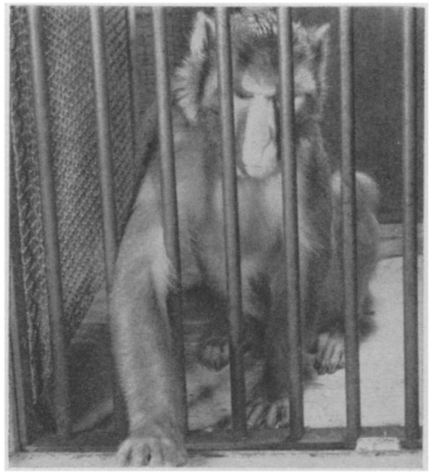
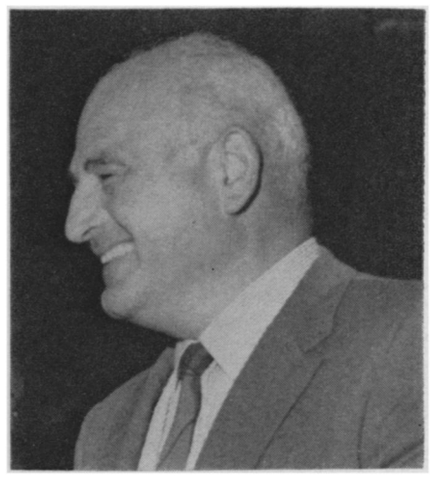
Johnson & Johnson

Barnard: Soon, for every man . . .



University of Wisconsin

. . . his own potential heart donor.



Drucker-Hilbert Co.

Kantrowitz: not quite so fast.

Animal or plastic hearts

Pioneer heart surgeon Christiaan Barnard opens a controversy among his colleagues with predictions of animal donors by 1970

This is the year of the human donor; 1970 may be the year of the baboon. Capetown surgeon Christiaan Barnard claims by then he will be ready to transplant a baboon's heart into a child.

The thought turns his American colleagues pale. Though many believe that animals will eventually make human donors unnecessary, they are thinking in terms of 5 to 15 years; not 2. Of Dr. Barnard's timetable, one says skeptically, "I wish him well." Dr. Adrian Kantrowitz, a pioneer in artificial parts, says, "Barnard is making projections without doing the experiments. Artificial hearts will come first; neither will come in two years."

What little evidence there is on cross-species transplants, or heterografts, tells two tales. Medicine is not ready for them yet, but it will be; when it is, some of today's ethical issues and problems of supply and demand in transplants will vanish.

Thousands of persons need new hearts right now. Dr. Theodore Cooper, director of the National Heart Institute, recently put the U.S. figure at 81,000. Less than 60 have been so treated. "I could do 4 transplants a day if I had the hearts," states Houston's Dr. Denton Cooley who has 7 (out of 10) surviving patients. There are not enough available human donors, but there are enough baboons. And it is not inconceivable that eventually each man will have his own animal, ready and waiting in case he needs it.

Dr. Barnard plans to build tolerance for the animal organ by exposing the recipient to small doses of the baboon's tissue for one or two weeks before the operation. One baboon would be singled out for each transplant candidate.

The speed with which such talk can be translated into fact hinges on solving the problems of rejection. Fundamentally, the rejection phenomenon is the same in cross-species grafts as it is in man-to-man grafts; if doctors can overcome it in one case, they can overcome it in the other.

However, with heterografts the problem is magnified. Dr. Kantrowitz, several years ago, transplanted a pig's heart into a dog. The dog was dead in 30 seconds. In 1964, Dr. James D. Hardy of the University of Mississippi put a chimpanzee's heart into a man. The recipient died on the operating table. This year, Dr. Cooley unsuccessfully tried a ram-to-man transplant.

Nevertheless, there is encouraging evidence. A series of kidney transplants in 1963 and 1964 showed that heterografts are possible. Chimps, baboons, monkeys and pigs gave their kidneys to human recipients with varying degrees of success. Many patients with chimp kidneys rejected them promptly, but one man lived for nine months. "The striking thing is that in 1964 we didn't have anti-lymphocyte serum to help fight rejection," Dr. Keith Reemtsma of the University of Utah observes.

Today, virtually all of the heart and kidney transplanters rely on ALS and other immunosuppressive drugs to alter the immune system and prevent it from attacking and overwhelming the foreign organ.

Experience from the 1963-1964 kidney heterografts, Dr. Reemtsma suggests, supports but does not prove the idea that best chances of success rest with closely related species. Best results were with chimp-to-man grafts. Baboon kidneys survived up to two months; monkey kidneys no more than 10 days. With pig kidneys the record is 375 minutes. The history of animal heterografts lends further support. Sheep with

goat's hearts are alive after a year and a half.

In human transplants, too, surgeons strive for as much genetic similarity between donor and recipient as possible. Blood groups must be compatible; tissue types should match closely to thwart long-term rejection.

But the art of tissue typing is less than four years old. Twelve groups of tissue antigens are known. There are probably more, and until all are identified, tissue matching tests will be somewhat inaccurate.

Assuming the value of genetic similarity, chimps and baboons stand as the most likely candidates for human use. Chimps have the lead in that they come in A and O blood groups. Baboons have A, B and AB blood types but there are no type O baboons; O's are universal donors.

