not always solution

By KATHI DODSON
and CHRISTINE KILGORE
Collegian Science Writers

Implanting the Penn State pneumatic heart in Robert Cresswell, after his body had previously rejected a human donor heart, may not have been an appropriate application of the artificial heart, said John Pennock, associate professor of surgery at the University of Hershey Medical Center.

"It may well be this situation is not an acceptable situation to use the heart... where the patient has rejected a transplant and the transplant fails," Pennock said at a press conference yesterday. "That depends on why the transplant fails, but if it fails because of rejection, I think that tells you something about the patient."

Cresswell, who received the Penn State heart after his body rejected a human donor heart he had received seven days earlier, is highly likely to reject a foreign heart because he has an unusually high antibody count, Pennock said.

"We have located four or five organs that were compatible in blood type with Cresswell over the past five or six months," Pennock said, adding that Cresswell has been on the transplant list since May 12.

But since Cresswell's unusually high antibody count greatly increases the risk of donor heart rejection, a very close match between Cresswell's blood protein and donor heart's blood protein and the patient care at the medical center, said such a precise match can be very difficult if not impossible.

Pennock said Cresswell's high antibody count is a result of several factors, including his previous donor heart rejection and numerous transfusions given to Cresswell during earlier regular heart surgery.

"When you get a foreign tissue in the body, which is what a blood transfusion is, your body builds up antibodies to these cells," Pennock said. "Cresswell has very high levels of these pre-formed antibodies."

"We know from doing statistics that probably one in 100 hearts would be compatible," Pennock said, adding that the medical center would have to offer 100 donor hearts before they found one that matched.

During the day, Cresswell rides a stationary bicycle, sits in chair, walks a little, and does arm exercises to keep up his strength.

"I don't feel too bad — I feel alright," he said in an interview last week. "I can sit up and then I walk a little." He added that he also enjoys putting together a model engine that should run when completed.

Faith Cresswell, who visits her husband every day, said she enjoys watching movies on a videocassette recorder in his room. "His favorites are old Westerns and wrestling — he is crazy about wrestling," she said. "And he likes his nurses — they flirt around a lot."

She added that Cresswell has not received many visitors or mail lately and that he had expressed his hopes for some visitors last Sunday. His children visit him every two weeks along with visits from his pastor and doctors.

John Vastyan, a hospital public relations spokesman, said earlier this month that once a week, Cresswell moves from his room to a conference room, where he eats lunch with his wife, nurses and physicians.

"He is moved in a wheelchair... moving is an easy thing to do now and it's something he likes," Vastyan said. "This trip outside the room is very important."

However, Faith added, he still suffers from depression. "Emotionally, he gets different levels of depression. He used to be happier... he used to smile and joke more," she said, adding that the death of other artificial heart patients has upset her husband. "We can't do anything about it — we can't go any further until we get that heart," she said. "I (too) have my ups and downs, but I know I have to keep strong for him," she said. "I love him and I'm committed... once you've started something like this you can't stop."

"If everyone would say a prayer that he gets a donor heart... that would be the best thing they could do for us," she said. "And it's not just my husband who needs a heart — there are a lot of people out there who need vital organs to live."

Faith said a trust fund established in Huntington is helping finance her husband's medical expenses, which surpass \$150,000.

"Medical assistance would only pay for a third of the cost — we've gone way above that now," she said. "I don't know what is going to happen."

Device may replace PSU artificial heart

By CHRISTINE KILGORE
Collegian Science Writer

An electric artificial heart, now being developed as a long-term or permanent replacement for defective hearts, may someday replace the Penn State pneumatic artificial heart, according to one of the electric heart's developers.

David B. Geselowitz, a University professor of bioengineering and medicine, said the electric heart can be contained completely within the body and does not require the bulky external power unit that must be used with the Penn State pneumatic artificial heart — the device now pumping inside Robert Cresswell's chest.

While the pneumatic, air-driven, heart is operated by an external compressed-air pump, the electric heart is operated by a small electric motor, Geselowitz said. And the battery required to power its motor can be carried by the patient, allowing extra mobility.

"Aside from a battery pack, the electric heart would be essentially all implanted inside the body," Geselowitz said. "With the air-driven heart, you're connected to a bulky motor unit — it leaves something to be desired and is just not practical. An electric motor replaces large pneumatic devices and gives the patient much more mobility."

Geselowitz, a leader in the cooperative artificial heart research effort between the University's College of Engineering and the College of Medicine at the University of Hershey Medical Center, said two separate electric motor devices are now in use. The electric assist device is used to help one of the heart's chambers pump blood, giving the heart time to heal, he said, adding: "This is used in a situation where the natural heart can't function adequately. It is used in conjunction with the natural ventricle and often takes over a good part of the function of the heart."

