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Scientists Advocate Policy: In Vitro Fertilization in Australia

By
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Introduction

In its capacity as the legal arm of the pro-life movement in the United States, Americans United for Life has also served as a resource for scholars and advocates working to impact public policy in foreign countries. Likewise, AUL has been watchful of trends in areas other than abortion and euthanasia that could effect developments in these, its two areas of central concern.

One such related area is broadly referred to as "new birth technologies." The ability to "create" life in the laboratory would seem to conclude the debate over when the life of an individual human organism begins. Yet, this has not been the effect. Instead, we see the growing temptation to experiment upon human embryos, not for the benefit of these individual lives, but for the advancement and perfection of the emerging conception and birth technologies. Widespread acceptance of such non-therapeutic research will further solidify a cultural and political attitude that human life before birth posesses not intrinsic value, but a value that is contingent upon the desires of others with power over that life.

Public policy debate over birth technologies remained relatively dormant in the United States until quite recently. However, surrogate motherhood, fetal tissue transplants, and a "new look" at embryo experimentation have created a flurry of media coverage, legal commentary, and legislative initiatives. A new Congressional commission on bioethics, while inactive at this writing, has been charged to issue its first study on the question of experimentation upon the human embryo. In addition, a variety of public and private institutions will undoubtedly take up the question in coming years.

As this process unfolds, so will a new debate over the value of nascent human life. Among the leading advocates will be physicians and other scientists beckoning us not to fetter their efforts to remove barriers to fertility by "arbitrary" appeals to the intrinsic value of embryonic life. We will also hear constitutional arguments, such as those presented in the Baby "M" case, that the constitutional right to

procreate (premised, ironically, on *Roe v. Wade*) must outweigh state interests in regulating non-therapeutic embryo research that is necessary to effectuate that right.

As this monograph documents, the United States has not and will not be alone in addressing these issues. In fact, matters have progressed further in Great Britain and Australia, with the issuance of the Warnock Report (1984) and the Australian Senate Select Committee Report on Human Embryo Experimentation (1986). Both of these documents recommend strict regulation of embryo and fetal research, and the Australian report takes the remarkable step in recommending total prohibition of non-therapeutic embryo research. (The Warnock Report recommends permitting such research until 14 days after fertilization). In a real sense, therefore, the emerging study and debate upon embryo experimentation in the United States will be part of an ongoing international debate. As Dr. Caton demonstrates, we have a great deal to learn from the experience of Australia and Great Britain, in particular, the appropriate means of responding to scientific advocacy of policies which would permit radical manipulation of the human person, the family, and ultimately, the entire community.

Hiram Caton is uniquely qualified, in a biographical as well as a professional sense, to contribute to this international discussion. He received his academic training in his native United States at the Universtiy of Chicago and Yale, and taught at Pennsylvania State University, among other institutions. Since 1976, he as enjoyed a distinguished career as professor in the School of Humanities at Griffith University in Brisbane. He has published in many disciplines, including philosophy, biosocial science, and behavioral biology. He has lectured widely in the United States and Europe.

This monograph, along wth his many other writings on bioethics, establish his ability to analyze the myriad of political, ethical, and scientific components of issues such as in vitro fertilization and embryo experimentation. We offer this latest AUL Study in the hope that it will contribute to greater understanding of these issues not only in the United States, but wherever such understanding is needed.

Edward R. Grant
President
Americans United for Life

The Ambience of the Senate Select Committee

In October 1986, the Australian Senate Select Committee on Human Embryo Experimentation tabled its Report. The principal finding was that "the embryo may be properly described as genetically new human life organized as a distinct entity oriented towards further development," so that "the respect due to the embryo from the process of fertilization onwards requires its protection from destructive non-therapeutic experimentation . . ." (Senate Select Committee 1985, xiv).

In reaching this conclusion, the Committee rejected the advice of the Australian Academy of Science and of the National Health and Medical Research Council (NH&MRC) concerning the nature of embryos. It rejected as well the ethical corollaries of their advice, that experimentation should be permitted until the fourteenth day and that the use of embryos as research material is warranted. The Committee also rejected the NH&MRC's recommendation that norms should be administered by an advisory accrediting, licensing and surveillance body consisting largely of medical and scientific experts. Instead the Committee recommended a statutory regulative body armed with criminal sanctions. The regulative body is itself to be subject to injunction to ensure that it remains within its powers (Senate Select Committee 1985, 51-53).

These recommendations are largely concordant with Senator Brian Harradine's private member's bill on embryo experimentation, whose introduction occasioned the Select Committee's establishment. The Harradine bill was stoutly opposed by IVF scientists from the outset. The Committee's recommendations have since been sharply criticized by medical scientists and by NH&MRC spokesmen.

This observation suggests that, in compiling their submissions, the *in vitro* fertilization lobby (if I may so call it) recognized that they must endeavor to repair a presumption against the innocence of IVF that the establishment of a Select Committee on the Harradine bill implied.

•Senator Harradine's bill was supported by a petition bearing 132,000 signatures.

•Church leaders usually associated with liberal opinion had for some time expressed reservations about various aspects of IVF practice. The submissions of churches to the Select Committee revealed that their reservations were based upon informed and searching examination of biomedicine.

•Despite extensive favorable press coverage of IVF, the public remained uneasy. Five states established committees of enquiry on IVF and artificial insemination, most of which had reported by the time the Select Committee was formed. These enquiries called for limitations on research and closer surveillance of research and clinical practice, including artificial insemination. The state of Victoria, where most IVF work was carried out, enacted the Infertility Act (1984), which placed tight restrictions on IVF, particularly in regard to embryo experimentation.

•At the federal level, the Family Law Council established the Asche Committee, whose Interim Report, published shortly after the second reading of the Harradine bill (July 1984), expressed serious reservations about birth technologies and about the self-regulation model of ethical surveillance favored by the NH&MRC. Its final report, *Creating Children*, which appeared in July 1985, called for a broadly-based national statutory authority to regulate reproductive technology.

•The Asche Committee findings were substantially influenced by representatives of the Feminist International Network on New Reproductive Technologies (FINNRET). The formation of this group represents an abrupt about-turn from feminist support for reproductive innovations. FINNRET claims that reproductive technology brutalizes the birthing experience by turning women into "mother machines" who will soon be obsolete; and that biomedicine is the "Manhattan project" about to unleash the bomb of genetic engineering

(*Liberation and Loss,* 1986). The feminist defection was a major ideological loss for the cause of biomedicine.

Despite opinion polls showing public support for IVF service, the 270 submissions received by the Select Committee confirmed the abundant indications of widespread community apprehension about the social and psychological effects of reproductive technologies. The Committee's Hansard documentation runs to 2,200 pages, much of it the record of testimony before the Committee. The submissions are well-informed about clinical practice, reproductive biology, and developing norms in the area of reproduction and biotechnology generally. The Committee members, for their part, proved to be astute examiners of expert witnesses.

For these reasons, the Select Committee ambience, and the Hansard testimony, are outstanding sources for examining the advocacy of scientists in a policy-making process meant to set norms in an exceptionally contentious field. Since Australian scientists are leaders in IVF, and in addition are supported by ethical philosophers of international standing, it is likely that their testimony approaches an optimal defence of science subjected to ethical scrutiny.

Ethics: A Specialist Subject

On examining the justification of embryo experimentation by scientists, one notices the repeated disclaimer that they are not ethicists (89, 99, 120, 316, 373, 384f, 390, 682, 707, 759, 804f, 816, 864f).[1] The disclaimer is neither a gesture of modesty nor an expression of irony. It is basic to these scientists' self-perception in relation to a regulative environment, and we must strive to understand the disclaimer's exact sense. It does not signal indifference to ethical questions or indifference to norm-setting processes. On the contrary,

[1] Page references in parenthesis are to the Official Hansard Report of the Senate Select Committee on the Harradine Bill.

their submissions and testimony indicate that medical scientists are at pains to comprehend the ethical dimension of their work. Indeed their sense that they are not ethicists stems partly from their studied view of what ethics is. Let us consider particulars.

•Ethics is recognized as a specialist field cultivated by persons with training in philosophy, theology, law, and related subjects (120, 373, 682, 707, 757). Ethicists are concerned to produce comprehensive systems or philosophies in which the ethics of embryo experimentation is only a part. IVF scientists perceive their involvement in ethical justification as an unavoidable circumstance

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of their specialization, which draws them into extensive discussions meant to help identify and fix the norms under which they operate. In the course of this activity, they make many statements of an ethical character--including statements about the nature of ethics--but they do not, in their professional capacity, undertake a systematic defense of them, as ethicists do. The ethics disclaimer, then, puts on notice that the ethical opinions expressed by medical scientists are fragmentary, undoctrinal, and perhaps situation-dependent.

•The absence of doctrine places scientists in a posture of relative deference to those who do have (or think they have) a comprehensive ethical view. The operative deference in this case is exercised toward norm-setting and enforcement bodies and the public opinion that they are presumed to represent (113, 116, 120, 333, 384f, 761). Scientists seek to influence such bodies to adopt norms that permit what they perceive to be essential research and clinical practice, but they accept that ethical constraints may encumber research and clinical practice.

IVF scientists also defer to the wishes of their clients whenever IVF procedures involve choice. The assignment of a range of choices to clients, on the ground that they are the only ones ethically competent to make them, strongly signifies these scientists' perception of what ethics is.

•The self-presentation as a scientist obliged by circumstances to engage in ethical discussion conjures a certain image which usually lingers as an unexpressed sub-text of their explicit statements. It is the image of medical scientists as persons whose dedication to humanitarian service is harassed by busybodies, usually ignorant, with axes to grind. The sub-text may be detected in the tone of irritation that sometimes sounds in their express statements. But we need not rely entirely upon our sense of nuance, since the sub-text occasionally emerged to become an explicit reproach (392ff., 741f., 2004f.). Complementary to this self-image is the image of the IVF scientist stymied by the indecision of ethics committees or legislation. Here the scientist, who has fully resolved the ethical question to his own satisfaction, sees fundamental research placed in abeyance until numerous cumbersome committees reach a decision (114, 116, 320, 2002ff., Trounson 1987).