But baboons are available and chimps are not. "At this point, chimps should not be used for transplants," Dr. Reemtsma warns. "They should be saved for breeding. They could be selected for blood type O and raised as universal donors."

Whenever there is talk of choosing animals for heterografts, pigs inevitably get prominent mention. "Why, I don't know," Dr. Reemtsma remarks. "I've seen no biological data showing their closeness to humans, although the size of a pig's heart approaches a man's. Perhaps it comes from Orwell's 'Animal Farm'."

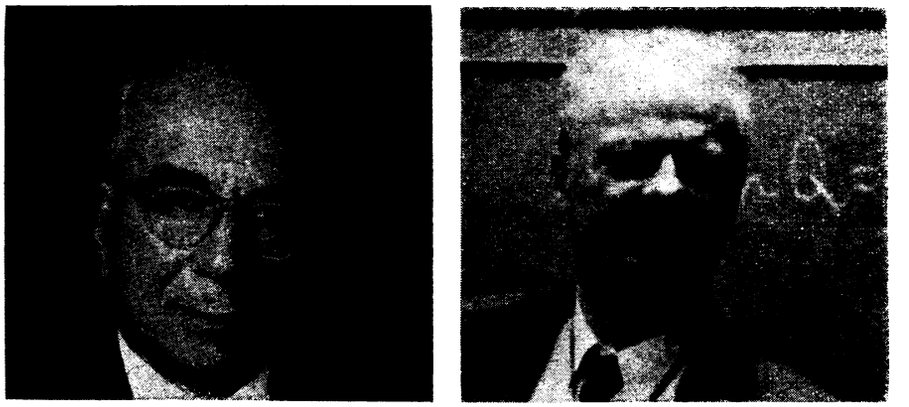
In addition to breaking the supply and demand barrier, animals offer transplanters a way out of the immunological labyrinth. Because a man's donor animal could be selected well in advance, there would be time to alter incompatible tissues. Whether it would be better to prime the animal by injecting it with the potential recipient's tissue or to do it the other way around remains unknown. Either way, it creates a possibility of tampering with the immune system that would be unethical with human donors.

In the heart arena, surgeons split on predictions of whether animal hearts or artificial hearts will dominate the future. They agree that human hearts will not and that perhaps animal hearts will always be best for children because they can grow. Dr. Barnard last week posed another imponderable. If an animal's heart is transplanted to a human, will it adopt a human's life span or will it die its natural death in a few years?

Whatever happens in heart surgery, animal organs clearly hold the key to the future of other organ transplants. The heart is essentially plumbing, a pump. But other organs produce and metabolize chemicals. No one presently envisions a man-made organ which can do that.

POLITICS

Posting the lineups



Cornell University

Strauss vs. Bethe: old tunes.

It is a lineup reminiscent of the political divisions among scientists and engineers 10 years ago and 20 years ago.

On one side are Dr. Jerome B. Wiesner, provost of the Massachusetts Institute of Technology, and Dr. Hans Bethe, Nobelist and Cornell University physicist. Wiesner helped write the nuclear test ban treaty and Bethe helped negotiate it.

On the other side are Adm. Lewis L. Strauss, who headed the Atomic Energy Commission a decade ago, in the critical years of the nuclear arms race, and Dr. Edward Teller, builder of the thermonuclear bomb.

Teller and Strauss, and "eminent academicians, distinguished engineers and non-professional administrators who have been closely associated with the relationship between science, engineering, private enterprise and the Government" announced their support of the Presidential candidacy of Richard M. Nixon several weeks ago.

Last week, as the scientific community finished choosing up sides, Bethe, Wiesner and "a founding group of 141 of the nation's most distinguished leaders in the fields of science and engineering" announced their support of Vice President Hubert H. Humphrey.

Nixon has already made an issue of the recent cutbacks in Federal support of science and technology, linking it, in a speech in Bethpage, N.Y., last week, to "the opening of a research gap" with the Soviet Union, and "the Administration's belief that a static balance of power can be maintained, based on a common 'plateau' of technological achievement. . . ."

Nixon is promising "reasonable and responsible increases in subsidies for basic research . . ." and a policy structure that would replace Washington's influence, except in defense and space, with substantial reliance on increased initiative from private enterprise.

His principal emphasis, however, is on maintaining and increasing the United States' strategic lead over the Soviet Union.

Critical of the cutback in Defense and space agency support of university research, he would put science and technology in full array against the Soviet "panoply of offensive and defensive strategic weapons, including an orbital nuclear delivery capability, ever-improving tactical military equipment, communications facilities, surface naval and merchant vessels and a large number of nuclear powered swift and quiet submarines."

Humphrey will not hold for a reduction in the Federal involvement in support of research and development. But he sees a shift in directions.

Proposing "a high priority and a strong commitment of support from the Federal Government . . . cutting back research is false economy," Humphrey, in a recent statement to the scientific community, maintained:

"Just as science has served our security and economic ends so well, it must now serve our nation's social objectives. We must expand our efforts to bring science and technology to bear on preventing and controlling crime, building new cities and making today's cities livable, improving education and health care for all Americans and managing our physical environment."

It is in terms of the research gap with the Soviet Union and the mobilization of science and technology in the service of a continued arms spiral that the hard lines are being drawn.

Harking back to ancient wars and using words like "the troglodyte or dinosaur wing of the scientific community," Wiesner declares: "Any man who would turn to Lewis Strauss for scientific guidance I don't think is the