On the other hand, the electric total heart replaces the patient's heart rather than assisting a heart that has failed to function.

Like the motor driven devices, air-driven devices now used also include a ventricular assist device and a total artificial heart — recognized as the Penn State heart. But while both types of air-driven devices are only used temporarily, Geselowitz said, researchers hope that the electric

'The total electric heart has sustained a calf up to 222 days.'

— David B. Geselowitz

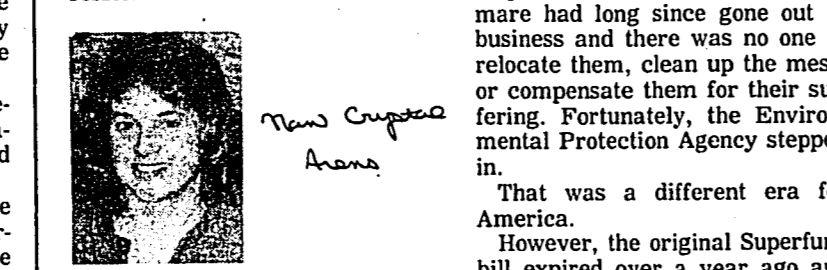


The Penn State Heart is covered with velour to improve the heart's attachment to tissue and uses plastic cardiac valves to control blood flow.

So, just how safe is your water?

It's dead.
When the 99th Congress adjourned Saturday, a bill, which would provide money to keep the Superfund program in business for another five years, breathed its last.

As our faithful legislators headed for some last-minute campaigning before the November elections, the Superfund bill sat unsigned on President Reagan's desk. And so it went the way of all bills lacking a presidential seal — to the circular file.



The federal Superfund was established in 1980 to help clean up the toxic messes left by chemical companies. Many Superfund cases, like the Drake Chemical Company site in Lock Haven, involve waste dumps that were simply abandoned by their producers, leaving local

residents holding the toxic bag.
In fact, Superfund was one of a few good things to grow out of the Love Canal tragedy of the 1970s.
In the case of Love Canal, a sprawling new housing project was built over an abandoned waste dump. Several years after people began living over the decaying barrels of waste, residents began reporting rare forms of cancer and alarmingly high birth defect rate.

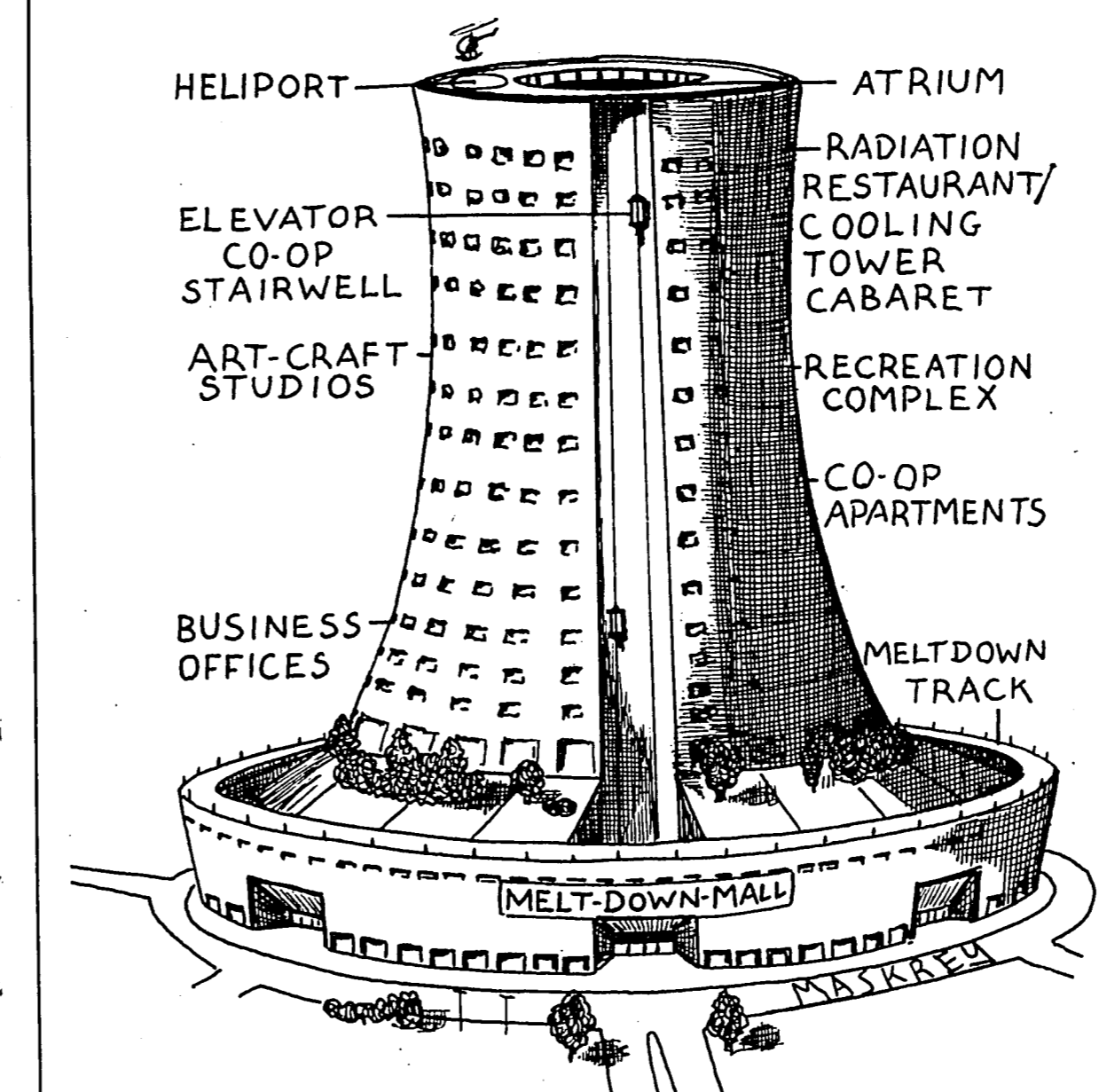
When the investigations started, EPA environmental groups lobbied for up to \$15 billion because the EPA needed strong financial support if it hoped to make a dent in the more than 20,000 waste cleanup cases throughout the nation (some 1,000 cases in Pennsylvania). However, the EPA would have been happy to make due with \$9 billion — \$3 billion more than nothing.