This characterization suggests that the expressed ethical views of IVF scientists comprise but a single dimension of information; and when the normative formulae expressed in that dimension are examined, it is apparent that indeed they do not constitute an ethics.

Of course scientists need not be ethicists in order to have an ethics, since they might embrace an appropriate system. Bioethics has been a going concern for several decades; the Centre for Human Bioethics, at Monash University in Melbourne, has in particular published extensively on reproductive medicine. Indeed the Centre's Director, Professor Peter Singer, has collaborated with IVF scientists in preparing bioethical tracts pertaining to IVF, and the Centre has received NH&MRC grants for studies of bioethics. Singer thus appears to enjoy the esteem and confidence of the biomedical establishment. Nevertheless, he appeared before the Select Committee only in his private capacity, and no scientist testifying to the Committee invoked his system. This striking dissociation is further evidence that medical scientists should be taken at their word when they disavow being ethicists.

I suggest accordingly that the norms and ethical rules that scientists from time to time enunciated are best evaluated as components of a second dimension which I identify as the "operative ethics" of IVF scientists, namely, their professional personalities. Here we find what are for them effective values. "Values" substitute for ethics to mark the afore-mentioned distinction between a consistent, justified set of norms and rules of thumb. "Effective" indicates that in the dimension of professional personality, the provisional character of rules gives way to affirmations of numerous value certainties. The description obtained from this dimension of information is less an ethics than a self-image of the IVF scientist in his or her vocational capacity.

It is agreeably simple to identify how and when the effective values of IVF scientists were engaged by the matters placed before the public by Senator Harradine's private member's bill: it was the bill itself that crystallized a response. In a conference telephone call that linked all IVF teams, they agreed that if the bill were were made law, they would cease IVF research (94, 458ff.). That decision, which was perceived by the Select Committee Chairman Senator Michael Tate to be a boycott threat, illustrates what is meant here by the assertion of values through professional personality.

Two aspects of the bill provoked them. One was a provision under which private persons could sue in federal courts if they believed that specific researchers were in breach of the law. Once suit was filed, research and clinical practice involving the person or persons named in the injunction would be suspended until the case was heard. Believing that this clause exposed them to malicious suits, some denounced the bill on that account (741f., 2004f.). They objected not only to the onus of suits, but also to what they perceived to be the slur implied by criminal penalties.

Secondly, the bill would alter the norms of embryo research just after Victorian legislation seemed to have stabilized them. Scientists believed that the Infertility Act permitted experimentation up to the fourteenth day after fertilization, as well as experimentation on so-

called "spare" embryos, although freezing embryos was banned.[2] The Harradine bill was perceived to be rather more restrictive. Its ban on the use of embryos as research material would bring much IVF and IVF-related research to a halt.

Given these circumstances, it is noteworthy that scientists enjoyed an undisturbed good conscience about reproductive technology. The presiding temper of the testimony is conveyed by Dr. Carl Wood, the leader of the team that produced Australia's first IVF baby: "We are a very ethical group of people" (102). Nowhere in their submissions and testimony is there any concession to the doubts about the morality of manipulating the human genome that had set so many investigations in motion. In addressing the Committee, scientists appeared to operate on the assumption that full disclosure of information about IVF would remove the ignorance that led to reservations and suspicions. Let us examine that self-justification.

The Topography of Good Conscience

MEDICAL MERCY. Scientists emphasized justifications that enjoy undoubted public approval, especially the provision of medical service. Assisting infertile couples to have a child was the jewel of this crown, since most people resonate with the joy of a couple whose

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2 According to Professor Louis Waller, Chairman of the Standing Review and Advisory Committee established by the Infertility Act, the Act says nothing about a 14 day period of permitted experimentation (personal communication, 9 January 1987). In March 1987, the Committee approved a project involving non-therapeutic experimentation on embryos up to 20 hours after fertilisation. Half of the Committee's members believed that such research was contrary to the provisions of the Infertility Act. In October 1987, the Committee advised the Victorian government that the Infertility Act should be amended to allow experimentation for the first 24 hours after fertilization.

bitter disappointment with childlessness has found a remedy. These feelings were evoked during a slide presentation of the microsurgical technique of IVF, when a scientist said:

> "No doubt a number of men in this room have experienced the joy of being involved in conception, the birth of a child and the subsequent fathering of that child. Those men should perhaps pause for a moment and just imagine what it would be like if you were infertile, if you knew that you could never be the biological father of your child. What I have just presented to you is a technique that offers a chance for the first time to those infertile men to inseminate their own wives' eggs . . ." (33).

This evocation of sympathy for parental desire placed the Committee in contact with the feelings of IVF clients, who comprise a constituency strongly supportive of the service.

EXPANDED MEDICAL BENEFITS. Scientists also stressed the dramatic expansion of new medical services and potential services from the IVF base. These include therapies for male infertility, the development of improved genetic screening techniques, rapidly expanding research on genetic and chromosomal causes of birth defects and heritable diseases, new discoveries in embryology and endocrinology leading to (among other things) new contraceptive techniques, and a cornucopia of improvements in the breeding of livestock. This display of the research leverage obtained in association with IVF was directed against one type of critic ignorance: those who would impose draconian constraints on IVF research might be less inclined to do so if they were aware of the many benefits that would be forfeited. It was in this spirit that scientists claimed the pro-life mantle for themselves.

"PRE-EMBRYO" VS. "EMBRYO." As was mentioned, the Harradine bill presupposed that from the moment of fertilization the human embryo is sufficiently human to warrant protection. The bill expressed the increment of humanity as the capacity to realize "full human potential;" and permissible experimentation was conditioned by its assisting that development. The perceived vagueness of "full human potential" was the subject of much criticism; and the Committee, in its recommendation, phrased the thought by saying that embryos are "genetically new human life organized as a distinct entity oriented towards further development." Since the biological attributes of the human conceptus were crucial to the bill, scientific submissions as well as the Committee devoted a great deal of attention to embryology.

The alternative views aired before the Committee, and the norms that followed from each, had been established in the early 'Eighties. In his speech at the second reading of his bill, Senator Harradine emphasized that two Royal Commissions had determined on the basis of scientific testimony that a new individual human life begins at the moment of fertilization, when female and male gametes fuse. The opposing view, expressed in the majority report of the Warnock Committee[3] and supported by the Medical Research Ethics Committee (MREC), was that the embryo properly speaking was the stage of development commencing with differentiation of the primitive streak (about the fourteenth day) and concluding with the differentiation of organs (the fetal stage).[4]

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[3] Three members of the Warnock Committee believed that the use of embryos as research material should be proscribed, while four others wished to prohibit the fertilization of ova soley for the purposes of experimentation.

[4] The MREC diverged from the Warnock Committee in not accepting the time of the development of the primitive streak as an absolute beginning of "the human individual," as the Committee put it. On this basis the Warnock Committee recommended that it should be a criminal offense to "handle or use as a research subject any live human embryo derived from *in vitro* fertilization beyond that limit" (Warnock 1985, § 11.22.)

To mark this distinction, the British Medical Research Council had introduced the term "pre-embryo," which was quickly adopted in Australia. It was argued that the pre-embryo did not satisfy the conditions supposed by Senator Harradine's bill, which must therefore fail for want of an object.

Rebuttals of concept of the embryo assumed in the Harradine bill were meant to contest the idea that embryos have an unambiguous destiny to become human beings. Two arguments that attracted the attention of the Committee may be styled "the mole argument" and "the wastage argument."

". . . entities that in 1983 qualified for ethical consideration were deprived of it in 1986 thanks to the pre-embryo distinction."

The mole argument refers to the rare development of embryos into hydatidiform moles. They were a particularly striking example of the various ways in which embryos might deviate from their supposed human destiny. Professor Roger V. Short, speaking to the submission of the Australian Academy of Science, bore the main responsibility for making the mole argument support the contention that pre-embryos are not sufficiently distinctive in humanness to warrant protection. He asserted that "scientific evidence provides no support for the concept of fertilization as the beginning of life" (2132). It is not until the fourteenth day, he maintained, that scientists can be sure that the embryo will not be a mole or whether it will develop into two or more individuals (2144, 2156-2162).

This line of argument was met with suspicion. Senator Harradine confronted Professor Short with the published statement of a leading scientist who chastised the pre-embryo distinction as a terminological gimmick invented to evade an ethical embarrassment (2150). Professor Short responded by citing a leading scientist who defended the distinction, pleading that the failure of embryologists to recognize the distinction heretofore was "sloppy" (2153). He believed that the sloppiness had proved to be costly in public debate, for the public

imagine the embryo as having a head and limbs (2152). The introduction of the term "pre-embryo" seems to have been motivated largely by a wish to rectify this public relations disadvantage.

Senators Harradine and Carrick whittled away at the distinction by asking why the ontogeny of the conceptus should be marked by only two distinctions when a multitude of stages were conventionally enumerated by embryologists. Professor Short eventually conceded that the distinction was "purely arbitrary" (2162). He also seemed to contradict his unqualified denial that there is any scientific evidence to support the view that human life begins at conception when he acknowledged that fertilization constitutes "a quantum leap in the probability that you are going to get a new individual when the sperm penetrates the egg" (2159).[5]

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[5] When the MREC issued its *Ethics in Medical Research Involving the Human Fetus and Human Fetal Tissue* (1983), it made no mention of the pre-embryo distinction. Whereas in 1986 the pre-embryo phase extended from fertilization to the fourteenth day, in the 1983 statement fetal life was defined as extending from the time of implantation, "which is about a week after fertilization," until its separation from the mother's body (p. 7). Thus, entities that in 1983 qualified for ethical consideration were deprived of it in 1986 thanks to the pre-embryo distinction. The MREC's position that embryos may be manipulated up to the fourteenth day was another striking change of position. In its guidelines booklet *Ethics in Medical Research* (1983), the Committee declared that the culture of embryos *in vitro* could not be continued "beyond the stage at which implantation would normally occur . . ." (p. 27). Such rapid changes in guidelines demonstrates that the Committee is attuned to respond quickly to clinical needs and bioethical new waves. Yet the foundation had been laid in a fundamental article by R.G. Edwards, published in 1974. In a magisterial annihilation of textbook embryology, he wrote that "fertilization is only incidental to the beginning of life . . ." (Edwards 1974, 13). The question, of course, is not the beginning of life, but the beginning of an individual human life.

