says the study has established that the human capacity for personal attachments is not a product of oral, anal, genital development, but of these simple species-directed behaviors. A severe disruption in species behavior—such as long-term neglect—can lead to personality damage.

But the child possesses a good deal of resistance to psychic damage, says Dr. Freedman. "Babies are not so sensitive as we have been led to believe," he says. "All a viable flower needs is sun and water—with a fairly adequate mama, a baby does fairly well."

But while the one-year-old child's smiling and crying may be instruments for personality development, each child does them somewhat differently—at different times and in different patterns—according to its own genetic inheritance. "Early attachments don't cause personality . . . they are personality," says Dr. Freedman.

"We are persons, or personalities, from the very start. While it is true that one is always becoming, one is also being" and the style in which these early interactions occur is itself personality. "Each infant negotiates them in a unique way. "

Dr. Freedman also attacks another pillar of personality development—the Oedipus complex—with the weapon of evolution.

In psychoanalytic theory, a child enters the oedipal pitfall at about the age of four or five when he begins to desire the parent of the opposite sex and enter into competition with his same-sexed parent.

But, says Dr. Freedman, the upsurge of feelings of rivalry at that age can be related to the animal drive for dominance, rather than sexual feelings. If male competition among animals is founded on dominance struggles, as it seems to be, it could be that the oedipal conflict is in fact simply this same need to win and be top dog.

"When we find little boys less passive, more negativistic, more aggressive, more rivalrous or more investigative than little girls, we probably have our mammalian primate ancestry to thank and not some proposed libidinal stage or social force," says Dr. Freedman.

At the moment, evolutionary theory offers a fresh view of man but few pragmatic suggestions. Dr. Freedman, who has also done psychotherapeutic work, admits the new ideas haven't helped his work with patients at all.

They have, however, helped direct research into new areas. Dr. Freedman's students, for example, are doing different kinds of studies now. One is working on the cry of a battered child—the infant consistently beaten by its parents—to see whether there might be some abnormal quality in the cry that affects parental attitudes—which also have their evolutionary component—abnormally.

Equally important, the ethologist sees normal behavior differently. "We see war and conflict as characteristics of man," not as psychological abberations, he says.

Eventually, the study of human evolution should give clues to man's social behavior, which is unique among mammals in its strength. Something happens, for example, in group therapy that does not happen in a one-to-one patient-doctor relationship. There is no theory to account for this group phenomenon, says Dr. Freedman, but somewhere it should bear the mark of the species. ◇

TRANSPLANTATION I

Balancing the Drug Dosage

The death of Louis Washkansky 18 days after he had received a heart transplant Dec. 3 focused attention on the need to balance drug dosages and radiation treatment given to suppress rejection of foreign tissue against the need to maintain antibodies to fight infection. Washkansky died of pneumonia.

Dr. Christiaan Barnard, the Capetown, South Africa, surgeon who performed the first human heart transplant, told a United States television audience (Columbia Broadcasting System) on Christmas Eve that he would rely less on immunosuppressive drugs in his next attempt.

The transplant itself was a success and the heart was not rejected, but Dr. Barnard believes germs inside his patient got a foothold and killed him because his reaction to the drugs was too vigorous.

Until the last five minutes of Washkansky's life, the young heart of Denise Darval, replacing his own, continued to beat strongly. His improved circulation had improved other body functions and lessened the swelling in his legs and liver, which had resulted from the poor pumping of his own failing heart.

Dr. Barnard had been afraid to use smaller doses of drugs and radiation because it was the first time a human heart had been transplanted and because he saw some evidence that the patient was starting to reject the organ.

Heart specialists including Drs. Michael E. DeBakey of Baylor University College of Medicine, Houston, Texas, and Adrian Kantrowitz of Maimonides Hospital, Brooklyn, hailed the surgery itself as a success and a great step forward. Nevertheless, the delicate and critical balance between immunosuppressive therapy and the threats of graft rejection and the danger of exposure to infectious diseases remains the major unknown on which future successful transplants may well depend.

