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Bio-Technology and the Future of Humanity: An Investigation of the New Reproductive Technologies and Their Impact on Women.*

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Biographical Note

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Her current work is on reproductive technology and she is co-editor with Rita Arditti and Shelley Minden of Test Tube Women: What Future for Motherhood? (1984) and co-author with Gena Corea et a1 of Man-Made Women (1985). She is presently a post-doctoral research fellow at Deakin University, Australia and continues her research on the new reproductive technologies and genetic engineering and their impact on women. She is also an editor of the Athene Book series, the Women's Studies International Forum, and Reproductive and Genetic Engineering:An International Journal of Feminist Perspectives.

Biotechnology is an umbrella term which includes procedures and manipulations - frequently in combination with gene technology, specifically the recombinant DNA method and cloning[1] - on plants, animals and human beings. Basically its principles are that:

a) plant, animal o r human cells, often with the help of bacteria and viruses, are used as living factories to produce 'artificially assisted' substances such as drugs and vaccines, and/or;

b) by introducing a foreign piece of DNA into their genome, original cells are altered, i.e. 'improved', to correct nature's seeming 'imperfections'.

Common to alt the technologies is that they are experimental: first, because they have been developed for less than twenty years with the bulk of the developments in the last ten years, and second, because they emanate from a compartmentalised, reductionist and mechanistic conception of the nature of life. The basic idea is that by multiplying or exchanging a specific gene or part thereof the researchers know what they are doing, i.e. are in control of their manipulation. In reality, however, no one knows what influence this manipulation will have on other parts of the manipulated organism, or, in the case of a manufactured product (i.e. genetically altered bacteria to resist frost or eat oil), what kind of interactions will take place between these new organisms and their own cellular environment as well as the outside world. Moreover, once created and released, such new organisms can never be recalled. But in spite of the many potential dangers - including the use of biotechnology

for genetic warfare[2] - bio-technology internationally has become the fastest growing industry. Big Business with its mentality to make money quickly and think-about the consequences later is virtually swamping the world with new factories and applications for patenting of biotechnology procedures including the creation of new animal species (e.g. the famous 'geep', hybrid made from joined sheep and goat cells, see Schneider, 1987).

Big Business also demands that the invested capital will pay off, in other words markets to make profits need to be created. This will, for instance, increase the dependence of the so-called Third World on industrialised western countries. It will also create new needs in people to buy biotechnology products or to use biotechnological procedures. And it is to be feared that the 'gene revolution' will be as unsuccessful as and, perhaps, cause even greater harm than the 'Green Revolution' of the 1960s.

New Human Reproductive Technology - biomedical procedures by another name - is one field of this new industry. In its widest definition it means that its promoters believe that the production of human offspring can no longer be left to 'nature' - mainly women - but needs to be 'artificially assisted'. It is to this topic that I will turn now and, quite specifically, to the crucial role that women play in the development of - and I hope resistance to! - these new Reproductive Technologies (nRTs) because of the essential link between IVF (in vitro fertilisation, better known as the test-tube method where the egg cell is fertilised with sperm in a glass dish in the laboratory outside the woman's body) and experimentation on human embryos.

I do not believe that these technologies 'are in women's interest and 'good' for women. On the contrary, it is my contention that these latest attempts at further medicalising women's lives in every aspect of our reproductive capacities from attempts to conceive to giving birth via technological interventions are neither a therapy nor a cure but what they amount to is medical experimentation on women's bodies and souls.

Secondly, I believe that this medical experimentation is a new form of violence against women, and, instead of curing a problem, often creates one: psychological and physiological illness. Procedures associated with the nRTs amount to a violation of a woman's bodily integrity, of her physical health and mental sanity, and, in fact, quite fundamentally of her dignity as a human being. Moreover, for example, instead of satisfying the 'clients' on test-tube baby programmes by giving them their desired child, because of the programmes' low success rates, 85 to 90 out of 100 women leave the clinic without child. Instead, many of them are deeply disturbed about being 'failures' once more: this time even with the 'help' of technology. In addition to this turmoil they may have to pay a high price: short and long-term physical damage done to their bodies from the hormones administered as part of the IVF procedure.

Thirdly, I want to argue that whilst the promoters of increased medical intervention in the process of human procreation speak of 'choice', 'free will' and 'voluntary consent' of the patients[3] who, as they maintain, are perfectly 'free' to refuse participation in their human experimentation laboratories, I believe that increasingly it is not 'choice' but often choice amounting to coercion which makes women worldwide queue, for example, for IVF programmes, or ask for more prenatal tests.

I will begin by looking at some examples from IVF to illustrate my point that the nRTs amount to experimentation on women's bodies and that I perceive them as a violation of women's bodily and mental dignity. Furthermore, as a participant in a survey which I conducted in Melbourne in early 1987 among women who left the IVF clinics without a child stated they do not work for the women on the programmes. Rather, as she put it: 'The only ones it works for are the scientists and doctors'- not us!'[4] And they also work for Big Business: multinational drug companies which have invested billions in the area of biotechnology including human reproduction and therefore have to constantly expand their markets in order to make profits.

Next, I shall briefly discuss the choice vs. coercion argument and conclude with a look at what the future holds for all women - not just for those with a fertility problem - which is rapid new developments on pre-implantation diagnosis and the maturation of immature eggs in vitro.

