

life to many patients." But Dr. Hardy was beset by the problems of timing the recipient's crisis with death of a suitable donor, and he was tortured by ethical questions raised by keeping a doomed donor alive mechanically.

Time and fate cooperated a bit in Cape Town. Grocer Washkansky lay a month in Groote Schuur Hospital with no chance that his badly fibrosed heart would allow him to survive. His only hope was transplantation. Finally a young woman, Denise Darvall, was brought in mortally injured after being hit by a car. Tissue typing determined that she was a good match for Washkansky. When she died surgeons were ready for the transplant. Dr. Barnard left the back wall of the two atria of the patient's heart in place, to avoid having to connect the venae cavae and pulmonary veins. After the heart was in, it was electrically shocked into beating and began to provide good, steady circulation.

Immunosuppressive drugs and radiation therapy were used to ward off rejection. Despite Washkansky's diabetes, he seemed to progress well. But his undefended body acquired pneumonia in both lungs, and despite continuing good operation of his new heart, with no sign of rejection, he died. Barnard said afterward that the immunosuppressive therapy given may have been too strenuous.

Three days after Washkansky's operation Dr. Adrian Kantrowitz of Maimonides Hospital in Brooklyn transplanted the heart of a dead malformed infant into a two-and-a-half-week-old boy with malformation of the right ventricle. A shunting operation had been tried and had been unsuccessful in developing sufficient circulation in the boy's lungs to keep him alive for later open heart surgery (Dr. Lower believes the only effective operation for conditions like this boy's will be found to be transplant.) For several hours after the transplant the boy's breathing and blood pressure were normal. Then the new heart stopped, far too soon for there to have been rejection.

Dr. Kantrowitz termed the attempted transplant a "failure pure and simple." Colleagues at Maimonides said one of the difficulties in the case was the fact that a heart-lung machine could not be used on the baby. Instead hypothermia was used, the baby being immersed in ice water before surgery to slow down its bodily processes.

On Jan. 2 Dr. Barnard tried again. He gave retired dentist Philip Blaiberg, 58, the heart of Clive Haupt, 24, who died of a brain hemorrhage. Blaiberg had more luck. He does not suffer the disadvantage of diabetes.

Dr. Barnard, learning from his first experience, has been more sparing in

the use of immunosuppressive measures. However, last week Blaiberg was entering the time of maximum risk of rejection.

The next transplant was done at Stanford by Dr. Shumway. Mike Kasperak, 54, dying because of heart damage caused by a viral infection 10 years ago, received the heart of Mrs. Virginia White, who died of a massive cerebral hemorrhage Jan. 7. Kasperak last week was on the critical list due to failure of liver and kidney function. He was bleeding into the gastrointestinal tract. The liver and kidney troubles pre-date the transplant.

At midweek, however, peritoneal dialysis (flushing the abdominal cavity) and transfusions of fresh blood were meeting the crisis. Dr. Shumway said the complications were "severe but soluble" as long as heart function remains good. Cardiac output was fairly normal.

Kasperak, like Washkansky, presented the additional problem of having a heart cavity much larger than the organ it contains. This extra space filled with blood, confusing efforts to monitor the heart for rejection signs.

Dr. Kantrowitz performed his second transplant last Tuesday. Louis Block received the heart of Miss Helen Krouch in a nine-hour operation. The donated heart was too small to handle Block's circulation and Block died hours after surgery.

Despite the five operations in quick succession, and the anxiousness of Dr. Lower and others to perform cardiac transplants, there is still much hesitation and doubt on the part of many cardiac surgeons. They feel that the surgery is experimental (Dr. Shumway himself has termed it so.) and are reluctant to get into such a high-risk area. Some feel that experimentation should not be carried so far in the operating room. Others are not confident that results with animals are easily extended to apply to humans, that at some point experimental surgery must be tried.

Most agree, however, that cardiac transplant will remain an unusual, high-risk operation for last-ditch application. Part of the risk is that while kidney transplants can be done over if there is rejection, heart transplants are one-shot efforts. If there is rejection the patient dies.

Better tissue typing would help, Dr. Lower says. He terms this technique still in its infancy. There is no real evidence, he believes, that tissue typing, as done today, contributes significantly.

