

Studying Heart Transplantation

By Rick Carpenter
ALUMNEWS Editor

At the young age of 3 years old, David R. Clarke attended his first class at the University of Wyoming.

Now, almost 40 years later, he will return to his hometown of Laramie to receive one of the University's highest honors, the Distinguished Alumni Award.

"We were taking hearts from animals and profusing them on an apparatus and could actually keep them beating for a period of time." Clarke said of a project he worked on at UW

Although the first class Clarke attended was not to study, but to be studied by a psychology instructor, his association with the University began as the son of a former zoology department head and pre-med adviser, the late L. Floyd Clarke.

Clarke said his father had the single-most influence on his life and his career, serving as a catalyst by planting the early seeds of what has already been a fruitful career as a heart surgeon, an assistant professor of surgery for the University of Colorado Health Sciences Center and the chief of cardiothoracic surgery at both the Denver Children's Hospital and the health sciences center.

By the time Clarke was in third grade, he was attending a University sponsored school where he eventually graduated from University Prep High School in 1961. Spending 13 years at University of Wyoming sponsored schools provided Clarke with some educational assets with dividends that continue to pay off for him.

One of those assets was being able to take University classes while attending high school, enabling Clarke to focus on classes related to the biological sciences during his college career.

Getting a few college courses out of the way early meant Clarke was always one step ahead of his fellow students who were, in effect, playing

catch-up with him. His training was further advanced by working part-time during his college years in a Laramie hospital. He quickly got to know the surgeons in the hospital and eventually was allowed to do part of his work in surgery.

But Clarke's association with the university was not totally academic. From his early childhood, his father took him to UW athletic events. As all young boys tend to do, Clarke looked up to the college athletes with awe and has fond memories of tennis players who gave him tennis balls and even a tennis racquet. He also served as a batboy for the UW baseball team.

"Almost everything that has happened to me subsequently is a result or is somehow influenced by the University of Wyoming," Clarke said in an *Alumnews* interview from his Denver office in the University of Colorado Health Sciences Center complex.

During his college years, Clarke became involved in projects similar to

what he's now doing 23 years later in the medical profession.

"While at the University of Wyoming," he said, "I developed a strong interest in the heart, probably fostered a lot by the professors I had.

"Dr. (Rollin H.) Denniston helped me with some projects involving the cardiovascular system which really peaked my interest."

One of the most memorable experiences Clarke had at UW, was a lab project he and a few classmates were working on.

"We were taking hearts from animals and profusing them on an apparatus and could actually keep them beating for a period of time and we had a whole setup of monitoring equipment and all sorts of big machines," Clarke said of the project.

"The camaraderie associated with that group of students working on the project and the fun we had doing it and the input from the professors in helping us do an obviously much bigger experiment than they expected us to do because of the number of

continues to serve in those roles and is also an assistant professor of surgery and the director of the thoracic surgery residency training program at the center.

Today, Clarke is still profusing animal hearts. But now, the project is a little more serious than in his college days, although the training he received on the project at UW has served as necessary ground work for what he's doing now.

"We're working on an improved method of trying to preserve the heart during cardiac surgery under certain circumstances — for surgery in small babies, which is something where there is very little work done," Clarke said.

"As it turns out, and what we've established in the past year, is the conventional way that the heart is preserved when you're doing an operation on an adult is probably somewhat harmful to a baby. It's probably better to do nothing than to do what they do to adult hearts."

Another related project Clarke is

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resources involved, and the kind of support we got doing it, is a memorable thing," Clarke said.

"Something that I hope still goes on at the University and I know doesn't go on in many major colleges, where you get that kind of individual attention for a group of people who want to do something special."

The project was aimed at determining the effects of different drugs on the heart by monitoring the blood pressure, heart rate and general function of the heart and documenting the response of the heart to injections of the drugs.

After graduating from the University of Wyoming with honors in 1965, Clarke was admitted to the University of Colorado Health Sciences Center where he graduated from medical school magna cum laude in 1969. Then he served his internship and residency at the center before traveling to London for a year, 1975-76, to specifically train in pediatric heart surgery.