1. Experimentation that Amounts to Violence

Since the birth of the first test-tube baby in 1978 the international clique of 'technodocs' - a term used to describe both IVF scientists and doctors - have reported the following 'firsts': from Australia, in 1983 the birth of an IVF child from a donated egg, and in 1984 a birth from a frozen embryo as well as the first IVF quadruplets. 1983 also saw the US 'first': an IVF birth via 'lavage' meaning that the body of a woman was employed as a temporary surrogate by artificially inseminating her and flushing out the embryo before it implanted itself in her womb and inserting it into the uterus of the sperm donor's wife. (Bustillo et a1, 1984). In September 1985 we were told about the first pre-sexed IVF baby: a boy born in an IVF clinic in New Orleans, and in 1986 news reached us about the first birth - twins - from frozen egg cells in Adelaide, South Australia. Finally, in 1987, we heard about the 'frozen sister': a test-tube sister born to an English IVF child who in 1985 had been 'harvested' from the same egg-crop - an Australian IVF practitioner's term - as the first child, then was frozen and thawed/implanted in her mother's womb 18 months later[5], as well as the first woman in the world to give birth to her. own grand children: a 47 year old South African woman who had her daughter's fertilised eggs implanted which resulted in triplets born by a caesarian section.[6]

In addition to these 'successes', the 'reproduction supermarket' as Robyn Rowland and Gena Corea have called it, has also given us a pool of human eggs to choose from at the Cleveland Clinic in Ohio, U.S.A.,[7] and a host of new IVF techniques:

PROST - putting the fertilised egg back at the end of the fallopian tubes meaning that the technique is clearly made for infertile men, since a 'functioning' woman with fallopian tubes is required),[8] - or a recent 'success' from London: a pregnancy achieved through the replacement of a donated frozen embryo in the fallopian tube.[9] And we have Michele, the child born seven weeks after her mother was declared dead from a brain tumor but kept alive on a life-support until the birth, and the girl baby without a brain that was carried to term by her mother, artificially kept alive and flown from Canada to California to have her heart donated to a new born boy with a heart problem.[10] And as a German neurologist predicts: the technology exists to produce embryos in vitro, then manipulate them in a way that, implanted in a 'surrogate mother's' womb -and poor women in the Third World come to mind immediately - they can be carried to term as anencephali (without brain) and their organs sold to sick people - the ultimate use of women as living incubators.[11]

All these events are hailed as 'successes' by those who seem to perceive women as birth machines whose parts can be combined at will and whose mental state whilst being used as temporary breeders or anxiously waiting to find out whether the embryos inserted in their wombs would 'take' are of no importance what so ever. In contrast to those who see them as successes I see them as dehumanising experimentation: as treating women's bodies and minds as matter that is not part of a living being. The dehumanising aspect, becomes most obvious in a new method called Intravaginal Culture and Embryo Transfer and described as providing 'a simple, fast, and inexpensive approach to the fertilization and culture of human oocytes'. After fertilisation of extracted oocytes, the embryos are put in a hermetically sealed tube and 'placed in the mother's vagina, held

in place by a diaphragm, for an incubation period of 44-50 hours'. As Dr Ranoux of the University Clinic in Paris said of his new technique (which 12 by the way earned him a prize)12:

> Intravaginal culture simplifies the laboratory manipulations needed for in vitro fertilization, since no incubator or carbon dioxide is needed.

'No incubator is needed.....'!? - or should one say that, as the technodocs see it, the new technology helps a woman to assume her proper role? As Ireland's leading IVF specialist, Roby Harrison, puts it: 'the best incubator is the one God provided.'[13] I can hardly envisage a more reductionist picture of a woman than a body whose vagina incubates her own future child in a test-tube.

And women on the IVF programme are indeed acting like good incubators - they walk ' voluntarily' into a lab, present their veins for endless blood samples - as many as 200, as some women in my study report - swallow fertility drugs as told, bear hormone injections and do not dare to complain about 'side effects' such as:.

> hot flushes and abdominal discomfort or bloating, blurred vision, nausea, nervous tension, depression, fatigue, dizziness and lightheartedness, insomnia, headaches, back problems, and breast soreness.[14]

Incubators that are required to submit themselves to an ever increasing battery of new experimental procedures such as untested and potentially dangerous 'hormone cocktails' as. a French gynaecologist (Cabau 1986: 2-4; see also Laborie 1988) calls them: mixtures of different hormones to, on the one hand, stimulate the growth of a multitude of egg follicles, but on

the other eliminate woman's own bodily functions - that is make her menopausal - in order to then start them afresh with fertility hormones. And 'it works' reports a doctor excitedly 'the women even get hot flushes'.[15]

All of this is very dangerous. The Journal of In Vitro Fertilisation and Embryo Transfer reports the case of a 25 year old woman who underwent hyperstimulation on an IVF programme in Bristol, U.K., which led to rapidly developing cancer covering both ovaries, appendix, uterus and bladder. Superovulation seems thus to promote cancerous cell growth (Carter and Joyce, 1987: 126-128). Yet another time-bomb may be ticking in Chlomid - one of the most frequently prescribed follicle stimulating hormones on both IVF programmes and 'conventional' infertility treatments. It bears a very close structural similarity to DES (Diethytstilbestrol), a drug which was prescribed to women prone to miscarriage from the 1940s to the 1970s and which resulted in 3-5 million daughters and sons with fertility problems and, in the case of the daughters, with increased incidence of cancer of the womb and the vagina as well as increased rates of breast cancers for the mothers.[16]

Not only have the women to submit themselves to experimentation with regard to follicle and egg cell growth but also to new egg recovery methods. One such method hailed as 'real progress' which is said -to be painless and entailing the additional benefit of letting women participate in the egg recovery is described by an Austrian medical student who participated in a course on IVF as follows:[17]

> Lying on the gynaecologist's chair, legs apart, an object for the spectators, the woman was shaking with shame and fear.... Dr. X, sitting between her legs, introduces the vaginal scanner.
>
> Free-handed he punctures the follicles by each time thrusting the needle into the woman, analogous to the desire to penetrate. All the students present stare at her genitals. After harvesting 5 follicles the woman wants to stop the torture because it hurt so ... much. "But", Dr. X says soothingly, "there are still such beautiful follicles", and against her will follicle six and seven are punctured as well. Each time, with each thrusting of the needle she shakes with pain but Dr. X insists on continuing even to the point where only a black follicle which looks like a bubble remains. It turns out to be a cyst.
>
> And all of this is considered routine despite the fact that while puncturing a follicle, Dr. X injured the iliac vein. Such life-threatening injuries are diminished and cast aside with jokes: when he had finished, the doctor suggested the patient had breakfast with her husband and go shopping.'