The consistency of the body, in preserving what Nobelist Sir Macfarlane Burnet of Australia calls integrity, explains the tendency of transplanted patients to die of infection if they do not reject their grafts.

When surgeons trick the body into accepting a transplant through radiation and drugs such as Imuran and prednisone designed to suppress protective immune reactions, they lay it open to defeat by infections it ordinarily would throw off.

The lung is particularly vulnerable to infection since it is exposed to bacteria from the air. This is why Washkansky died of double pneumonia, despite apparent success in defending the heart transplant.

Dr. R. E. Billingham, chairman of the department of medical genetics at the University of Pennsylvania Medical School, Philadelphia, says that immunosuppressive drugs can keep in abeyance a host's resistance to a graft for months or even years. But success depends upon the ability to find a drug dosage that will prevent rejection of the transplant while not impairing the patient's immunological defense machinery too much.

The danger, of course, lies in rendering him incapable of coping with common microorganisms; infections the patient normally could survive without difficulty can easily become lethal, while high dosages of the drugs can harm normal body cells as well.

Most authorities believe that what causes death or rejection of a transplant from another person (except for identical twins) are the mononuclear lymphocyte cells. These make up about a fourth of all the white corpuscles with which the body normally fights infection. The mononuclear cells leave the blood vessels and infiltrate the graft tissue in formidable numbers.

Although more research needs to be done to identify the mechanisms, lymphoid cells, into which lymphocytes are packed, are believed to destroy target cells such as those of a graft.

"We can confidently anticipate," says Dr. Billingham, "that within a few years individuals will be typed with respect to their transplantation antigens, as they presently can be typed with respect to their blood groups. As this work progresses we shall see the development of the genetics of tissue compatibility in man, concerning which we know prac-

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tically nothing at the present time."

Sir Macfarlane Burnet writes in "The Integrity of the Body" that it is one of the "concise statements of modern immunology that the body will accept as itself only what is genetically indistinguishable from the part replaced." He says it is as if "the body can recognize its own individuality and will accept nothing that is inconsistent with that individuality."

Sir Macfarlane says most workers in immunology believe that the small lymphocyte must play a major part in immune processes. He takes the viewpoint that the lymphocyte is probably a carrier of genetic information; also that "any form of stress or, what perhaps amounts to the same thing, administration of large doses of cortisone and similar corticosteroid hormones, will sharply reduce the number of lymphocytes in blood and in the lymphoid tissues."

He points out that even the "most optimistic and courageously experimental of surgeons will find that nature fiercely defends the integrity of the body."

And, as Dr. Barnard knows, any attack on that integrity, in defense of a transplant, is an attack on the body's ability to survive totally unrelated infections.

Dr. Barnard and other heart surgeons expect to continue their efforts, while hopeful patients wait in line.

TRANSPLANTATION II

Ethical Problems Reverberate

While Louis Washkansky fought his losing battle against death in a South African hospital, an international panel of heart surgeons, meeting in New York, thrashed out the ethical implications of his heart transplant.

The American heart surgeon, Dr. Jacob Zimmerman of St. Barnabas Hospital, New York, told his colleagues from Switzerland and Great Britain, "I will never participate in such surgery." To which Dr. Donald Ross of The National Heart Hospital, London, a pioneer in transplantation of heart valves from the dead to the living, rejoined, "But you will, we all will."

Asked if a heart transplantation were imminent in Zurich, Swedish-born surgeon, Dr. Ake Senning replied with a reluctant yes. Dr. Senning, who has repaired defective valves joining the heart's left ventricle with the major body artery, the aorta, using connective tissue from the patient's hip, said he was most concerned about the physician's judgment as to when a patient's heart is fatally damaged or defective.