Clarke returned from England to become the assistant director of the thoracic surgery residency training program at the health sciences center where he quickly rose through the ranks to chief of cardiothoracic surgery at the center and at the Denver Children's Hospital. He

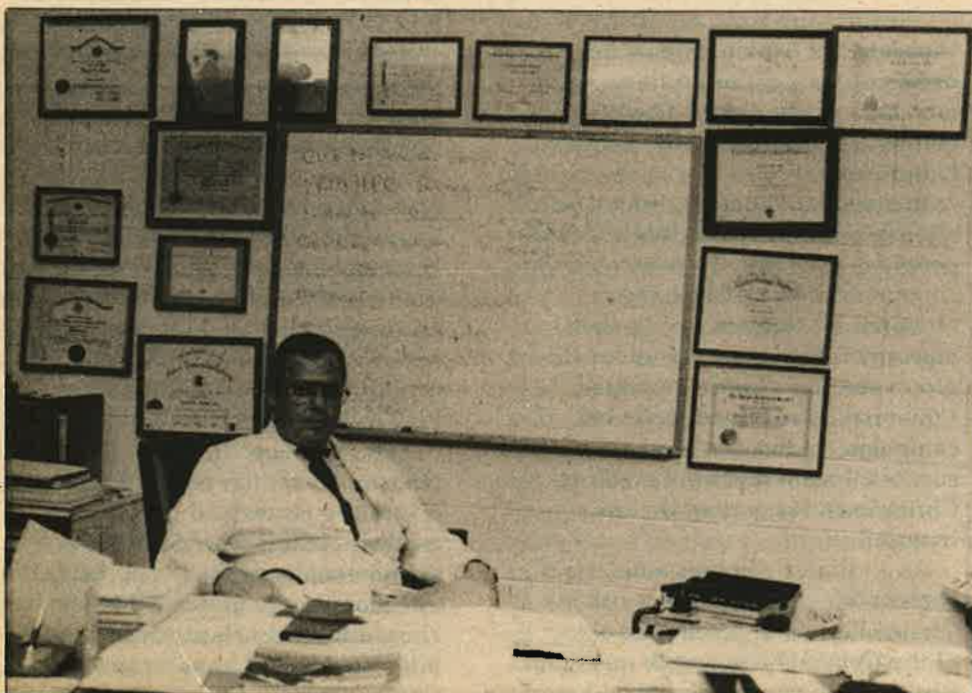
working on is a method to deep freeze the whole heart to preserve it for purposes of future transplantation. Again, the emphasis of his study will be to aid babies.

"One problem we have with heart transplants with babies is there aren't any donors available," said Clarke, who is trained in heart surgery and heart transplantation. "The few donors that are available are never available at the time you have a baby that needs a heart."

He said the unavailability of heart donors for babies leaves doctors with two choices, either to use a baboon heart as in the famed Baby Faye case or to preserve human hearts so they can have a type of storage bank to have a heart available when it is needed. "We're working on the second option," Clarke said.

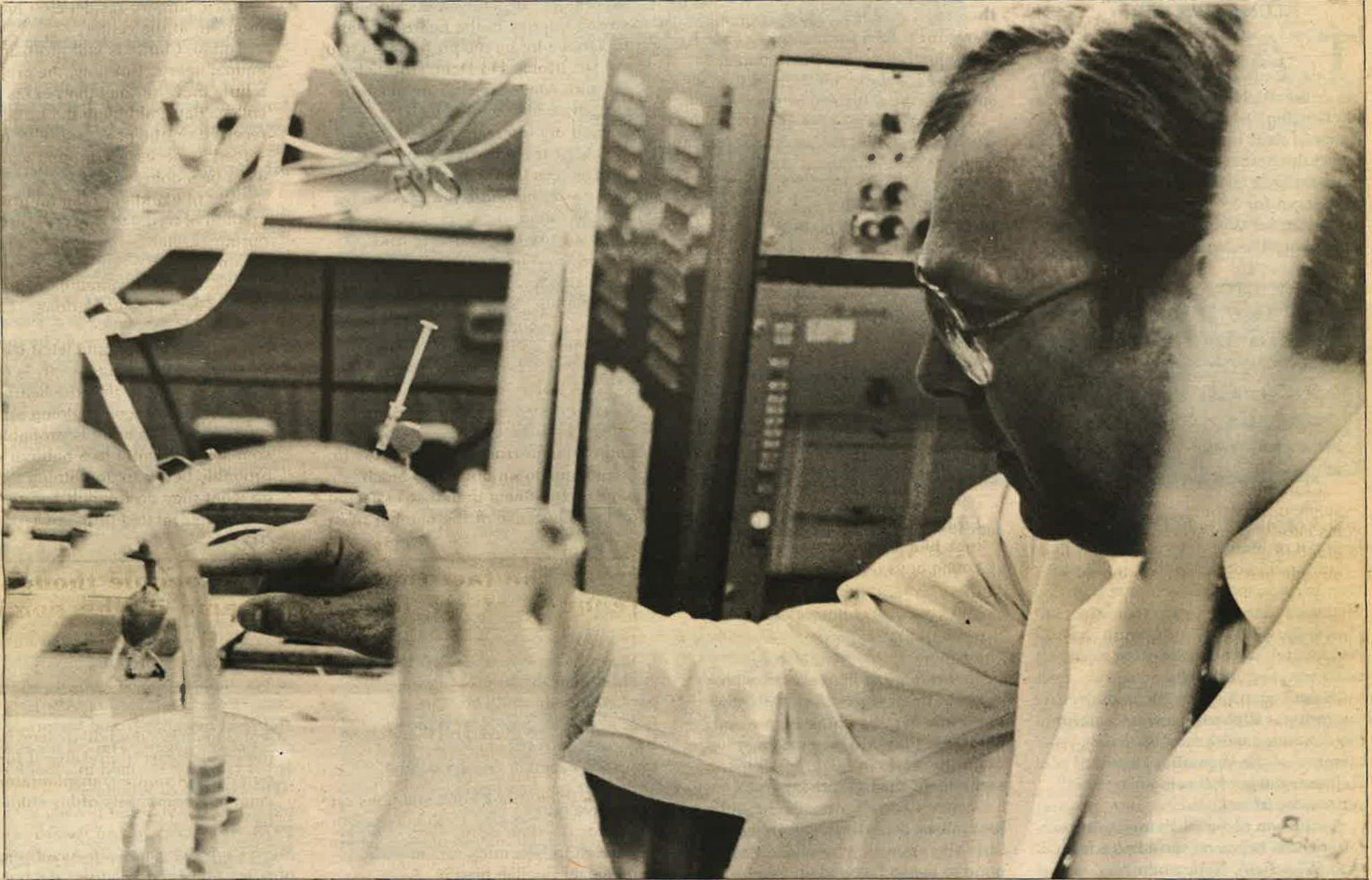
Currently, Clarke's study is focusing on the optimum method and temperatures to utilize during the deep freeze method. "What they're saying now, is that with the cryoprotective chemicals they're now using, probably a slower freezing process and a more rapid thawing process tends to work a little bit better," he said.