I think these examples amply demonstrate that IVF is far from being an 'established practice' as IVF practitioners internationally like to call it, in order to sell it to the public as something which is here to stay, but that it continues to be violent experimentation on women's bodies, we need to remind ourselves that the IVF success rates worldwide remain between 5 and 10% only and that they do <u>not</u> go up. Furthermore, it remains to be seen what happens with the various hormone cocktails and in particular Buseriline which involves 'short-circuiting' the pituitary: they may have yet unknown serious effects on other metabolic processes.[18] Moreover, so far they have not lead to more pregnancies and, most importantly, to more births. But what they are leading to is more eggs -and hence more embryos - which, as will be discussed later, is of direct use to the IVF scientists. In other words thousands of women throughout the world are experimental guinea pigs whose bodies and souls are violated in the process of being 'egg farms' (Murphy, 1984): of providing scientists with a constant flow of eggs.

And, to repeat myself, the women don't even get what they supposedly started the programe for: a child. Many of them are angry at IVF practitioners and their failure to treat them as human beings, but who instead treat them as defect machines to be poked and tampered around with until they produce. And if they don't deliver their goods, they are thrown off the programme and refused further help. Their space is needed for a new experimental object. As one woman in my study put it:

> I felt like a baby machine; no one was interested in me as a person. I was just a chook with growing eggs inside - and if they didn't grow properly then it was my own fault.

Another said:

> No one ever talked to us about our experiences in the programme. I mean the psychological side of it. Doctors don't place a great deal of importance on you. For them you are just X, just another number and if you have 'failed', another statistic.

Many women who do 'fail' - sometimes after eight or more attempts spanning a time of five or more years in which their lives are suspended and they have been up and down on an emotional roller coaster again and again - at the end have become ill in the very real sense of the word: my research has revealed cases where the administered drugs led to irreversible neurological damage and even to infertility caused by contracting an infection during egg recovery via the vagina. And we may soon see more and more women with chronic illnesses from the hormones. From my study it is evident that the majority of the 90 to 95% women for whom IVF was unsuccessful had the most abysmal time in adjusting finally to life without children when it was all over. As one woman explained to me:

> When I was told after the third attempt that my eggs weren't good enough and that I should give up I was shocked and utterly devastated. I remained deeply depressed for more than a year and I was suicidal a lot of the time. I felt such an abysmal failure, a barren woman unable to give my husband a child and my parents their grandchildren. I had even failed technology.

She speaks for many others who after years of having been coached into becoming Mother Machines (Corea 1985a) are then confronted with the shock that there is no other way than to embark on the grieving process in order to finally accept that there will be no biological child (or no more biological children).[19] I contend that precisely because of the IVF programme, for many this process will be much harder than had they begun it some years ago. The years of being experimented upon on body and soul leave marks on their sense of self and identity. Being dropped as a 'bad statistic' without any support offered to cope with the. shock and often having become economically dependent on the husband because of IVF's high cost is great harm done to women who were mislead into believing that the nRTs would indeed provide them with the child they wanted. It is the exploitation of a desire without true choice which I will explore further in the next section.

2. Choice vs. Coercion: Women as Victims and Colluders

'But women want it....! or 'No one forces a woman to go on an IVF programme...' are two of the most frequent responses thrown back at critics of the nRTs. Implicit in this statement is a total lack of understanding of the many societal forces that coerce women into having children. This is especially true in the pronatalist industrial West so as to overcome the imminent 'Birth Dearth' warned against in a recent U.S. publication (Wattenberg, 1987).[20] Economic considerations which demand

that women step outside the jobmarket (or are employed only in part-time positions as a cheap and flexible 'reserve' labour force) also play a role. Equally important, however, are continuing sex-role stereotypes -often internalised by women themselves - that a 'real' woman is only a woman with child. There is still a tremendous stigma attached to a fertility problem and almost all women in my study said they felt embarrassed and 'guilty' about not being able to produce a child.[21] Because IVF is sold by its promoters as a feasible procedure and the risks involved are not mentioned, many women now feel that they have no choice but to try their luck. 'I feel I had to do it', 'it seemed our last chance, 'I wanted to have done absolutely everything possible' are among the most frequently voiced statements in my study. Even by women who don't really believe that IVF will work. As one participant remembers:

> I never really believed it would work. But I felt I had to do it. so that I then could say "I've done absolutely everything."

Once on the programme the women have to give up their autonomy. From the doctors' point of view they have come to them because they want a child 'at any price'. Women who question certain procedures are not liked. As one woman told me:

> When I came with my list of questions Dr X patted me on my head and said: "now don't you worry your little head off ... we know what's best for you, so if you co-operate and stop worrying you'll have a good chance." Later, however, he stopped being so 'nice' and once, when I complained about his assistant being too late for egg pick-up - which meant that I had missed my chance that month -he commented sharply that "doctors' wives always cause trouble" and "you want a child, don't you? - if you do, then give up your job, stop being a problem and co-operate." So I felt I had to shut up or risk delay on the programme.

In my view these are not true but rather 'constructed choices'[22] with little space left to say 'no' to the procedures - or parts of them. How many women will say no when they are asked for spare eggs or embryos for

research for fear they might have to pay for this refusal with worse treatment? To talk about asking them for 'informed consent' when they are in such a vulnerable position is a farce to say the least.[23] It is also unlikely that many, when finally on the programme (the waiting lists can be as long as two years), will have the courage to say 'stop' (but some do!).[24] Most of the participants in my study are women determined to comply with whatever they are told to make the operation 'child' successful. They may resent the patronising treatment they receive, they may even worry about damage done to their bodies and they readily admit that they are under enormous mental and physical stress, for instance to make the programme's demands fit in with their work, but they believe they must go on. In addition to their husbands they now feel that they can't let the doctors down.[25]