Neither he nor Dr. Ross felt that heart transplants posed a greater hazard of rejection by body defenses than do today's fairly common kidney transplants. In fact, they suggested that the heart is probably better able to withstand the attack of white blood cells and antibodies than either the kidneys or the liver.

But Dr. Zimmerman was more concerned with the donors. "It is medically and morally wrong," he said, "for us as doctors to stand by a dying patient's bedside hoping he'll get it over with quickly so we can grab his heart." The heart surgeon even envisioned a despotic ruler doomed by a diseased heart, ordering the execution of a political enemy to obtain the organ for transplant. "A million dollars," he continued, "could buy a patient almost anything—including a new heart."

Dr. Senning said that though there are many problems in obtaining donor hearts quickly, and even more problems in choosing among the many applicants for heart replacement, techniques already developed in Europe and the U.S. should give surgeons at least an hour between death of the donor and removal of the heart. (In the late 19th century, French surgeons removed the heart of a guillotined criminal, iced it, and then made it resume beating many hours after the execution, Dr. Ross recalled.)

Both Dr. Ross and Dr. Senning were optimistic that heart banks could be established by chilling and storing the organs from dead persons just as corneas, kidneys, skin and bones are stored today.

EARTH SCIENCE

Creation of an Island

A new island was created last month in an eruption of lava, smoke and steam spewing 4,000 feet high from the surface of the ocean. The outbreak of the restless earth was sighted east of Fiji Island in the southwest Pacific by the New Zealand freighter Tofua.

The new island is No. 7 Metis Shoal of the Tonga Islands, a volcano that rises some 3,300 feet from the floor of the sea. Until last week it had been submerged 10 feet below the surface of the water. Capt. Peter Bennett of the Tofua estimates the new island to have been half a mile long and 150 feet high when he sighted it building up from the sea. Further eruptions and the erosion waves and wind may change its dimensions.

Many sea islands are created, then washed away by further volcanic activity, waves and wind. This activity is constantly going on, but is seldom reported because it often takes place in remote ocean regions. Two weeks ago the ring-shaped volcanic island, Detection, erupted in the Antarctic Peninsula in the South Shetland Islands. The much observed new island Surtsey was created a few miles southwest of Iceland. It rose from the sea Nov. 14, 1963, and is now a substantial two-square mile island on which small plants are taking root. The world's most massive sea volcano is Hawaii, rising some 29,000 feet from the bottom of the ocean, perhaps the largest volcano of the world.

FROM BRUSSELS

Euratom Drops Out

On January 1, Euratom quit the fields of fast breeder reactor research and studies of fusion power, thanks to an intransigent France.

Euratom's budget for 1968 is a meager $40.6 million, less than half of last year's. This budget will cover Euratom's activities in the four Joint Nuclear Research Centers at Ispra (Italy), Mol (Belgium), Petten (Holland), and Karlsruhe (Germany).

Research into the second generation of proven water and gas-cooled reactors, treatment of irradiated fuel and radioactive waste, which were the main fields of activity in the just-ended Second Five-Year Program, will continue.

The budget for 1968 has now been accepted as provisional and a group of experts is being asked by the ministers responsible for science and technological research in the six member countries to study plans for a third quinquennial program. But it does not look as though any long-term program will cover anything like the range of activities formerly carried out by Euratom scientists.

All Euratom's association agreements (with individual member governments) and contracts (with national institutes and companies) were suspended at the New Year. Association contracts covered all the most advanced fields of research including fast reactors and the construction of prototypes. This research will now be continued by the national governments on their own or through a series of multilateral agreements, without Euratom's coordination and with no Community budget.

The root of Euratom's troubles was French determination to keep key areas of research to herself. The French were firmly supported by the Italians, who claim that their industry does not obtain sufficient contracts in view of their 23 percent share in the Euratom budget.

The French will doubtless be glad to say good-bye to Euratom's participation in the construction and operation of a sodium-cooled fast reactor at Cadarache in the South of France; France was, in any case, planning to go ahead on its own with a similar reactor. This reactor,