Such admissions, together with testimony of other experts that unique human life does begin at conception, were noted in the Report as reasons for rejecting the pre-embryo distinction (Senate Select Committee, 10-13). The Academy of Science was seen to be saying that since some embryos develop into moles, the destiny of all embryos is doubtful until scientists can be certain on the fourteenth day. The doubt was the basis for justifying experimentation on normal embryos because they might be cancerous moles.

The doubtful logic of the mole argument, together with the suspect character of the pre-embryo distinction, and Professor Short's inconsistent defence of the whole position, influenced the Committee to adopt the alternative view that human life begins with fertilization.

The wastage argument figured prominently in submissions (67, 80, 684, 2015, 2154) but was somewhat less keenly pursued by the Committee, perhaps because it was not regarded as containing any relevant information distinct from the mole evidence. Scientists thought otherwise. In its simplest form the wastage argument asserts that the natural loss of "pre-embryos" due to chromosomal abnormalities is 30 percent, a rate uncommonly high among mammals (67). Further natural losses occur at the embryo and fetal stage. The estimated total loss between fertilization and birth is 50 percent. The moral is that since nature pays so little respect to the conceptus, it is Quixotic to impose ethical solemnities upon a small scrap of genetic information.

The wastage argument has an extension which explains why so few fertilized ova survive. The reproductive biology of mammals generally contains a number of chemical and physiological barriers inhibiting not merely the conceptus and embryo, but also sperm and ova. These barriers were interpreted as Darwinian fitness tests eliminating reproductive entities of inferior quality (2015). Despite the intense selection pressure, embryos that develop to term can go wrong genetically in numerous ways. Here the story of abnormalities and disease commences; and the intimate link between embryo experimentation and the search for therapies for genetic-related diseases

was stressed. These include fetal diagnostic service (by chorionic biopsy) and abortion of fetuses found to be abnormal; grading of embryos for quality prior to transfer; and experimental work on direct genetic interventions, such as gene transfer between embryos (not yet operational for the human species). These developments were justified as innovations to reduce the number of births that inflict sorrow on parents and service burdens on society (41, 44, 72f., 83f., 1598, 1951, 2173). The natural selection story enabled scientists to view their artificial selection procedures as a more directed and intelligent supplement to what already occurs naturally. By these two routes, therapy and artificial selection, scientists justified eugenic medicine. None of the scientists favorable to IVF failed to commend it. Indeed, they regarded it as part of their therapeutic duty not to implant defective embryos, and to abort abnormal fetuses, when requested by patients to do so (72f., 368, 2163, 2183f.). The implicit "quality of life" standard undergirding these value judgments was never acknowledged, although it was criticized in testimony by IVF opponents.

The value of life. Since these larger horizons were in view, it is not surprising that the defense of the fourteen day cut-off point for experimentation was clumsy. Professor Short's predicament is instructive. He was obliged to defend it as an agreement reached by influential scientific bodies and accepted among ethics managers; yet what had been agreed was admittedly "purely arbitrary" scientifically and morally.[6] Professor Short's fall-back position was that an objective determination of the moral status of pre-embryos was "impossible" (2135). He felt certain, however, that the moral status of experimentation was beyond reproach, since it was "wrong" to prohibit experimentation until an authoritative majority view emerges (2135). Ethics is not, in his expressed view, a fixed body of norms

[6] A press release from the NH&MRC dated January 28, 1987 asserts that "the MREC has never stated that human life begins at a particular point. The MREC has chosen the time of implantation—usually 14 days [*sic*] after conception—only as a point on which to base discussion of embryo experimentation."

because it is caught up in the flux of social change, one element of which is the growth of knowledge (2136). Underscoring this point, he claimed that the Pope approved of IVF,[7] and he stressed that the research of Edwards and Steptoe was unethical by the standards of the British Medical Research Council (because prior animal work hadn't been done) (2143, 2179).

" . . .the value of the human embryo is only overridden by the quality of the research . . ."

Scientists tended to substitute a "developmental" view of the value of life for the pre-embryo cut-off. It was said that all life is valuable to some extent and as such is entitled to a certain regard that prohibits willful harm. How to proceed in particular cases is a matter of weighing costs against benefits on a scale of relative value. Thus Dr. Alan Trounson said: "I believe the value of the human embryo is only overridden by the quality of the research, if the benefit will outweigh the use of the human embryos. I think it is no different from arguments on a lot of other things . . . " (108). The MREC combined the sliding scale concept with a determined defense of the 14 day cut-off. Committee Chairman Professor Richard Lovell maintained that there is a perceived order of decreasing value from teenager to child to newborn to fetus to embryo. This increment of value is measured by the amount of grief experienced by the loss at these respective stages (382).[8] He estimated that very little grief attaches to the loss of em-

[7] This was incorrect, of course, as the Magisterium on reproductive technologies released in March 1987, made clear.

[8] A pediatrician specializing in birth defects singled out this assertion as being the direct contrary of his experience in dealing with parents. Parental attachment to the unborn, Dr. Wealthall said, commonly begins before pregnancy, sometimes years before. He detected no sliding scale in the affections of parents. Dr. S. Wealthall, National Women's Hospital, Auckland, "The Reasons for Applying

bryos, and supported his view by referring to the law on abortion, which leaves fetuses less protected than the embryo under the Harradine bill.

Lovell also adverted to the therapeutic balancing of costs and benefits mentioned by Dr. Trounson and others. The balancing in this case is distinct from balancing the risk of a therapy to a particular patient against the possible therapeutic gain. Medical scientists balance the entire loss of experimental embryos against the gain of implanted embryos. This criterion was often defended as established and accepted medical practice (382, 2007, 2155f., 2162, 2179).

Unacceptable Revision of Norms

Scientists commonly expressed dismay that the Harradine bill broke drastically with norms to which they were accustomed and which they believed to be largely accepted in the community. The Waller Committee recommendations and the Victorian Infertility Act based on them were referenced as a point of contrast. While Victorian legislation was perceived to be a substantial encumbrance, scientists could live with it. But the Harradine bill was said to be intolerable. The points made were these:

Experiment and Therapy. The prohibition of non-therapeutic experimentation is contrary to the norms of contemporary medical science, where experiment and therapy are inextricably linked (355, 360, 2015, 2129, 2134, 2164). Some scientists objected to the word "experimentation" in the Harradine bill, which they viewed as a ploy to awaken guinea pig anxieties or to insinuate sinister intentions. This is a curious response since the NH&MRC guidelines under which these scientists operate are entitled Statement on Human Experimentation. The Statement indeed indirectly evokes memories of medical immorality by referring to the Helsinki Declaration on medical ethics (354). This Declaration and its successors were meant to en-

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High Technology to Birth," 56th ANZAAS Congress, Palmerston North, N.Z., January 27, 1987.

sure that, as the NH&MRC expresses it in another document, "what was revealed at Nuremberg must never happen again" (331). The Nuremberg trials revealed that German physicians carried out non-therapeutic and lethal experimentation on unconsenting subjects. Notwithstanding that ethical calamity, the postwar integration of research into medical practice has been accompanied by acceptance that non-therapeutic experimentation is indispensable to medical science. Accordingly, scientists believed it to be an accepted community standard that some embryos could be sacrificed for the benefit of knowledge (108, 392f., 728, 733, 2129, 2131, 2134, 2162, 2179), even though the express norms governing research on human subjects prohibit non-therapeutic experimentation that harms or may harm the experimental subject. That this declared norm under which medical scientists ostensibly work was attacked as an insupportable innovation when it was embodied in Senator Harradine's bill appears to indicate that the norm is a dead letter.

Abortion. The bill conferred on embryos a measure of protection denied to fetuses, or indeed to embryos destroyed by IUD "contraception." All IVF scientists took the legitimacy of medically and socially therapeutic abortion for granted; indeed, they stressed that in the present stage of research, abortion is a major tool for eliminating heritable diseases (6, 41, 368, 2015, 2163, 2181f.) It was thus a staggering paradox, occasionally styled "irrational" and "illogical," that legislation should protect embryos from experimentation. A leading IVF scientist claimed that the whole intention of the bill was to establish a norm that could be used to assault the legitimacy of elective abortion (8). The implied logic of this argument is arresting. It appears to be this. The fetus is undeniably human life. If its destruction on the choice of the mother is permissible, then the destruction of innocent human life is permitted in principle. Accordingly, even if embryos are human life, experimentalists may innocently destroy innocent human life.

The Rigidity of Law. The bill rejected the procedural mechanisms for medical ethics in Australia by entrenching specific prohibitions in law. The current and preferred procedure is to establish community standard norms through Institutional Ethics Committees (IECs) organized by the Medical Research Ethics Committee of the NH&MRC, which awards federal medical research funds. The committees are institution-specific because rules for vetting proposals usually require a host of proposal-specific decisions that are thought to be best made locally. Legislative entrenchment of norms would set a precedent for replacing the local arbitration-like process by an inflexible rule blind to local wishes (310, 384f., 394f.).

Criminal Penalties. Nothing in the bill appeared to be more offensive to scientists than the criminal penalties of its enforcement clauses. One member of the MREC expressed his indignation that the Parliament of Australia should dare insult and discourage the "enthusiastic" young scientists who are leading the world in IVF research (392ff.). This flash point identifies a conflict that surfaced frequently in the submissions and testimony: the research imperative vs limits imposed in the name of ethical safeguards. The imperative submits to regulation in matters of procedure. But when regulation becomes substantive by placing some research out of bounds, dire conflict results. Thus Professor Short declared gravely that "to prohibit all research on the human embryo is to call a halt to progress; the abandonment of experiment is the death of science" (2131). The research imperative is here identified with an ineluctable cultural force, progress; to set bounds at any point across this broad front is to derail the entire ineluctable force. Another scientist echoed Short's notion by claiming on the basis of historical experience that prohibition on research succeeds only in driving it underground (2002-2015, 2022f.). The implication seems to be that scientists hold society to cultural ransom.

This idea emerged in a sharp clash with Senator Harradine, who intended that his bill should make genetic engineering of the human

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"Robert G. Edwards, discussing regulation of the far-reaching implications of IVF, stated that genetic modification of human embryos 'is easy to do and conceal'."