It is thus my contention that the combination of exterior pressure forcing people with a fertility problem £o undergo IVF and interior problems of abiding by the rules of the experts in white,26 on top of the very real pain that .the unfulfilled desire for a child can cause, leaves women very little choice of foregoing IVF, or, as I will shortly elaborate, the rapidly expanding range of other technical interventions such as pre-implantation and pre-natal diagnosis. In addition to these self-perpetuating dynamics I want to conclude this section with two further examples which in my view clearly indicate that 'choice' with regard to the use of the news technologies isn't true choice but, often amounts to coercion. And no, this is not science fiction, this is 1987:

After talking to me with great anger about how abysmally badly she had felt when treated by Professor X ('he is a real pig', 'he is absolutely star-struck with himself', 'he isn't interested in people, only in

science') and how deeply she resented being dismissed from the programme because of the presence of sperm antibodies and being told that there was no hope for her and her husband - they were and would always be infertile - she then proceeded to tell me that only four weeks after leaving the programme she became pregnant (without any drugs) and is now the mother of an 8 month old baby. But then, with a monotonous voice, she proceeded to say 'I suppose, however, that one day I will have to go back.' 'I don't understand', I replied. 'Go back? What do you mean?'. 'Well', she continued:

> You see it's these frozen embryos. I've got frozen embryos from all three attempts. Now, I don't want them to be flushed down the sink, I don't want to give them for research and I don't want to give them to another woman (I couldn't bear the thought that my child was running around without me knowing it). So what other option is there than go back. I know it sounds sick. Here I am feeling so angry about the programme, being totally sick of it, even having my own child ... and yet, you know ... you just plug on, on and on ... Also, I must admit I feel quite maternal towards my embryos in the fridge - I used to tell my friends and they used to laugh - and I'm actually worried: I don't think we had a bill for a while for storage fees... I'd be really p... off if something had happened to them...

This is where I believe that the extent of coercion implicit in IVF reaches a new dimension.[27] A further conversation with another woman who remembered her feelings when the embryo transfer had failed made me name IVF for the first time a sadist[28] practice, devised to simultaneously keep women hooked to it and set them up for failure. These are her words:

> I cried and cried when I heard that the embryo transfer hadn't worked. Ever since they had allowed John and me to have a look at our embryos in the glass dish through the microscope I had really believed it. Yes, we could have our own children, there they were... mind you I don't actually think of them as babies but these cells have the potential to become a baby... our own baby... for the first time that abstract hope 'child' becomes real... and then all you get is this phone call: "Sorry, Mrs.H. see you next time..." and you ache and ache but then sign on again because it seems you were so close, close as never before in your life.. so you had to give it another try...

It is precisely the embryo transfer which does not work in the majority of cases. And it is precisely the question of why the embryos do not implant themselves in the womb about which the IVF scientists remain most in the dark. But people on IVF programmes are not told this. Instead, and especially so when they were able to look at their embyros through the microscope, they are made to believe that for the first time ever they were dose to having their own child. I believe that it is this very real sensation which has been described to me by many women in one way or another, plus the total absence of any acknowledgement of the depth of the loss, an-d hence grief experienced, which fills many women with such despair that they see no other option than to sign on for another round, traumatic though it may be. Again I do not believe that the word ochoice' can be used in such a context. But for those who disagree and also think that women on IVF programmes are a small and special group only[29] and that theirs are but individual problems, I shall conclude my presentation with some more thoughts on 'choice' with regard to the use of reproductive technologies in the lives of the next generation of women.[30]

3. Experimentation and Coercion that will Affect All Women

Experimentation and coercion meet - and will increasingly do so - in the development of pre-natal diagnosis and the newly created field of pre-implementation diagnosis. But what is pre-implantation diagnosis?

Internationally, biotechnological firms are at present engaged in a competitive rat race to develop so-called DNA probes which are able to recognise specific marker genes in chromosomes.[31] These chromosome parts in turn point to defect or missing genese[32]. In this way, it is claimed that in the future it will be possible to diagnose 3000 genetically caused diseases by removing one cell from a 4 to 8 cell embryo, a procedure which is called 'embryonic biopsy' and which will thus allow a check-up of the embryo before it implants itself in the woman's womb, so that only 'good' embryos would be put back.

Firstly, there is an unspoken fundamentally biological determinist and eugenicist ideology in such attempts to equal anything deviating from the 'norm' (which norm?, made up by whom?) with a defect gene. Despite the assertion by medical experts that only 3% of all present birth 'defects' are caused by genetic disorders (Fabro, 1985:4), the public is made to believe that proven genetic disorders are much more frequent. Secondly, the substantial financial investment in the development of tests for pre-implantation diagnosis makes it quite obvious that a market wilt have to be created: developed supposedly for 'couples at risk' only - in the same way that amniocentesis has become almost compulsory for many

women (see Farrant, 1985: 96-122),[33] pre-implantation diagnosis could become mandatory. Women's 'choice' would thereby be even further diminished: the choice to say 'no' to these technologies and take on the risk of bearing a child with some birth defect may not longer exist.

It is thus wrong to believe that what happens today in the field of the nRTs and, specifically, IVF, will remain confined to infertile people. In the same way that amniocentesis, chorionic vi1i biopsy and especially ultrasound[34] have become 'information - age rites of passage for pregnant women' (Ince, 1987: 79), it is reasonable to believe that pre-implantation diagnosis wi11 soon be recommended - if not forced upon - more and more women, in fact to a11 pregnant women who will be made to feel so insecure about their 'imperfect' bodies - and normally responsible if something is wrong with their child (which includes not being eligible for pregnancy benefits) - that .this will become a new coercion for pregnant women to submit themselves - and their flushed out embryos! - to more and more tests. To put it quite bluntly I believe we are faced with a future where IVF will be recommended as the preferred method of conception - the clean fuck so to speak - because parents to be wi11 be assured that IVF would be a much easier way to ensure the imperative quality control of the embryos than having to flush them out of a woman's womb.