He says it has been found in kidney transplants that sometimes a bad match will take while a good match will be rejected. He suggests that current typing methods miss important factors.

A much-needed breakthrough is in

immunosuppressive drugs. If drugs could be found that suppressed only the relevant part of the immune reaction, leaving the rest of the body's defenses intact, they could be used energetically with less fear of infections.

At present transplant recipients face extended immunosuppressive therapy, possibly lifetime therapy.

Studies are in progress to learn the mechanism of adaptation, by which the body ceases to fight the transplant. It is possible, Dr. Lower thinks, that in some cases repair of the foreign organ is done by the body, using host cells rather than cells derived from the transplant. In such cases the organ eventually would be composed, at least in part, of tissue identical to that of the host. He stresses that this is simply a theory.

There is, apparently, a lot of theory, and as yet too little fact, surrounding the fundamental biological processes involved in transplant surgery.

THE PILL

No Moral Revolution Discovered, Yet

By the 1880's both men and women had mechanical devices that together would provide virtually 100 percent contraceptive safety. Thus for almost a century young people willing to experiment with sex have had a means of avoiding pregnancy.

Nevertheless, this fact seems to have been obscured in a floodtide of publicity over oral contraception and its moral impact. Suddenly, the late-arriving pill is supposedly forcing a change in sexual mores.

Authorities on sexual behavior, however, remain unimpressed with the power of the pill. Not only has contraception long been available, they point out, but young people don't generally base their decisions about sexual behavior on contraception.

The pill isn't a major force affecting social mores, says Dr. Ira Reiss, University of Iowa sociologist and author of the recent work, "The Social Context of Premarital Sexual Permissiveness."

Perhaps one or two percent of premarital sex incidents are due to the pill, he says. The other 98 percent would stem from basic values, emotional involvement and the courtship system that has evolved in the United States since the last century—a system that leaves the marriage choice up to young people.

Dr. Ernst Prelinger, clinical psychologist at Yale University, agrees. "Women

make decisions about the way they want to behave and then fit the pill in or not," he says. Those who use the pill seem to be people who would have thought of other ways.

If the pill is relatively unimportant as a moral force, earlier contraceptives may have been crucial. One of the first things made with vulcanized rubber in the 1840's was a condom, and women had the diaphragm 40 years later. Nineteenth century developments in contraception probably were important factors encouraging the upper classes to get involved in sexuality, Dr. Reiss observes.

Even then, the impact was not immediately apparent. A breakthrough in premarital practice came in the 1920s—40 years after invention of the diaphragm. Contraception may have been only one factor, says Dr. Reiss, but for the upper classes, freedom from the stigma of illegitimacy must have been important.

Unmarried coeds today list fear of pregnancy behind other considerations in relation to sexual behavior, says Dr. Reiss. "The thing that seems to stop young females from taking pills is an inability to see themselves as always sexually ready," he declares. Once out of college and past the age of 22, of course, the woman changes and then the pill might have greater impact on sexual practice, but, says Dr. Reiss, some 60 percent of women today get out of college as virgins, a ratio that has not changed much since the pill.

For many young people, explains Dr. Prelinger, use of the pill seems "too brazenly open" to be acceptable. "They feel it impairs the poetry of the experience."

This may explain why, despite diaphragms, foams and pills, high school and college girls still manage to get pregnant. The Group for the Advancement of Psychiatry two years ago noted this paradox in its report, "Sex and the

College Student," for which Dr. Prelinger acted as consultant.

"One arresting paradox," says the GAP report, "is the number of unintended pregnancies that occur despite the availability of contraceptives."

