



Avco-Everett.

Years of work have still led to no U.S. decision on MHD; a 1961 experiment.

been developed by engineers by Avco Corp., Everett, Mass., a leader in MHD experimentation.

Another technique, developed by scientists at Westinghouse Electric, involves injecting the burning gases at various points along the length of the MHD duct, which prevents them from cooling off as they reach the end. By this means, the input temperature necessary to produce electricity can be some 300 degrees F. lower.

A nuclear-powered MHD system could run at a lower temperature, because the gas, instead of being a burned hydrocarbon, could be helium, which can become a conductor at about 3,100 degrees F. In a nuclear system, the helium would take heat directly from the reactor core, then pass through the

MHD generator to produce electricity.

Even that lower temperature is out of the ball park today, however. The maximum temperature produced from Britain's gas-cooled Dragon reactor is about 2,300 degrees F. And the U.S. is pushing liquid sodium cooled—rather than gas cooled—reactors as its next generation of nuclear power generators.

So the immediate future of MHD, if it exists, lies in fossil-fueled generators, in competition with conventional nuclear plants. The Russian project will use natural gas, and is largely aimed at providing feasibility rather than high efficiency. A superior fuel would be char, a by-product of converting coal into gaseous or liquid fuel. Coal conversion is a developing technology in its own right. ◇

PERSONALITY

The Evolutionary View Emerges

Theories of human personality, long dominated by an almost exclusive emphasis on early childhood, parent care and cultural influences, are now showing the marks of a revived interest in biology.

The new biology is not that of an old style hereditary determinism, but a new willingness to see man as a species—as an animal that evolved over the millennia carrying along many kinds of behaviors and developmental processes from his ancestors.

Though still in infancy, the evolutionary viewpoint is already showing muscle by offering alternatives to such well-rooted theories as the Oedipus complex and the primacy of early childhood.

In an upcoming book, "Perspectives in Human Evolution," edited by S. L. Washburn and scheduled for publication in March (Holt, Rinehart & Winston, N.Y.), Dr. Daniel G. Freedman of the University of Chicago spells out this evolutionary view in his chapter, "Personality Development in Infancy; a Biological Approach."

Until now, says Dr. Freedman, infancy has been a convenient dumping ground for personality theory. Supposedly, early experiences cause the personality to develop in certain ways and all later life is an effect of them.

According to Freud, for example, babies go through three stages—the oral, anal and genital—and depending upon the stage of fixation, human personality is cast into particular character types.

Psychoanalytic theory is the only systematic treatment of how relationships develop between humans, says Dr. Freedman, yet close study of children has revealed that they simply do not learn to relate—as Freud thought they did—via the erotic zones.

"Psychoanalysis is clearly in flux and, as a matter of fact, needs help to direct it into more viable ways," Dr. Freedman comments. An evolutionary viewpoint, he believes, can offer that help.

"An evolutionary psychologist or ethologist doesn't think strictly in terms of early life being a cause and later life an effect," explains Dr. Freedman. Early experiences cannot be the sole foundations of personality, since the child is born with personality already in existence, he says.

The child comes with the tendency of the human species to form close personal attachments in certain ways—via crying, cooing, smiling, following and seeking out the human face.

Dr. Freedman, who has spent eight years in close observation of children,

AAAS

The Meeting Opens in New York

The American Association for the Advancement of Science has some 110,000 members. Between Christmas and New Year's Day each year some 10 percent of them converge on some American city for an annual meeting. This winter's meeting, the 134th, was held in New York City last week, when for five days more than 10,000 scientists representing more than two dozen disciplines jammed a couple of West Side hotels to hear 85 symposia and 1,200 invited speakers on research in areas ranging from man and transportation to the hazards of fallout in Utah, from exobiology to plasma astrophysics and from the impact of ballistic missile defenses to web-building spiders.

The meeting concluded with what was billed as an informal discussion on the question, "Do life processes transcend physics and chemistry?"

The annual Christmas gathering of the AAAS is probably the largest and most diversified scientific meeting held.

Next week a Science News team will report the most significant aspects of the meeting.

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 aberrations, 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. ◇

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-

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 Cape-town, 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 pa-

tient 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,