However, there remains a lot of work to do on refining this technology. And as it needs to be done on humans the only way, to develop more pre-implantation tests is via embryos obtained through IVF. It is here that the compulsory link between IVF and embryo research becomes evident: a link that so few people want to acknowledged, or even see. Yet the second report of the British Voluntary Licensing Authority (VCA), April 1987, states it quite clearly (p. 16):

> There are important research projects both to improve the present success rate for IVF and to develop techniques such as the freezing of eggs and pre-embryos that may be used with safety. Recently some projects have started that are related to the diagnosis of defects, in the pre-embryo. The aim is to avoid replacing pre-embryos with chromosonal or other abnormalities in the uterus; a vital concern for couples who are at risk of giving birth to children with severe inherited genetic disorders. (Underlining mine).

And where do these embryos come from? They come from women who have been superovulated to produce eggs, and, as elaborated earlier in this paper, possibly harmed greatly physiologically and psychologically (see also Rowland, 1987c). Until these tests are fully developed, having a constant supply of women's bodies remains thus imperative. And again the question needs to be asked 'who decides?' and, in line with what I have discussed earlier in this paper, what kind of experimental procedures are once more sold to the public as 'established medical practise'.

But pre-implementation diagnosis As only the beginning. 'The Next Stage: Gene Therapy' is the headline of a 1987 article which focuses on what could be done with defective parts at an even earlier stage. U.S. scientist Robert Desnick from Mount Sinai Medical Research Center is quoted as saying:

> Ultimately, genetic cures would mean "correcting all sperm and eggs as well, so you could never pass it on."

And the same article continues to assert that:

> By the mid-1990s, geneticists should be able to screen the general population for harmful genes and test - at birth - a person's Likelihood of developing certain types of cancer, high blood pressure and heart disease.

Such statements not only reveal deeply ingrained eugenicist ideas, they are also misleading. For one needs to be very clear about how unspecific gene therapy using the recombinant DNA technique really is: whilst it may be possible to substitute a specific gene, it is not possible to know (or even to test for) the effects the exchanged gene will have on other parts of the body. This is where the real danger of this technology lies: in a way similar to using hormones in IVF technology and disrupting hormone cycles, pre-implantation technology is playing around with disrupting peoples' genes without knowing any of the 'side effects'. In addition, the idea of gene therapy reveals a biologically determinist belief: surfacing once more is the old belief that 'biology is destiny' - this time it is our genes which are wrong and should be changed. 'Serious' research news that genetic markers for manic depression have been found[35] are deeply alarming and the formerly mentioned area of pre-implantation diagnosis has already become a familiar area of research as recently documented in the statement of the West German Research Foundation (DFG) which specifically recommends further research on pre-implantation diagnosis (Deutsche Forschungsgemeinschaft, 1987) and in many research communications presented at international congresses, (for example Verlinsky et a1. 1986: 186).

In conclusion, I believe, that more than ever women are 'living laboratories' (Rowland, 1984: 364) in the hands of the triumvirate scientists, doctors and pharmaceutical companies. Male infertility is high on the research agenda internationally[36] from France we hear that as many as 16% of the women on -IVF programmes are fertile and undergo the whole procedure because of their husband's fertility problems (Laborie, 1988).

Women on IVF programmes die - the most recent death occurred in Perth, Australia.[37] Women on IVF programmes get seriously sick, and women on IVF programmes do in fact not take a child home. Yet technodocs and biotechnology firms alike place increasing emphasis on the importance of developing genetic screening and genetic therapy as if these procedures could be performed without IVF, put differently, without invasive sadist experimentation on and violation of women. Indeed, with AIDS and the after effects of Chernobyl, freezing egg cells at an early age may soon be suggested as a safeguard for women in general (Tappeser, 1986, 132). Statements such as:

> I think in five years, gene cloning is going to be done in high school laboratories'

made by the president of Calgene, a genetic engineering company in California (Pollack, 1987), are deeply disconcerting. But the 'Final Solution to the woman Question' (Rowland, 1984: 356) may be developed among others by Patrick Steptoe, one of the 'fathers' of the first test-tube baby in his private clinic Bourn Hall in England: entitled 'Maturation of Immature Oocytes in Vitro'.[38] Steptoe is following cattle breeders such as lan Gordon at the University College of Dublin, Ireland. Gordon according to Vines (1987: 53):

> ....harvests immature eggs from the ovaries of cattle carcasses in slaughterhouses and matures the eggs in the laboratory. He has fertilised the eggs and matured them in the laboratory to the morula stage, when the embryo is a solid mass of cells.

One of Gordon's collegues, Christopher Polge of Animal Biotechnology Cambridge, UK, explains the aim (Vines, 1987: 53):

> We are looking for a cheap and more reliable source of embryos in cattle.... Then breeders wouldn't need to keep animals just to produce embryos (underlining mine).

Once the development of immature egg cells in vitro is possible, any slice from any woman's ovary - young or old, fertile or infertile - will do. Women could still be used as cheap labour, especially those of the 'wrong' colour from the 'wrong' class and the 'wrong' culture (see Klein, 1985) and women would still have to carry the embryos to term, unless, of course the artificial uterus, as again developed in cattle breeding,[39] were to be perfected soon.

The only way to stop women from becoming even more exploitable through their further reduction to producers of specific spare parts is to stop all IVF technology and by extension all embryo experimentation. There are many grounds on which this can be demanded: IVF is ill-making and dehumanising experimentation on women's bodies;[40] it is sadist coercion and the necessary prerequisite for fulfilling the increasing demand for eggs and embryos for genetic engineering purposes. There is a direct connection between making seem 'choice' so unavoidable that it will coerce some women into IVF and in the near future all women into pre-implantation diagnosis. The price to pay for a few babies when the future of women to keep the last remains of their reproductive autonomy is at stake, is too high. International resistance is needed, urgently.[41] All women whether fertile or infertile, whether mothers or voluntarily child-free, need to make space for women who are desperate with their desire for a biological child. There needs to be legitimacy conferred on discussions of the