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genome legally and practically impossible in Australia. The response was the fatality of the research imperative embraces this very prospect. The Senator was informed that prohibition is ineffective because such research would continue in secret. And there in the twilight of illegitimacy scientists would revenge themselves by creating the monster that terrifies moral feeling, the animal-human hybrid (2002). The scientist who made this remarkable threat or forecast happens to be at the interface of animal-human biotechnology.[9]

It is to be emphasized that the threat was made in the context of a spirited rebuttal of the slur on the honor of scientists implied by the criminal sanctions of the bill. The slur in question is the Dr. Strangeglove image that Senator Harradine had conjured in his speech to the second reading of his bill (2005f.). The sense of the rebuttal seems to be that science *is* Dr. Strangeglove, and the only question is whether society will have him in a benevolent or in an angry mood. Perhaps

[9] The scientist concerned states that he did not mean to threaten but merely to project research trends (personal communication). Such projections are not uncommon in the debate between scientists and exponents of regulation of birth technologies. Deutsche Forschungsgemeinschaft President Hubert Markl said in criticism of regulatory legislation introduced into the Bundestag that research might continue despite the criminal penalties prescribed in the proposed law (*Nature* 327 [7 May 1987], p. 6). Similarly, Robert G. Edwards, discussing regulation of the far-reaching implications of IVF, stated that genetic modification of human embryos "is easy to do and conceal" [Edwards and Sharpe, 1981, 89]. This concept has been adopted by futurologists. In their lavishly illustrated volume *The Third Millenium,* Brian Stableford and David Langford write that "in spite of this relaxation of the taboo [on human genetic engineering] the first significant attempt to create radically modified human beings was carried out in secret" (p. 181). The relaxation was effected by consumer demand for superficial modifications. Interestingly, the authors project this experiment as being carried out by Coral Sea Investments, headquartered in . . . Australia.

instructed by this example, the *Report* recommended criminal sanctions and banned animal-human gene transfer.

THE FUTURE IS OURS. The research imperative as cultural fatality was expressed in the confidence of IVF scientists that social values were rapidly changing in their favor. That same confidence laid to rest the bad conscience symbolized by Dr. Strangeglove.

Although IVF is an unnatural way of making babies, scientists were at pains to correct any notion that it is a marginal service. They represented it as boom area of medicine with a big growth potential to be calculated from the estimate that 10-15 percent of married couples experience infertility problems (104, 756, 778, 1602, 2127). Clients of the service are abundant; there are about 1000 IVF babies in Australia and the waiting lists at clinics are long. Although this is an impressive showing for a new, costly, strange, and emotionally taxing service, IVF scientists could also boast that they have established links with the wide range of research areas previously mentioned.

The substantial investments in reproductive technologies by hundreds of firms with interests in animal husbandry is particularly to be underscored. Funds flowing from these sources support a lively cadre of scientists who are no longer the low caste veterinarians of the past. They are reproductive biologists fully aware of the bracing fact that human breeding is technically only another kind of animal breeding. And they are the tip of the spear in the drive to produce new and better species.

Evidence of active community approval of IVF was given in the submissions of numerous IVF support groups. Their memberships are drawn mainly from couples who have been or are enrolled in the IVF programme, and their function is counselling; but they are also a medical lobby supporting IVF in a variety of ways.

Such indices of rapid public acceptance and research entrepreneurship supported the optimism that the establishment of the legitimacy of so innovative a technology was a harbinger of the future. About this there was agreement between IVF scientists and

some critics: for good or ill, IVF has become a sensational growth industry. IVF scientists traced opposition to sectarian opinions and special interests that they perceived to be inconsistent with the permissive orientation of the pluralist society. The rapid change characteristic of the pluralist society would produce further liberalization of values, thereby further marginalising critics.

Analysis of the Testimony

The foregoing descriptions support the characterization of the ethics of IVF scientists in terms of their professional personalities as medical scientists. In that capacity they can and do vigorously legitimate their activity by appeal to community standards.

Their main legitimation is what might be called "the therapeutic imperative." It is generated by interpreting public support for health care as a popular mandate for medical scientists to direct research wherever they will. The "Manhattan project" doubt, that some research may lead up dangerous paths, was rebutted by exhibiting the distress alleviated by present remedies and anticipated breakthroughs. The rhetoric of the therapeutic imperative mimics the claimed popular mandate. The direction of research is exhibited not as the choice of scientists but as a response to popular demand. This appeal is reinforced by the argument, so frequently emphasized in the testimony, that only IVF clients are ethically competent to decide which of the available options to exercise. The Select Committee minority report endorsed this point of view.[10]

10 One of the two authors of the minority report, Senator Olive Zakharov, helped identify this point of view in an address of April 18, 1987, entitled "Attacks on Humanism." Senator Zakharov singled out *The Humanist Experiment: Superman from the Test Tube* as exemplary of gathering conservative forces who wish to put a stop to "the right to a GOOD LIFE." The Senator was Australian Humanist of the Year, 1984. See *The Australian Humanist*, No. 14 (June 1987), 1-3.

The therapeutic imperative is capable of quite astonishing legitimations. To illustrate: eugenics is odious because of its elitism, its social darwinist tendencies, and its association with the Nazi regime. Yet eugenics–renamed "gene therapy"–was repeatedly identified by IVF scientists as a cardinal therapeutic objective whose legitimacy never comes into question because medical fiat has declared it to be therapy (6, 28, 36, 65, 119, 226, 1598, 1622, 1951, 2015f., 2163, 2179). Testimony revealed that medical scientists believe that they hold a mandate to eliminate the thousands of genetically-related diseases from the gene pool. They regard it as their duty to screen embryos for "quality," to implant only the "best," to apply tests for birth defects to the developing fetus, and to recommend abortion when defects are detected. The next step, gene transfer, is already well developed among animal scientists, some of whom are involved in IVF. Eugenic medicine is accepted not only without qualms, but as required by the therapeutic imperative and client demand.

In this example one sees how the therapeutic imperative lays to rest troubled conscience represented by Dr. Strangeglove. Doubts that may arise on considering the consequences of the research imperative are quieted when the latter can be interpreted as therapeutic in outcome. The criterion of therapeutic success, at least for purposes of public debate, is satisfied clients.

Although the therapeutic and research legitimations are strong in themselves, their combination in contemporary scientific medicine equips IVF scientists with a double-edged justification of great flexibility and persuasiveness. The core of the professional personalities of IVF scientists as moral agents derives from their interpretation of their activities under this double legitimation.

Legitimacy contests acquire a political character when the participants are able to invoke sanctions. IVF scientists proved their political savvy by not neglecting this consideration. Pressure was applied in the first instance by the threat to halt IVF service if the Harradine bill were enacted. The perception that this threat exerted real pressure is witnessed by the Select Committee Chairman. In questioning sci-

entists about the effect of the Harradine bill as law, Senator Tate declared that he wanted to know "what is being held over our heads" (458). That several dozen scientists believed themselves to be potent enough to intimidate the Australian Senate is a measure of their confidence in the public demand for the IVF service. The character of this demand merits extended examination. I will be content with a brief sketch.

Dr. Alan Trounson expressed his view of the ethical character of IVF clients when he said that infertile couples will "clutch at any straw" to have the wanted child (85). The point seems to be that the obsession with childlessness common among IVF clients makes them insensitive to ethical objections (1687-1694, Pfeffer and Woollett 1983). The guilt they feel is the sense of personal failure at being unable to procreate. If infertility afflicts 10 percent of married couples, there is a powerfully motivated minority keenly affirmative about IVF regardless of ethical considerations.

The concordance between the research interests of doctors and the choices of clients is especially striking in the area of eugenics. The Committee was informed that all patients at one clinic opted to abort fetuses diagnosed as having genetic defects. Further, IVF has given a tremendous boost to artificial insemination by donor; for IVF makes it possible for the genetic parents, the carrying mother, and the social parents to be different individuals. The legal and psychological complications incident to this astonishing intervention was a principal concern of the six Australian commissions that examined IVF. But such concerns have not only not deterred clients, their private choices have created the problems for which the commissions struggled to find solutions. This is evidence that the neophobia about biomedical technology, captured in the images of Dr. Strangeglove and Brave New World, is not shared by the consumers who, having met Dr. Strangeglove, think him a very nice man.

There are precedents for this effect. The factory system in the last century, and nuclear power stations in this, have been subjected to prolonged and intensive criticism, but both are still with us. The uptake of reproductive technologies appears to be repeating this pattern.

.Critics who raise the biotechnic specter are undercut by satisfied customers who like Brave New World. Such phrases as "test tube babies," which until recently carried frightening connotations, seem to have lost much of their shock value. Biotechnologies thus appear to be in the process of becoming a permanent fixture of our culture thanks to the impartial operation of market forces.[11] IVF scientists are well aware of the market demand for their services and it may be that this factor especially boosts their confidence that the future is theirs.

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11 In a fundamental discussion of regulation seven years prior to the birth of Louise Brown, Robert G. Edwards and David J. Sharpe wrote: "Does anything need to be done to regulate the application of new scientific and clinical advances? Why not *laisse[z]-faire*?" The authors reject this alternative because "people are bound to take an interest in what others propose to do with their successors, even in the name of scientific inquiry." They conclude by recommending professional self-regulation (Edwards and Sharpe 1971, 89).

Evaluation

Medical Ethics Today. The problems of regulating medical practice have burgeoned over the past two decades for a variety of reasons. We have reviewed some of the tangles arising from the integration of research into clinical practice. But in addition medicine has been made an instrument of social policy, and it has mutated into "the health care industry" competing for private and public dollars. In the course of these transformations, the moral code traditionally binding on physicians became obsolete.

The core of Hippocratic ethics was to heal or to relieve suffering, and otherwise to "do no harm." As a patient-based code, traditional medical ethics furnished insufficient guidance amongst the heterogeny of motive introduced by the recent technological innovations and far-reaching medical interventions. An early study of the ethics of medical experimentation found that researchers often must choose between optimum science and optimum patient care; and that the *norm* was to "balance" these two conflicting values in specific cases (Baker, Lally and Makarushka 1973, 7). In other words, it is accepted in the new medical ethics that the best interest of the patient may be sacrificed, to some extent, to science.