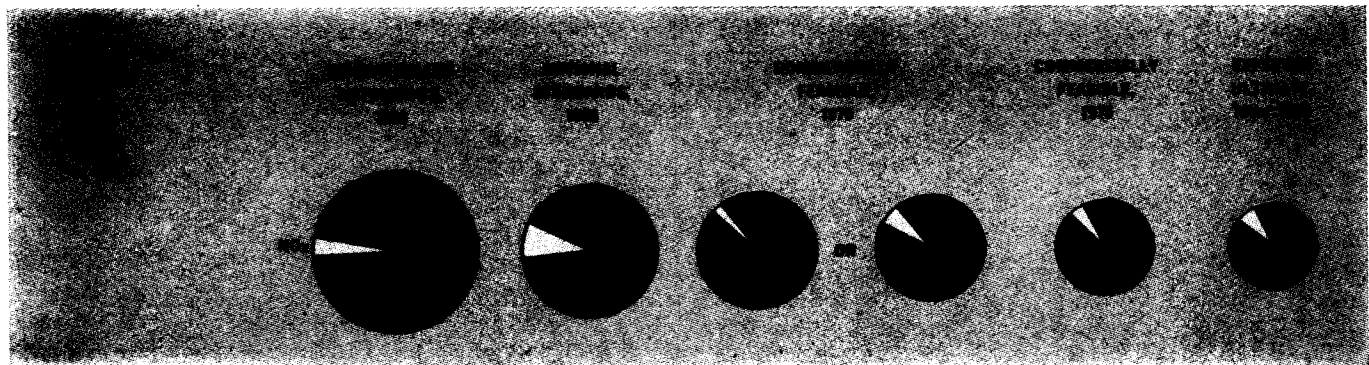
Sometimes, it's ignorance; other times it's a youthful need to deny sexual interest. "Use of contraceptives does, in fact, require conscious recognition of the intention to engage in sexual intercourse. Experimenting adolescents frequently seek to avoid this full awareness. A girl may feel that the planning involved in the use of a diaphragm or pills implies a stronger commitment to frequent sexual intercourse or to a particular relationship than she is prepared to undertake."

All this, however, could change.

"The impact of the pill might well be more powerful in the next generation," says Dr. Reiss. It took almost exactly a generation for the diaphragm to exert its influence. ◇

AUTO POLLUTION

Standards at the Edge of the Art



	TYPICAL EMISSION LEVELS	ESTIMATED POLLUTION PER CAR/YEAR		CURRENT STANDARDS		PROPOSED HEW STANDARDS		RECOMMENDED STANDARDS		HEALTHY AIR		
EXHAUST												
HYDROCARBONS	900ppm	300 lbs.	275ppm	90 lbs.	275ppm	90 lbs.	180ppm	60 lbs.	50ppm	20 lbs.	25ppm	10 lbs.
CARBON MONOXIDE	3.5%	1700 lbs.	1.5%	750 lbs.	1.5%	750 lbs.	1.0%	500 lbs.	.5%	250 lbs.	.25%	120 lbs.
NITROGEN OXIDES	1500ppm	90 lbs.	1500ppm	90 lbs.	350ppm	20 lbs.	600-800 ppm	40 lbs.	250ppm	15 lbs.	100ppm	10 lbs.
CRANKCASE BLOWBY (hydrocarbons)		130 lbs.		none		none		none		none		none
EVAPORATION (hydrocarbons)		90 lbs.		90 lbs.		none		none		none		none
TOTAL		2310 lbs.		1020 lbs.		860 lbs.		600 lbs.		285 lbs.		140 lbs.

Dept. of Commerce

Commerce report sets future goals for pollution standards. Proposed HEW limits approach these recommendations.

New look-ahead pollution standards, proposed by the Department of Health, Education and Welfare the first week of January, represent the limit of emission controls that can be achieved by present techniques. They are still, however, far from making the gasoline auto compatible with clean air.

Among the changes that would go into effect in 1970 is a shift from measuring pollutants as a percentage of the total exhaust, which favors large cars,

to limitations on the amount of pollutant emitted per mile travelled. Another would set limits for the first time on evaporation of gasoline from the fuel tank and the carburetor, sources of an estimated 20 percent of the hydrocarbon pollution put out by uncontrolled autos. Still another would limit smoke emission from diesels.

The major changes have been anticipated by industry, which has until early February to comment on the new stan-

dards before they are made final. Evaporation controls have been in the wings for several years in California, and the bias in favor of large cars has been a focal point for criticism of the 1968 standards.

The standards currently in force have been met by finer engine tuning and injecting air into the exhaust to complete burning of the fuel. These methods reduce the amount of unburned hydrocarbons and carbon monoxide, main com-