seemingly compelling forces to biologically mother while at the same time the nRTs need to be exposed for what harm they do to women. But also, we must not hesitate to make it clear that every woman on an IVF programme is both a victim and a colluder in that she contributes to upholding the notion that these technologies can be beneficial. In these discussions also need to enter radical critiques of science which ask the question quite specifically why, after Chernobyl, anyone would believe any scientist who supposedly knows it alt and devises experiments for the good of mankind (sic). As Dale Spender puts it: 'Science is the history of mistakes':[42] how many more mistakes do we need before we seriously put human and financial resources into the theory and practise of a truly holistic science that will benefit the people instead of the scientists. Last but not least, it is time to recognise that by not speaking out we alt are collaborators in this most recent move to curtail women's true choices. We all need to speak out loudly and passionately against these technologies. We can no longer abdicate our responsibilities by washing our hands of the matter.[43] We must dare to raise discussions about motherhood, about the still ongoing deeply internalised feelings in many women that without a child of their own their lives are incomplete, or, for that matter, without a man - a husband - in their lives, life is incomplete. U.S. philosopher Janice Raymond in her important work A Passion for Friends: Toward a Philosophy of Female Affection (1986) has coined the term heteroreality by which she means that we a11 live in a patriarchal world in-which, supposedly, woman is created for man. Young women especially need women mentors and friends who can show them that there are many different ways to lead a happy, socially responsible and full life and that being married and/or having children is only one of

them. Only when there are such real choices, when being on one's own or in a relationship with a woman is as socially acceptable, economically possible, and, in fact, recommended as a healthy way of life as much as being in a relationship with a man and married, only then win the compulsory nature of heteroreality[44] go and motherhood can become a real choice. As Janice Raymond says elsewhere (1987:65):

> The status of motherhood cannot be raised until the status of women generally is raised. Motherhood will only be valued when women are valued.

It is towards this validation of women as people - fully human and very diverse people with differing needs and interests - into which we still have to put a lot of work. But it is only when women validate themselves - ourselves - that women will stop being accessible as 'living laboratories' and submit to procedures in order to (supposedly) get a child which go directly against their physiological as well as psychological well-being. I thus end my reflections on human biotechnology, specifically IVF, with the. hope that you as concerned members of the community will speak out against them, expose the ideology behind the technologies and offer the women who consider IVF, support when they need to grieve over their un-had child. Perhaps in this way we can stop the cruel exploitation of the complex desire to feel a need for children. We should not forget though that women still hold one major asset: without women's bodies or parts thereof IVF research and embryo experimentation cannot be pursued. So women should capitalise on this very real power - but as I have said before, it may, unfortunately, not last for much longer....

NOTES:

* A shorter version of this paper is forthcoming in the Conference Proceedings from the Forum International Sur les Nouvelles Technologies de la Reproduction Humaine organise par Ie Conseil du Statut de la Femme, Universite Concordia, Montreal, Canada, October 29-31, 1987, to be published March 1988.

1. D.N.A. (Deoxyribonucleic acid) is the chemical molecule that carries genetic information and as a thread-like double helix forms chromosomes. Specific parts of these chromosomes are called genes. All chromosomes of an organism are called its genome. For a good overview article see Christine Ewing (1988).

2. For a good overview see Linda Bullard's chapter in Made to Order (1987).

3. Many feminist writers critique the use of the word 'patient' for women who are or are trying to get pregnant; see for example Ehrenreich and English, 1978; Corea, 1985 a and b. But defining pregnancy/or the problem of not getting pregnant - as an illness remains with us and women on IVF programmes internationally are referred to as 'patients'. Moreover, as I argue in this paper, I believe that .in many instances it is only whilst on the IVF programme that women get physically or mentally sick.

4. I conducted this survey as a Georgina Sweet Fellow (a grant awarded by the Australian Federation of University Women) at Deakin University, Victoria, between January and April 1987. My data consist of 40 questionnaires (35 pages long) followed up with 25 interviews with women who responded to advertisements to participate in a study on the impact of IVF on women that I placed in some fading newspaper's in Melbourne in December 1986. For more information see K1ein, 1987 a, b and c.

5. See Timothy J. McNulty, 1987, 'Birthrights' in Chicago Tribune, July 28 (p.8) and Susan Jamison, 1987, 'Miracle Mom Tells Her Incredible Story' in Weekly World News (USA), May 2nd.

6. See Chris Erasmus, 1987, 'Mother Gives Birth to Daughter's Babies' in The Age, (Melbourne, Australia), October 2nd.

7. See Boston Globe, 1987, 'Clinic to Provide Pool of Human Eggs', July 15, and New York Times, 1987, 'Clinic Plans Variation on Fertility Techniques', July 19th (p.26).

8. See West Australian, 1988, 'Perth boost for test-tube pregnancies'. January 2, 1988. Dr Yovich predicts a 43.5% pregnancy rate for PROST (pro-nuclear stage tubal transfer) which does not mean much in terms of actual births nor gives a total of the women on whom PROST was experimented upon. He also raises the possibility 'that the uterus was actually a hostile environment for the early embryo before a certain stage.'

9. See The Guardian (U.K.), 1987, 'New Test Tube Technique Produces "First" Pregnancy", August 3rd.

10. See Boston Globe, 1987, 'Special Birthday', August 4 and Sandra Blakeslee, 1987, 'A Baby Born Without Her Brain is Kept Alive to Donate Her 'Heart' in N.Y. Times, October 19th:4.

11. See Der Spiegel, W-Germany, No. 52, Dec. 21st 1987, 'Einen atmenden Leichnam begraben. p. 163.

12. Ob. Gyn News, 1987, 'Infra Vaginal Culture, Embryo Transfer Could Reduce Cost of IVF', Vol. 22, No. 12, August .1-14, see also Francoise Laborie, 1987.

13. Comment made by Dr. Harrison at the Third International Interdisciplinar Congress on women, Dublin, Ireland, July 9th, 1987.