The Balance Doctrine may also be called the Guinea Pig Doctrine. That designation highlights the profound alteration in principle of traditional ethics which places the well-being of patients in competition with abstract ideals or social goals extrinsic to the patient's condition. Attending physicians no doubt elevate their motives by fixating on the service to science achieved in experimental trials of a zoological or veterinary cast. But it is apparent that the experimentalist's advancement of knowledge is closely linked with the advancement of his career (Roberts, *et al.* 1981, Ravetz 1971, *Protecting Human Subjects* 1981). Often it is difficult to separate from the mere mercenary interest of researchers and pharmaceutical companies (1607-1622, Kenney 1986, Bates and Lapsley 1985, Hayes and Hayes 1982, Edwards and Sharpe 1971).

The multiplicity of ends pursued in medicine and medical research has diluted the ethical thought of physicians by complex balancing acts. The phenomenon is profusely illustrated in Robert G. Edwards' seminal articles on the ethics of *in vitro* fertilization. In his 1971 essay he wrote: "The beginning of medical ethics, however, is *primum non nocere* [above all, do no harm]; this permits the alleviation of infertility, and has been stretched to cover destruction of foetuses with hereditary defects . . ." (Edwards and Sharpe 1971). The simple, unambiguous Hippocratic injunction to abstain from harming patients is "stretched" into its opposite--destruction of the patient--represented as innocent medical practice. Edwards entered the brave new world of eugenics under the auspices of Orwellian newspeak: killing patients is not harm.

It is hardly to wondered that under the dispensation of "bioethics" patients in increasingly large numbers and ever expanding categories have become medical victims. Well known cases are the thalidomide disaster, the induction of lethal diseases in patients for experimental purposes, the use of comatose patients as spare parts depots, and the introduction of numerous harmful treatments and devices used in fertility control (Barber, Lally and Makarushka 1973, Hayes and Hayes 1982, Morris 1984, Corea 1985, Stover and Nightingale 1985). To prevent scandal, it was deemed advisable to balance the Balance Doctrine by emphasizing informed consent and by establishing ethics committees to conduct surveillance. Informed consent was subsequently upgraded into the doctrine of patient autonomy, which today is widely believed to be the keystone of medical ethics (*Proteching Human Subjects* 1981, *Proposed International Guidelines* 1982, Clements and Sider 1983, Clements 1984, Engelhardt 1986).

Superficially, patient autonomy seems a firm restraint upon zoological, veterinary, and merely mercenary impulses that may invade clinics. Closer examination proves this to be somewhat optimistic.

Patient autonomy means that the burden of preventing the guinea pig fate falls to the patient, who may be in no condition to contemplate

life choices (Roberts, *et al.* 1981, Clements and Sider 1983). It falls to the patient from the shoulders of the physician, who withdraws from his Hippocratic responsibilities once the autonomy process becomes operative. In this phase of clinical service, the physician becomes a technician willing to serve diverse and scarcely compatible ends: patient care, research, social policy, product innovation and investment protection, and increasingly today, cost-containment (Morris 1984, Clements and Sider 1983, Clements 1984, Corea 1985, Kuhse and de Garis 1984, Kuhse and Singer 1985, Baron 1983, Bean 1982, Culliton 1981, Linnell 1982, Panem 1984, Office of Technology Assessment 1984, Weir 1984).

It is testimony to the concrete significance of ethical validations that sweeping changes of medical practice accompanied the displacement of Hippocratic ethics. Elective abortion may serve as an example.

This practice has no medical basis. Its outcome is the death of a human subject. It is justified by appeal to the mother's right to refuse to bear a child that she has conceived (Callahan 1970, Tooley 1983). Once the physician places his skills in service to the ethic of choice, the unborn child is lost. The "balance" struck in this case trades the inconvenience of carrying to term, and possible regrets of giving up to adoption, against a human life. To redress the one-sidedness of this balance, a new medical duty, "social therapy," was placed on the scales against the unborn to mitigate the stark cruelty of choosing its death. Social therapy is an elastic concept lacking foundation in clinical practice. The concept legitimates a wide range of motives and intentions by using the prestige of medicine as the means to their fulfillment. Thus social therapy may mean birth control for superfluous breeders. It may mean salvaging a women's reputation. It may serve the purposes of equality, or of eugenics. It it may serve contemporary needs by providing fetal tissue for scientific and commercial use.[12]

[12] The MREC approves the use of fetal tissue for research purposes but declares that there should be no element of commerce in it. A delicate problem arises in respect to harvesting fetal tissue, that is, conception for the purpose of aborting a fetus so that the tissues may be used for transplantation. This problem is resolved as follows: "We are advised that a desire to have use made of fetal parts is not a lawful reason for the performance of an abortion. The matter of a lawful, induced abortion is one between the mother and her attending physician. The perspective of the researcher will be different. . . . there is no ethical obligation on them to inquire into the motives for the initiation of the pregnancy. . . ." (*Ethics in Medical Research Involving the Human Fetus and Human Fetal Tissue*, 11). The first of these statements is nullified by the second. If the mere agreement of mother and physician makes an abortion lawful, the mother's motive is not a material consideration. But regardless of an abortion's legality, the statement exempts researchers from scruples stemming from the provenance of the procured tissue. It follows that Australian scientists need have no compunctions about using harvested fetal tissue. The logic shows clearly how readily informed consent may be geared to medical research.

Similarly, the business (and it is a business) of scavenging the bodies of the comatose for hearts and livers was managed ethically by inventing a new definition of death that could be applied exclusively to this category of patient. Informed consent isn't required of them; indeed in France they become the property of the state so that the most efficient use may be made of their tissue (Scott 1981).

Informed consent also furnishes no safeguard against the administration of death to the terminally ill for cost-containment reasons. This procedure is called by the reassuring name "euthanasia." Patient autonomy, in the specific form of the "right to die," has been the principal ethical software for legitimating the destruction of patients unable to exercise choice, or patients who in their weakened condition may be persuaded to choose as physicians, relatives, administrators, or judges think they should (Glover 1977, Horan and Mall 1980, Kluge 1975, Kuhse and Singer 1985, Lynn 1987, Destro 1986, Koop and Grant 1986). The right to die, in other words, establishes yet another category of allowed medical killing.

The doubtful validity of the Balance Doctrine was at the heart of the Harradine Bill, since the question it raised was whether some embryos may be sacrificed that other embryos--and medical careers--might prosper.

Australian scientists' advocacy of embryo experimentation combined the public image of physicians as Hippocratic servants with the realities of experimentation and contemporary flux of values. The combination was anchored in the media image of the exuberant IVF madonna and child, with the benevolent experimentalist smiling knowingly in the background. On this basis scientists attempted to sustain the impression that research medicine is ethically impeccable, in the Hippocratic sense, even though it had admittedly abandoned Hippocratic absolutes for the flux of relative values.

". . . Australian scientists need have no compunctions about using harvested fetal tissue."

This orientation seems to account for the old-fashioned righteousness that IVF advocates placed on display after the Select Committee had tabled its Report. They urged the benevolence of science with all the fervor of pre-Nuremberg progressives, without acknowledgement of the ethical calamity perpetrated in Germany (Lifton 1986).[13] There was no recognition that the ever-expanding circle of medical destruction of patients may properly occasion some concern about the ethical soundness of contemporary medicine. Instead they derided as "delusory" the Select Committee's recommendation of legal regulation of embryo experimentation (Scott 1987, Trounson 1987). The tone of these outpourings moved one critic to style them

[13] In his golden words on the ethics of IVF, Edwards dismissed Nuremberg and Hiroshima with a wave of the hand: these references "hardly help to provide clarification" (Edwards 1974, 15). As usual, Edwards was right. Throughtful attention to these references would have made his task immensely more difficult.

the "pompously presumptive apologia for the medical research establishment" (Clarke 1987).

Pompous they may be, presumptive they certainly are. The beginning of ethics is an abiding sense that one may do harm. This humble beginning did not often find a voice amidst the asertions of scientific righteousness. To the examples previously given let one more be added. Professor Short, speaking for the Academy of Science, was questioned about incentives scientists may have for conducting banned research in secret. He replied that there was no such incentive, since unpublished research was equivalent to no research. "I do not think scientists--if I may defend the scientific community--are in the business to do things in secret." Asked whether weapons research proves the contrary, he responded, "that is where the government, if I may say so, utilizes, and maybe misuses, the scientists" (2148). Here is an armor of righteousness that the Calvinist might well envy: Although scientists admittedly allow themselves to be misused, this significant fact does not in any way detract from their status as the moral elect. But righteousness is a poor counsellor. Short missed the opportunity to comment on testimony presented to the Select Committee about the effects of the secrecy provisions of Monash University's commercial agreement with the firm, IVF-Australia (1614-1622). And he shut the door on a large literature describing the acute problems created by the massive intrusion of biotechnical commerce into universities--an intrusion in many cases spearheaded by scientists-entrepreneurs (Faberge 1982, Linnell 1983, Wade 1980, *Science, Technology and Human Values* 1985).

The refusal to acknowledge that medical science has done and continues to do harm, and the coordinate demand for public trust, was implied by indignation at the concept of criminal penalties; and again by the advocates' emphatic rejection of the legislative model of surveillance and control. The presumption of this position may be assessed by reference to the findings of committees and commissions similar to the Senate Select Committee.

Britain's Warnock Committee, which carried considerable authority, as well as the Commonwealth Department of Justice Asche

Committee, and committees established by the states of Queensland, Victoria, Tasmania, South Australia, and Western Australia, either concurred in endorsing the validity of criminal penalties and the legislative model or were compatible with them.[14] So massive a rejection of the position of IVF advocates might reasonably have led to some public soul-searching and resignations from the Medical Research Ethics Committee. It led instead to stonewalling. Although the MREC is obliged to advise and inform government, the findings and advice of these numerous bodies were not assessed during Select Committee testimony nor indeed acknowledged. Major addresses on the subject, by two members of the MREC, subsequent to tabling of the Select Committee Report, failed to mention this evidence (Scott 1987; McCaughey 1987). Instead the argument strategy was to isolate the Senate Select Committee recommendations, or those recommendations plus Victoria's Infertility Act, as anomalous compared other standards. These standards were variously identified as the MREC's system of self-regulation; the Warnock Committee recommendations; and the absence of legislative precedents elsewhere in the world.