Reagan, however, wouldn't support any bill over a meager \$5.3 billion. And to avoid the veto override Reagan knew would follow, the legislators have coughed up the money — except in small, stopgap doses.

A Science News article last week, EPA Administrator Lee M. Thomas said, "virtually no new work has been started for months," adding that Superfund's emergency

response program is operating at only "a drastically reduced level."
If another Love Canal, with hundreds of families involved, were to surface today, the EPA would be virtually powerless to help.
Why? Basically because the Reagan administration doesn't believe Superfund is money well spent.
With less than two weeks left in the session, House and Senate bipartisan negotiators came up with a compromise bill, giving Superfund \$9 billion over the next five years.
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Nan Crystal Arens is a senior majoring in Earth science and technical writing and is a science columnist for The Daily Collegian.



Shopping at TMI a possibility

By HEATHER WILSON
Collegian Staff Writer

Spending a day in Harrisburg soon? After a jog around the Half-Life running track, stop for a drink at the Radiation Restaurant in the Meltdown Mall, formerly known as the Three Mile Island nuclear power plant.

Jay M. Critchley, founder of the Nuclear Recycling Consultants, has proposed a project to convert TMI into a "historic nuclear park and planned community."

"This is a very serious proposal," Critchley said, adding that "his intention is to focus attention on the nuclear industry."

"The Unit 2 reactor at TMI was shut down after a nuclear accident in March 1979. Cleanup efforts continue within the reactor's containment building. Calling the project a "visionary

proposal," Critchley said one idea for TMI facilities include the Meltdown Mall — a shopping mall at the base of the cooling tower; the Half-Life jogging track on the roof of the mall and the Radiation Restaurant and Cooling Tower Cabaret located within the tower.

The plan also includes the Too Cheap to Meter Museum, which would be dedicated to the historical, political and cultural dynamics of the nuclear age, he said.

Critchley, of Provincetown, Mass., established the recycling consultants in order to convert nuclear fuel-producing plants into productive community facilities, he said, adding that these nuclear power plants are "like temples to technology."

When nuclear power plants were first constructed, Americans believed the energy they produced would be too cheap to meter, but in reality it is extremely expensive, he said.

Critchley said he has filed papers to register TMI for inclusion in the National Register of Historic Places because the site is "associated with events that have made a significant contribution to the broad patterns of our history."

One of the recycling consultants' goals, Critchley added, is to preserve as many of the buildings at TMI as possible.

Bill Travers, deputy director of the TMI program office, said the proposal is feasible but that the final decision to recommitment of the plant or turn it into a historic site is in the hands of General Public Utilities, the owner of TMI.

Travers added that radioactive contamination remains in the reactor building, and that the project could only be implemented "way into the future."

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The Daily Collegian Thursday, Oct. 23, 1986—3

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