14. From Oasis Newsletter, Adelaide, South Australia, 1986.

15. Pers. Comm. Infertility Counsellor, Melbourne, April, 1987.

16. From the 1940's to the 1970's DES Diethylstilbestro'l) was given to 2-3 million pregnant women worldwide to prevent miscarriages (which was never proven to be true). Today, there are 2-4 million so-called DES-daughters and sons who are infertile and, in the case of the women, suffer from increased rates of cancer of the cervix and the vagina. The mothers themselves have increased rates of breast cancer. See Corea, 1985b: 275, Direcks and Holmes, 1986: 53-55, Direcks, 1987: 161-165, and Ob. Gyn News, 1987 'Offspring Don't Seem to Be at Risk From Ovulation-Inducing Drugs', Vol.22, No. 7, April 1-14. In my view it is tragic that infertile, DES daughters are now advised to try their luck with IVF: after having been harmed through one 'technological fix' they are now to entrust their bodies unto another similarly unsafe and experimental procedure.

17. The article is forthcoming in The Exploitation of Infertility; women and Reproductive Technology, Klein, ed. 1988.

18. For further details see Francoise Laborie, forthcoming 1988; the British Voluntary Licensing Authority mentions an 8.5% success rate per treatment cycle for 1985 (p. 15).

19. In many cases women already have children from a previous relationship. In my study there were 8 such women (1/5 of N = 40) and 4 men. There is also the possibility that pregnancy occurs naturally once the woman left the IVF programme. In my survey this happened to 4 women (1/10 of N = 40) but Holzle, 1987, reports that 38.8% of the women she surveyed in a West German IVF programme were pregnant 5 months after leaving IVF. It must also become known in public that more and more fertile women undergo the trauma of IVF because of their husband's low sperm count; in other words, the already low success rates (5-10%) may even be: lower once women with previous children or subfertile husbands are. deducted.

20. See Janine Perret's review of Ben Wattenberg's book. The Weekend Australian, September 5-6, 1987: 2-3, and Tamar Jacoby, 1987,'Be Fruitful or Be Sorry' in N.Y. Times Book Review, July 12, (p. 9).

21. Only one man in my study said that he felt 'guilty' (he had a low sperm count).

22. I am grateful to Christine Ewing for this term.

23. An amendment passed in October, 1987, to the Victorian Infertility (Medical Procedures) Act of 1984, specifies that embryo research up to 22 hours may only be conducted on embryos from couples on the IVF programmes. Whilst this may afford some protection to other women from being superovulated to donate or sell their eggs (as happens in Vienna, Austria with medical students, Dohnal pers. comm. 1987), it opens all doors to more experimentation on those who are already most vulnerable. Since they are now - officially at least - the only legal gamete donors there will be even more pressure on them to comply with the IVF practitioners' research demands. The price they have to pay gets higher and higher and reinforces the belief that these women are obsessive and neurotic and 'ask for it'. Within a feminist theory of solidarity with the ultimate goal to free all women from the tyranny of patriachal control which coerces them into using the nRTs, such a division of women is highly questionable and must be resisted.

24. A participant in my study describes her experience:

> After attending hospital for 2 1/2 hours one day, and being prodded and poked a11 that time: blood tests, ultrasound, needles, I eventually got off the table and said "tell the doctor he can stick this up his jumper." I knew weeks of that would be untenable, especially after having to get up at 5.00 am to travel two hours each way to hospital, AND PROBABLY NO BABY AT THE END. What a joke. I feel so sorry for the women who have to use IVF.

25. Having to be 'a good girl' and being afraid of saying 'no' is deeply internalised by many women. Having said this it is not my intention to blame women : as Sally Cline and Dale Spender (1987) among many others have shown, in patriarchy, disobedient women pay a high price, specifically with regard to violence and economic hardship (most difficult for women with children). The problem is though that submissive behaviour to the powers that be into which girls continue to be socialised, makes women both victims of and colluders with patriarchy and it is this vicious circle which needs to be broken in order to achieve true freedom and liberation.

Some exciting work is currently being undertaken by German educationalist Ute Enders-Dragasser who posits that the socialisation of girls at an early age has been over emphasized and that adolescent girls and young women, given emotional and material support, are very likely to resist patriarchal definitions of 'femininity'. Forthcoming 1988 in Women's Studies International Forum.

26. I actually do not believe that there is a great deal of difference between women on IVF programmes and other women - us - who submit - albeit in various degrees - to all kinds of invasive medical procedures whether related to pregnancy or other mind/body concerns because we are threatened or intimidated by patriarchy's doctors and scientists. This is also why I believe that we have to demonstrate our solidarity. It truly amazes me how quickly some of my informed feminist friends resort to antibiotics if a sore throat appears only on the horizon... but then I take painkillers too and sometimes over a long time when my arthritis becomes unbearable. What I mean in catling for solidarity with women on IVF programmes is that in my view succumbing to the 'technoligical fix' happens in a variety of degrees and forms but I see them a11 on a continuum of lack of knowledge and trust .in one's own body and the pervasive belief in patriarchal authority: the expert knows best.

27. The mention of storage fees made us both burst into laughter. Mrs X couldn't remember the ongoing storage fee but said that initially it had cost $160 to have the embryos frozen. She also remembered when she got the following receipt in the mail: 'It has been received from X 6 frozen embryos, 3 of which were destroyed', and commented: 'It was just a receipt for paying a bill, it was just so totally weird.'

28. There could be objections to using the term 'sadist' on the grounds that this might mean that women are therefore masochists.

Kathleen Barry has an excellent answer in her discussion of pornography (Female Sexual Slavery, 1979, p.209) which I think is applicable to the question of sadism in IVF:

> '...sadism is portrayed as the other half of the sadomasochistic duality in human nature. Pornography assumes that both parties of the supposed duality enter the act with free will and that the one beaten holds equal power with the one doing the beating.'