"One of the things we're going to be looking at is whether or not a wet



At home in his Denver office, Dr. David R. Clarke is surrounded by awards and lists of things to do.

Dr. David L. Clarke, Recipient *1985 University of Wyoming Distinguished Alumni Award*



While at the University of Wyoming, Dr. David R. Clarke perfused hearts and injected them with drugs to study the effects of the drugs on the hearts. Today, Dr. Clarke is working on a

method of deep freezing infant hearts for later transportation. Here, he studies a piglet heart that had previously been frozen.

thawing, like in a water bath, is better or whether we ought to use microwaves for thawing. Microwaves are probably a little quicker, but it may be too quick and may cause so much molecular motion that you disrupt the cells more."

Technology for preserving various tissues by freezing them to minus 196 degrees Celsius is now becoming commercially available. The problem with freezing, Clarke said, is if ice crystals are formed, they may penetrate cell membranes and destroy them. Cryoprotectors minimize the ice crystal formation and stabilize the cells during the freezing process, he said.

Clarke is starting his study with very small hearts because the tissue mass has a lot to do with how effectively an organ can uniformly be cooled. "So we're starting with piglet hearts and we'll probably move up to puppies or goats or something like

that before we move on to a human situation. It's a long term project which is just now getting started," he said.

"I haven't really thought about it," Clarke said, "but the apparatus we're

now using is not that far from the

One incident he mentioned was the fraternity's acquisition of a 1920 model fire engine from the Fort Collins area. He distinctly remembers he and his frat brothers driving the

would actually remove his shoes and socks and dance on coals from the fire. "He never got burned or hurt or anything, so I guess it was all right," Clarke said.

On a more serious note, Clarke said receiving the Distinguished Alumni Award is extremely important to him, particularly on the emotional level because of his "really strong, life-long affiliation with the University of Wyoming."

As people travel through their various careers, there are a number of certain awards or societies that are going to be expected if things go right, he said. But being a Distinguished Alumni is something that is not expected. "It's sort of something extra and it means a little more," Clarke said.

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Clarke is currently working on a method to deep freeze the whole heart to preserve it for purposes of future transplantation.

apparatus we used when I was a sophomore in college in the physiology lab in 1962 and '63. It still works today."

What also still works for Clarke is the ability to play as hard as he works, something he said he developed in college at the Sigma Nu Fraternity. The bespectacled doctor gave a few stories related to his frat life, but somehow seemed to be holding back some of the better stories behind a guilty smile.

fire engine back to Laramie with a number of fraternity members taking strategic positions on the truck. Then the truth came out, "Of course, we could buy all the beer we wanted in Colorado, that was another reason to come to Colorado."

Although he wouldn't mention the person by name, Clarke also has vivid memories of an Indian frat brother who would always perform a fire dance when he drank. Unlike a rain dance to make it rain, the frat brother