14 The Tasmania report said that "research and experimentation on embryos is not acceptable according to current community standards in Tasmania" (*Final Report* 1985, 135). The Report also concluded, on the basis of a review of regulative models, in favor of the Warnock and Waller Committee recommendations in this regard, saying that "the Committee does not discount the value of ethics committees but believes that the medical practitioners and scientists involved in infertility alleviation programs ought not to operate the schemes of self-regulation within these programs" (Ibid, 122). The IVF lobby's most aggressive push against the Senate Committee recommendations (February-March, 1987) happened to occur when the Health Minister of South Australia announced a moratorium on opening private IVF clinics, pending the enactment of legislation along the lines of the Victorian legislation. These significant facts were not noticed and therefore did not count as evidence against the claimed consensus against the legislative model.

Merely to invoke the self-regulation model begged the question, since its adequacy was the implicit subject of the Senate's inquiry. The recommendations of the Warnock Committee majority report do not support the MREC's position, since they reject self-regulation in favor of a statutory licensing authority and criminal sanctions for infractions (*Legislation* 1986). Much was made of the Warnock majority report's permission to allow experimentation on embryos up to the fourteenth day after fertilization. But apart from the fact that this permission was contested in the minority report, the majority report attached stringent conditions upon that permission, including minute inspection of IVF facilities and criminal penalties for infractions (*Legislation* 1986, 5, 8f). The appeal to Warnock was therefore misleading.

The MREC also inaccurately assessed the flow of opinion among British medical researchers. The Voluntary Licensing Authority recently declared for a statutory licensing authority, saying that "experience suggests that professional self-regulation is not always reliable" (*Second Report* 1987, 44).

The MREC was equally off the mark in its representation of opinion among legislators around the world. When the Select Committee introduced its Report to the Senate in October 1986, Senator Harradine read into Hansard the Assembly of the Council of Europe recommendation concerning embryo experimentation and the use of fetuses. The recommendation concurred with the Senate Committee's recommendation concerning the establishment of a statutory body to regulate birth technologies. But it went far beyond the Senate Committee's recommendations in banning, unconditionally, a long list of manipulations, viz., the creation of embryos from the sperm of different individuals, embryo fusion, the artificial womb, cloning, twinning, sex predetermination, and research on human embryos. In April 1987, the Justice Minister of the Federal Republic of Germany brought in legislation nearly this far-reaching, with provisions for penalties up to five years goal.[15] The legislation was strongly contested by Germany's science conglomerates.

15 *Nature* 327 [7 May 1987], 6.

Custom Made Babies? The avowed purpose of the Harradine Bill was to prevent the application of biotechnology to modify the human genome. In their submissions to the Committee, the Academy of Science and MREC did not address this issue. A number of submissions from persons and groups critical of embryo experimentation adverted to the prospect, but apart from the colloquy previously discussed, only one submission from IVF scientists addressed the question frontally. It came from Dr Alan Trounson, Director of the Center of Early Human Development at Monash University and associate of the Australian IVF pioneer, Professor Carl Wood.

Trounson meant to answer what he styled "misinformed and intentionally misleading" speculation on this subject, particularly statements contained in the Asche Committee Report. In six brief paragraphs, he contested claims that twinning, the substitute organic womb, the artificial womb, sex predetermination, and genetic manipulation of sex cells are "areas of ongoing and future research"(5). In each case he denied technical feasibility, and pointed out that such projects lay outside MREC guidelines.

Those guidelines contain a few sparse statements on this important subject. Anxieties about possible genetic control of the the human genome are styled an "argument by speculative anecdote; but some of the fears are to be taken seriously" (*Ethics in Medical Research*, 34). In a further comment, cloning human cells is said to "contravene a biological principle that has a strong fundamental claim to ethical sanctity" (38). The principle in question is asexual reproduction, which is rare in vertebrates. The value of this barrier to cloning may be assessed by observing that asexual reproduction occurs regularly in our species, in the case of monozygotic or identical twins. Evidently that fact would serve as well to justify cloning. To strengthen the weak argument, the guidelines note that cloning in lower vertebrates has produced a "high proportion of malformed offspring." Since this is likely to hold for human beings as well, the guidelines reject cloning as "ethically unacceptable on both fundamental and consequential grounds" (38). On this logic, cloning would be acceptable were it not dysgenic.

Such, roughly, was the public posture of the IVF advocates in regard to anxieties and enthusiasms concerning the biological Manhattan project. Considered as testimony from experts in reproductive technology, and as interested parties sensitive to public opinion, it exhibits an ignorance quite unbelievable. Since this will be apparent to those versed in these matters, I confine my observations to a few summary points.

Trounson's assurances bear no relation to the far-reaching genetic engineering being carried out in animal husbandry and cancer research. He stated, for example, that there are "many reasons" why sex predetermination by separation of x and y chromosome-bearing sperm "is not possible" (6). A bare fifteen months later, two British medical teams had succeeded in doing the impossible (*Nature* 327 [1987], 547). One of the successful researchers commented that "it certainly wouldn't be ethical to use the method to choose the sex of a baby. But we couldn't prevent the technique being used that way." The whisper of irony seems to suggest that the idea that the market-oriented research behemoth might be restrained by mere ethics has now become quite ludicrous.

The anxiety dismissed as a "speculative anecdote" arises from countless statements by eminent biologists that the application of genetic engineering to our species is altogether feasible. The initial burst of enthusiasm for genetic engineering occurred between 1965-1975 (Baskin 1984). It was then that Roger Brinster began his transgenic (or gene-splicing) experiments with domestic animals, and Nobel geneticist Joshua Lederberg elucidated the fundamental mechanisms for obtaining genetic novelty, viz., renucleation (cloning), cell fusion, gene splicing, tissue and organ transplantation, and hybridization (Lederberg 1963, 1966, 1966a, 1972). He envisaged the simian-human hybrid, the hybridization of "remote species" (fish and man), and the induction of photosynthesis capacity in humans. He settled momentous ethical questions by off-handed remarks. Thus clonal man was justified by observing that "if a superior individual . . . is identi-

fied, why not copy it directly, rather than suffer all the risks . . . involved in the disruptions of [sexual reproduction]?" (Lederberg 1966, 9) Contrary to the assurance that cloning in higher mammals will not work, the Lederberg declared that "nuclear transplantation is one method now verified to assure sex control, and this might be sufficient motive to assure its trial." Taking note of transgenic experiments, he declared that there is "enormous scientific interest" in mingling human and animal chromosomes, and advised that this research "is being and will be pushed in steps as far as biology will allow, to larger and larger proportions of human genome in intact animals and to organ combinations and chimeras with varying proportions of human, subhuman, and hybrid tissue" (ibid, 11).

This vast intervention in animal and human reproduction has as its strategic objective the control of human evolution in order that a higher and more viable type of man may be produced (ibid; Lederberg 1966a, 1963, 1972). Admittedly the eugenics project is contrary to the concept of freedom imbedded in our culture, but reproductive freedom and our cultural inheritance must be discarded because that culture is "biologically vulnerable," i.e., dysgenic. The old concept of the person as individual is to be replaced by the new realization that "man is part of the continuum of life," or, as another author put it, "man is a bridge to the future" (Caton 1986).[16]

The scenarios drawn by Brinster and Lederberg took *in vitro* fertilization, embryo transfer, and gene splicing to be essential components of the technology of the custom made animal. This was underscored in 1971 by Nobel geneticist James D Watson. Citing the "unexpectedly rapid progress" of the Edwards and Steptoe *in vitro*

16 Dr. Lederberg claims that his writings on these matters have been misunderstood; he specifically disavows having ever advocated the application of genetic engineering to man (personal communication, 28 April 1987). Among the many who have misunderstood are Paul Ramsey, Robert G. Edwards, James D. Watson and Peter Singer. The misunderstanding might be cleared up by an unambiguous repudiation of genetic engineering and eugenics.

research, he forecast that IVF would soon become a widespread medical service; "the situation would then be ripe for extensive efforts, either legal or illegal [*sic*], at human cloning" (Watson 1971, 51). But IVF is not the only incubator of clonal man. Cancer research and research on genetic diseases are as well, owing to the intensive work on cell fusion processes. Unless drastic international prohibitions on research were not soon introduced, the momentum of research in tandem with client demand would soon carry us to the point of no return in the journey to the ultimate experiment (Watson 1971, 53). In this phase of early recognition, Paul Ramsey and Leon Kass produced the basic ethical criticisms of biotechnology.

In the second phase of biotechnology, the debates have been animated not by possibilities, but by the realities of galloping innovation (Grobstein 1981, Kass 1985). In Australia, the successes of Monash University's IVF team prompted sustained press attention to birth technologies. This includes the public prominence of Peter Singer's writings, which seek to persuade the hesitant that they may gladly and ethically embrace existing procedures as well as much of the exotica, including cloning, projected for the near future (Singer and Wells 1984; similarly Grobstein 1981).

Although the NH&MRC boasts that "Australia is in the forefront in developing and implementing ethical guidelines for IVF and related research," it has been slow in responding to these momentous developments. Its first public acknowledgement that manipulation of the human genome is indeed on the biomedical agenda came twenty years after Lederberg had described how it may be done, fifteen years after Watson had identified the inevitable consequences of current trends, and five years after Grobstein described the operation of these trends in clinical IVF. The acknowledgement occurred in Russell Scott's vigorous criticism of the legal model of regulation recommended by the Select Committee. Speaking at the ANZAAS Congress in January 1987, he observed that consistency would require banning genetic engineering:

> "To be truly logical and effective prohibition of IVF research should be complemented by prohibition of re-

search on gene therapy and genetic manipulation because the latter will be able to alter permanently the physical and emotional features of our descendants. But surely such prohibition is undesirable" (Scott 1987, 26).