29. Despite the publicly voiced sympathy with involuntary childless people, women who decide to try IVF are depicted as oddities or even deviants or in the words of a German psychiatrist (Peter Petersen), 1985, an opponent of IVF, as displaying 'emotional passivity, a dearth of feelings (p. 8), 'pathological' (p. 7) and with a psyche that is structured in a way which would make them becoming mothers and rearing a child of their own problematic (p. 9). Bachmann, 1987, goes one step further and predicts that IVF children will have problems because of their emotionally insecure mothers who needed a child for their 'narcissist equilibrium' (p. 22). Such male interpretations do not acknowledge the societal pressures on women to become mothers. They conveniently blame women for 'wanting it'. They thus create a paradoxical mixture of contempt and pity for women on IVF programmes and also bestow upon themselves the right to use 'these women' as experimental fodder. My survey indicates that IVF women are 'ordinary' women whose determination in life to have a (or another) child does not make them more or less 'neurotic' than others who would try everything to win a medal in a sport event.

It is no more their 'problem' (or even 'fault') when they let themselves be pushed into the IVF procedure than any other women's decision to stay in a job despite sexual harassment or with a husband despite marital rape. All cases represent albeit various degrees of coercion because, in general, partriarchy allows women the 'choice' to be different only at great risk. What is needed is not more unsuccessful technology but the possibility for women to fundamentally challenge their desire for a biological child and to come to terms with it when it seems impossible to be fulfilled.

30. For an excellent in depth discussion of the problem of choice see also Rowland, 1987a and b.

31. See 'Biotech Firms Compete in Genetic Diagnosis' in Science, December 1986: 1318-1320.

32. A British medical team has developed a DNA probe which enables them to determine the sex of a 4 to 8 cell embryo (or 'pre-embryo' as they call it); see West, et a1., 1987 and Johnston, 1987. This 'success' opens yet another door to the abortion of female 'foetuses practised widely not only in India but also in Western countries, eg. England. See also the report in the Boston Globe, July 22nd, 1987, on Robert Winston's research of Hammersmith Hospital, London, to determine the sex of a child with the technique of pre-implantation diagnosis.

33. Wendy Farrant provides an excellent overview of the development and application of amniocentesis in Britain (Farrant 1985: 96-122);

> Amniocentesis was first used for prenatal detection of neural tube defects in 1973 Since then there has been a rapid increase in the number of women undergoing diagnostic amniocentesis in early pregnancy... Initially, prenatal diagnosis was confined mainly to a select group of high risk women who had themselves often initiated the referral because of concern about their increased chance of producing a baby with a severe abnormality. As the service has expanded, there has been an increasing trend for referrals for amniocentesis to be doctor - rather than patient - initiated. A particularly important development has been the introduction of routine maternal serum AFP screening for neural tube defects.

34. 'Routine' pregnancies, too, get increasingly medicalised. In Austria, for example, there is a governmental recommendation pending to make two ultrasounds (sonograms) compulsory for all pregnant women (Dohnal, 1987, pers. comm.). In many other countries, eg. England, W-Germany, Switzerland, pregnant women are required to have ultrasounds (and sometimes even pay for them) despite the unproven harmlessness of this medical intervention. Increasingly, when having an ultrasound, the parents are told the sex of the child. Given the world-wide preference for sons (Williamson, 1976), ultrasound might thus contribute to 'femicide' (Holmes and Hoskins, 1985).

35. See 'The Promise and Peril of Genetic Testing: Perfect People' in The Weekend Australian, August 1-2, 1987, Magazine 4.

36. See Ob. Gyn. News 1987. 'Improving Therapy for Mate Factor Infertility' Vol. 22, No. 12, August 1-14, a report on microscopic techniques for the manipulation of sperm and mature human ova from the USA and Australia. The Second Report of the British Voluntary Licensing Authority, (1987), also lists a project on male infertility conducted at the Rosie Maternity Hospital, Cambridge (p. 20); see also Note 15.

37. See The West Australian, 1987, August 5th : 7 and Gomez DOS Reis, 1987: 126-128 reporting the death of a woman on an IVF programme in Brazil.

38. See p. 19 in the 2nd Report of the Voluntary Licensing Authority, U.K.

39. A research team from the University of Louvain in Belgium reports ,their research as 'Artificial Uterus: Culture of Oocytes and Embryos' on bovine immature oocytes and bovine and rat embryos cultivated in an artificial uterus similar to a heart-lung-kidney system up to 3-4 days; see Henriet et at (1985).

40. In fact IVF should not be called in vitro fertilisation as the time 'in vitro' is not very long and there is no pain similar to .the one the woman will have to undergo involved. Deborah Steinberg and I propose to call IVF Inviolation of Females (London, May 1987; see also Klein 1987b).

41. Since 1984 FINRRAGE (Feminist International Network of Resistance to Reproductive and Genetic Engineering) exists with chapters in 25 countries. FINRRAGE aims at monitoring the technological developments as well as legal and ethical decision making internationally. It also gets women who oppose the technologies in touch with one another. For further information contact FINRRAGE International, P.O. Box 583, London, NW3 IRQ. England. See also Made To Order (1987) for writings by members of FINRRAGE.

42. Dale Spender and Cheris Kramerae wilt explore on the idea that science is the history of mistakes in The Knowledge Explosion forthcoming 1989.

43. There is no corresponding term in English to the German 'Mitlaufer' (literal meaning: co-runner) which is used for people who during the Nazi regime were silent about the atrocities going on in their very neighbourhood (e.g. the daily deportations of Jews). A conference on Women and Fascisms sponsored by the Women's International' Foundation (WIF) in M-Germany, November 1987, made it ver y clear that we have all a duty to recognise parallels and speak out loudly so as to hopefully prevent other technologically fuelled hells on earth (see also Klein, 1988a).

44. U.S. feminist theorist Adrienne Rich wrote a ground breaking article on compulsory heterosexuality in 1980. But by including all aspects of life, not just sexuality, Janice Raymond's concept of 'heteroreality' is more encompassing and can be used to analyse the position of women in society at large.

45. I do not mean these statements to be anti-motherhood. But I do feel that women today have no real choices to decide whether they want to become mothers or not. There is not much feminist literature available on the topic of desire for children and motherhood: clearly an area where a lot of work needs to be done. Two useful books are: Stephanie Dowrick and Sibyl Grundberg (1980) and Joyce Trebilcot, ed. (1984).

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