To be sure, this was but an aside. Apparently it was not intended to initiate public discussion; for when another speaker at the Congress claimed that IVF was the antechamber to the control of the human genome, MREC Chairman Professor Robert Lovell attacked the paper, labelling its forecast "way out" and its bill of particulars "full of misinformation."[17] Yet at the same conference, Dr. Trounson, in a spirited defense of IVF, openly embraced what he called "the positive elements of [Aldous] Huxley's imagination" (Trounson 1987, 118), but dismissed the previously mentioned forecast to this effect as "rubbish." Further exchanges in the press continued to parade the emphatic denials of the science lobby before the public. At length the doyen of Australian IVF, Dr. Carl Wood, stepped in and terminated the embarrassing stall tactic. Dr Wood came clean by acknowledging the itch to change the human species and advising that the time for public discussion of this interesting matter had come.[18]

.....

On October 3, 1987, a South African *in vitro* surrogate made history by becoming at once the mother and grandmother of triplets. Patsie Anthony and her daughter Karen were reportedly paid $2.5 million for exclusive rights to the story. That bounty will no doubt inspire sharp competition for the big prize--giving birth to the world's first custom made baby.

17 *Melbourne Age* 28 January 1987, p. 3. The paper in question was an earlier version of the present work.

18 *The Australian* 13 May 1987, p. 1.

Appendix: The Pre-Embryo Distinction

The pre-embryo distinction, and the insistence that the beginning of an individual human life is a religious or philosophical rather than a scientific question, exemplify in vivid manner the impact of social agendas on scientific thought.

Prior to 1960, embryology, gynecology, Anglo-American law and the World Medical Association's ethical declarations were unanimous that pregnancy and an individual human life begins at the time of fertilization. This perception began to alter around 1962 when the Population Council and the International Planned Parenthood Federation undertook to persuade the World Health Organization to classify the intrauterine device as a contraceptive rather than as an abortifacient; for if it were the latter, its use in many countries would be inhibited by the Church's ban on abortion. So it transpired that physicians and scientists with an interest in population matters resolved that pregnancy should be redefined as beginning at the time of implantation (Horan 1976-1977, 328).

This social need-induced epistemological trend crystalized into doctrine under the impact of the abortion debate in the early 'Seventies. Pro-life groups introduced legislation which adopted the usual definition of fertilization as the beginning of individual human life. The opposing forces in medicine, science, and population control needed a counter-argument of equal comprehensiveness and finality. The doctrine that proved to be serviceable was that the determination of the beginning of human life is not a scientific question at all, but a religious or philosophical question (Nathanson 1983). If this were so, all attempts to set limits to expanding biomedical interests in fetal research and *in vitro* fertilization could be criticized as arbitrary. A further incentive to skepticism about vital events was the need to justify organ transplantation; for if it were accepted that the determination of the beginning of human life was a matter of opinion, indeterminacy about the end of human life did not seem so paradoxical. Into the

grey area created by skepticism, research interests inserted various brain death definitions as "responsible" approaches to the ethical "dilemmas" of reconciling "medical advances" with the rights of persons (Destro 1986, Koop and Grant 1986, Nathanson 1983, Scott 1981, 140f.).

The uncertainty doctrine is beset by two sorts of contradictions. On the natal end of the continuum, scientists who avow skepticism before ethics commissions are quite certain about what must be done to satisfy the IVF client: the egg must be fertilized. It is not an optional or merely incidental step in the process. On the mortality end of the continuum, surgeons know precisely that the required organs must be obtained before the cessation of vital functions: they must be living. These clinical certainties contradict the skepticism urged in ethics.

A second inconsistency is that the skeptical doctrine, taken in plenitude of its implications, is presently unacceptable to public opinion and, no doubt, to the skeptics themselves. If patients were randomly liable to have their vital organs removed on the grounds that it was a matter of opinion whether they were alive, there would be terror on the wards. Similarly, if the commencement of individual human life were deemed, for regulative purposes, to be a matter of opinion, law might permit any manner of manipulation of embryos and fetuses and indeed--why not?--newborns. Since this option is presently unacceptable, a line must be drawn somewhere. Advocates of birth technologies, having discarded the key beginning event, are unable to propose an alternative ontogenic watershed as well rooted in nature and ordinary clinical practice as is fertilization. Human life is a continuum, and where one draws the line is arbitrary.

These inconsistencies in the ethical substance of biomedicine are highlighted by scientists who protest the contradiction between the permissibility of elective abortion, or indeed intrauterine devices, and proposals to protect embryos from experimental destruction. Why should not the medical use of embryos and fetuses, with consent of their donors, be deemed as innocent as the will of a mother who does not desire her unborn child? In the literature I have canvassed, a convincing answer to this objection has not been found. The concerns of numerous commissions on surrogacy, IVF, and fetal research are tangible evidence of widespread perception that the two cases are distinct and require the application of different norms. But this perception has not been articulated into a clear statement of difference in principle that distinguishes the ethical propriety of abortion from the impropriety of *ab libitum* experimentation on embryos, fetuses, and newborns. Ironically, the principle invoked to draw bounds to rampant birth technology is that the interest of the child to be born are paramount over parent and medical wishes.

An attempt to draw such a distinction was brought before the Select Committee by feminists equally certain of their opposition to reproductive technologies and their commitment to the woman's proprietorship over her body, including the fetus. The critical objection to IVF, they urged, is that it brutalizes by "cheapen[ing] our view of life" (1601). Further, birth technology insults women by tearing away the veil of privacy and dispelling the mystique of birth and motherhood. The final injury is that this mystique is expropriated by male doctors, who are worshipped by infertile women as the font of their own motherhood (1605).

One may wonder whether IVF is a more effective tool for dispelling the mystique of motherhood and cheapening life than abortion clinics. To the protestation of IVF scientists that their services were eagerly sought and gratefully received by thousands of infertile women, feminists responded with the dictum that such women had been co-opted by press sensationalism and commercial soft-sell. May not as much be said of the clinic? One may accept that there is a difference, in the feelings of the feminists before the Select Committee, between abortion and reproductive technology. But what it may be does not emerge from their arguments.

DOCUMENTS

Human Embryo Experimentation in Australia. 1986. Senate Select Committee on the Human Embryo Experimentation Bill 1986. Canberra: Australian Government Printing Service.

Senate Select Committee on the Human Embryo Experimentation Bill 1986. Official Hansard Record. 7 vols. Canberra: Australian Government Printing Service.

Ethics in Medical Research: Report of the NH&MRC Working Party on Ethics in Medical Research. 1983. Canberra: Australian Government Printing Service.

Ethics in Medical Research Involving the Human Fetus and Human Fetal Tissue. 1983. Medical Research Ethics Committee of the NH&MRC. Canberra: Australian Government Printing Service.

[Asche Committee Report]. 1984. Family Law Council Subcommittee on Reproductive Biology, *Interim Report.* Canberra: Australian Government Printing Service.

Creating Children: A Uniform Approach to the Law and Practice of Reproductive Technology in Australia. 1985. Family Law Council. Canberra: Australian Government Publication Service.

[Waller Committee Report]. 1984. Committee to Consider the Social, Ethical and Legal Issues Arising from In Vitro Fertilization. *Report on the Disposition of Embryos Produced by In Vitro Fertilization.* Melbourne: Government of Victoria.

[Warnock Committee Report]. 1984. *Report of the Committee of Enquiry into Human Fertilization and Embryology.* London: Stationery Office.

Legislation on Human Infertility Services and Embryo Research: A Consultation Paper. 1986. Department of Health and Social Security. London: Stationery Office

The Second Report of the Voluntary Licensing Authority for Human In Vitro Fertilisation and Embryology. 1987. London: Medical Research Council.

[Demack Committee Report]. 1984. Special Committee Appointed by the Queensland Government to Enquire into the Laws Relating to Artificial Insemination, In Vitro Fertilization and Other Related Matters. *Report.* Queensland Government Printer.

Report of the Working Party on In Vitro Fertilization and Artificial Insemination by Donor. 1984. By Aileen Connon and Philippa Kelly. South Australia.

Final Report, Committee to Investigate Artificial Conception and Related Matters. 1985. Chairman: Mr. Don Chalmers. Tasmania.

Interim Report of the In Vitro Fertilization Ethics Committee of Western Australia. 1984. Chairman: Mr. Robert Meadows.

Proposed International Guidelines for Biomedical Research Involving Human Subjects. 1982. Geneva: World Health Organization.

Protecting Human Subjects. 1981. First Biennial Report on the Adequacy and Uniformity of Federal Rules and Policies, and Their Implementation, for the Protection of Human Subject in Biomedical and Behavioral Research. President's Commission for the Study of Ethical Problems in Medicine. Washington, D.C.: Government Printing Office.

REFERENCES AND BIBLIOGRAPHY

Anderson, W.F. 1984. "Prospects for human gene therapy," *Science* 226, 401-09.

Barber, Bernard, John Lally and Julia Makarushka. 1973. *Research on Human Subjects: Problems of Social Control in Medical Experimentation.* New Brunswick, N.J.: Transaction Books.

Baron, Robert. 1983. "Higher Education and the Corporate Sector: Ethical Dilemmas," in *Ethical Principles, Practices, and Problems in Higher Education*, edited by M.C. Baca and R.H. Stein. Springfield, Ill: Charles C. Thomas.

Bartels, Ditta. 1987. "The Human Embryo as Research Material," paper presented at the 56th annual ANZAAS Congress, Palmerston North, N.Z.

Baskin, Yvonne. 1984. *The Gene Doctors: Medical Genetics at the Frontier.* New York: Morrow.

Bates, Erica and Helen Lapsley. 1985. *The Health Machine: The Impact of Medical Technology*. Ringwood, Vic.: Penguin.
Bayles, Michael D. 1984. *Reproductive Ethics*. Englewood Cliffs, N.J.: Prentice-Hall.
Bean, L.R. 1982. "Entrepreneurial Science and the University," *Hastings Center Report* 12 (5), 5-9.
Callahan, Daniel C. 1970. *Abortion: Law, Choice and Morality*. New York: Macmillan.
Carmen, Ira H. 1985. *Cloning and the Constitution*. Madison: University of Wisconsin Press.
Caton, Hiram. 1986. *The Humanist Experiment: Superman from the Test Tube*. Brisbane: Council for a Free Australia.
_____ 1987. "The Ethics of Human Embryo Experimentation: The Testimony of Scientists to the Senate Select Committee on the Harradine Bill," *Linacre Quarterly*, in press.
Clarke, Roger. 1987. "Regulating Biomedicine by Law," *Search* 18, 156.
Clements, C.D. 1984. "The Bureau of Bioethics: Form without Content is Meaningless," *Perspectives in Biology and Medicine* 27, 171-182.
_____ 1985. "'Therefore Choose Life': Reconciling Medical and Environmental Bioethics," *Perspectives in Biology and Medicine* 28, 407-425
Clements, C.D. and R.C. Sider. 1983. "Medical Ethics' Assault Upon Medical Values," *Journal of the American Medical Association* 250, 2011-2115.
Corea, Gena. 1977. *The Hidden Malpractice: How American Medicine Treats Women as Patients and Professionals*. New York: Morrow.
_____ 1985. *The Mother Machine: Reproductive Technologies from Artificial Insemination to Artificial Wombs*. New York: Harper & Row.
Corea, Gina, *et al*. 1985. *Man-Made Women: How New Reproductive Technologies Affect Women*. London: Hutchinson.
Culliton, Barbara. 1981. "Biomedical Research Enters the Marketplace," *New England Journal of Medicine* 304, 1195-1201.
Cummins, J.M. 1985. "In Vitro Fertilization and the Ethics of Embryo Research." Lecture to the Second Annual General Meeting

of the Institute of Biology in Australia, University of Queensland. Xerox copy.
Destro, Robert. 1986. "Quality-of-Life Ethics and Constitutional Jurisprudence: The Demise of Natural Rights and Equal Protection for the Disabled and Incompetent," *Journal of Contemporary Health Law and Policy* 2, 71-130.
Edwards, Robert G. 1974. "Fertilization of Human Eggs in Vitro: Morals, Ethics and the Law," *Quarterly Review of Biology* 49, 3-26.
Edwards, Robert G. and David J. Sharpe. 1971. "Social Values in Research in Human Embryology," *Nature* 231, 87-91.
Engelhardt, H.Tristram. 1986. *The Foundations of Bioethics*. New York: Oxford University Press.
Fletcher, Joseph. 1974. *The Ethics of Genetic Control: Ending Reproductive Roulette*. New York: Doubleday.
_____ 1966. *Situation Ethics: The New Morality*. Philadelphia: Westminster Press.
_____ 1973. *To Live and To Die: When, Why, and How*. New York: Springer Verlag.
Glover, Jonathan. 1985. *What Sort of People Should There Be?* New York: Penguin.
_____ 1977. *Causing Death and Saving Lives*. New York: Penguin.
Grobstein, Clifford. 1981. *From Chance to Purpose: An Appraisal of External Human Fertilization*. Reading, Ma.: Addison-Wesley.
Hayes, Susan C. and Robert Hayes. 1982. *Mental Retardation: Law, Policy and Administration*. Sydney: The Law Book Company.
Horan, Dennis. 1977-1978. "Fetal Experimentation and Federal Regulation," *Villanova Law Review* 22, 325-356.
Horan, Dennis J. and David Mall, eds. 1980. *Death, Dying and Euthanasia*. Frederick, Md.: University Publications of America.
Horan, Dennis J. and Melinda Delahoyde, eds. 1982. *Infanticide and the Handicapped Newborn*. Provo, Utah: Brigham Young University Press.
Jones, D. Gareth. 1984. *Brave New People: Ethical Issues at the Commencement of Life*. Leicester: Inter-varsity Press.

Kass, Leon. 1985. *Toward a More Natural Science: Biology and Human Affairs*. New York: Free Press.
Kenney, Martin. 1986. *Biotechnology: The University-Industrial Complex*. New Haven: Yale University Press.
Kluge, Eike-Henner. 1975. *The Practice of Death*. New Haven: Yale University Press.
Koop, C. Everett and Edward R. Grant. 1986. "The 'Small Beginnings' of Euthanasia: Examining the Erosion in Legal Prohibitions Against Mercy-Killing," *Notre Dame Journal of Law, Ethics and Public Policy* 2, 585-634.
Kuhse, Helga and Caroline de Garis, eds. 1984. *The Tiniest Newborns: Survival--What Price?* Proceedings of the Conference held at the Royal Australian College of Surgeons. Melbourne: Monash Centre for Human Bioethics.
Kuhse, Helga and Peter Singer. 1985. *Should the Baby Live? The Problem of Handicapped Infants*. Oxford: Oxford University Press.
Lederberg, Joshua. 1966. "Experimental Genetics and Human Evolution," *Bulletin of Atomic Scientists* 22, 4-11.
_____ 1966a. "Experimental Genetics and Human Evolution," *American Naturalist* 100, 519-31.
_____ 1963. "Biological Future of Man," in *Man and His Future*. Ciba Foundation. London: Churchill.
_____ 1972. "Biological Innovation and Genetic Intervention," in *Challenging Biological Problems: Directions Toward their Solution*, ed. by John A. Behnke. New York: Oxford University Press, 1972
Liberation or Loss: Women Act on the New Reproductive Technologies. 1986. Papers presented at the national conference on new reproductive technologies and their impact on women. Canberra: Centre for Continuing Education.
Lifton, Robert Jay. 1986. *The Nazi Doctors: Medical Killing and the Psychology of Genocide*. New York: Basic Books.
Linnell, R.H. 1983. "Conflicts of Interest: Research, Consulting, and Private Practice," in *Ethical Principles, Practices, and Problems in Higher Education*, edited by M.C. Baca and R.H. Stein. Springfield, Ill: Charles C. Thomas.

_____, ed. 1982. *Dollars and Scholars: An Inquiry into the Impact of Faculty Income Upon the Function and Future of the Academy*. Los Angeles: University of Southern California Press.
Lynn, Joanne, ed. 1987. *By No Extraordinary Means: The Choice to Forgo Life-Sustaining Food and Water*. Bloomington: University of Indiana Press.
McCaughey, H.E. Dr. Davis. 1987. "Medical Ethics: Who Decides What and How?" 23rd Tracy Maund Memorial Lecture at the Royal Women's Hospital. Xerox copy.
McCullagh, Peter. 1986. "Better than Warnock," *The Tablet*, 1249-1251.
Morris, Bede. 1984. "Transplantation and Cannibalism: Ethical Problems of Contemporary Medicine," lecture delivered at the University of Adelaide. Xerox copy.
Morris, Bede. n.d. "Unnatural Selection and the Destiny of Humanity." Xeroxed paper.
Office of Technology Assessment. 1984. *Commercial Biotechnology: An International Analysis*. Washington, D.C.: U.S. Government Printing Office.
Overduin, Daniel Ch. 1982. *Life in a Test-Tube: Medical and Ethical Issues Facing Society Today*. Adelaide: Lutheran Publishing House.
Panem, Sandra. 1984. *The Interferon Crusade*. Washington, D.C.: Brookings Institute.
Pfeffer, Naomi and Anne Woollett. 1983. *The Experience of Infertility*. London: Virago Press.
Ramsey, Paul. 1970. *Fabricated Man: The Ethics of Genetic Control*. New Haven: Yale University Press.
Ravetz, J.R. 1971. *Scientific Knowledge and its Social Problems*. London: Penguin.
Restak, Richard M. 1973. *Pre-meditated Man: Bioethics and the Control of Future Human Life*. New York: Viking Press.
Roberts, Edward, et al., eds. 1981. *Biomedical Innovation*. Cambridge: MIT Press.
Rowland, Robyn. 1986. "Women as Living Laboratories: The New Reproductive Technologies," in *Gender, Deviance and Social Control*, edited by J. Figueira-McDonough and R. Sarri. San Francisco: Sage.

Rosenfeld, Albert. 1969. *The Second Genesis: The Coming Control of Life*. Englewood Cliffs: Prentice-Hall.

Science, Technology and Human Values. 1985. Special Issue: *Secrecy in University-Based Research: Who Controls? Who Tells?*

Scott, Russell. 1981. *The Body as Property*. London: Allen Lane.

_____ 1985. "Legal Implications and Law Making in Bioethics and Experimental Medicine," *Journal of Contemporary Health Law and Policy* 1, 47-74.

_____ 1987. "Regulating Biomedicine by Law--Delusions at the Epicentre," paper presented at the 56th annual ANZAAS Congress, Palmerston North, N.Z.

Singer, Peter & Deane Wells. 1984. *The Reproductive Revolution: New Ways of Making Babies*. Oxford: Oxford University Press.

Stableford, Brian and David Langford. 1985. *The Third Millennium: A History of the World: AD 2000-3000*. New York: Knopf.

Stover, Eric and Elena Nightingale, eds. 1985. *The Breaking of Bodies and Minds: Torture, Psychiatric Abuse, and the Health Professions*. New York: Freeman.

Tooley, Michael. 1983. *Abortion and Infanticide*. Oxford: Oxford University Press.

Trounson, Alan. 1987. "In Vitro Fertilisation--Past, Present and Future," *Search* 18, 116-118.

Veatch, Robert M. 1976. *Death, Dying, and the Biological Revolution: Our Last Quest for Responsibility*. New Haven: Yale University Press.

Wade, Nicholas. 1980. "Cloning Gold Rush Turns Basic Biology into Big Business," *Science* 208, 688-89, 691-92.

_____ 1984. *The Science Business: Report of the Twentieth Century Fund Task Force on the Commercialization of Scientific Research*. New York: Priority Press.

Walters, LeRoy. 1979. "Human In Vitro Fertilization: A Review of the Ethical Literature," *Hastings Center Report*, August 23.

Walters, William A.W. 1982. "Cloning, Ectogenesis, and Hybrids: Things to Come?," in *Test-Tube Babies: A Guide to Moral Questions, Present Techniques and Future Possibilities*, edited by W.A.W. Walters and Peter Singer. Melbourne: Oxford University Press.

Watson, James D. 1971. "Moving Toward the Clonal Man: Is This What We Want?," *The Atlantic Monthly* 227 (5), 50-53.

Weir, Robert. 1984. *Selective Nontreatment of Handicapped Newborns*. New York: Oxford University Press.

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