

**MORAL IMPLICATIONS OF THE MANIPULATION
OF THE GENETIC NATURE OF MAN**

by

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I. The decisive ethical problem

1: Respect for the natural order

Considering the development of modern technology because of which the survival of mankind might be endangered or man's genetic intactness could be destroyed or arbitrarily changed or because of which even the preconditions for higher existence on the planet earth might be destroyed, Hans Jonas and many more are confronted with the decisive ethical question in the development of human genetics - and with which ethics never had to deal so far - "why and wherefore mankind should exist at all; why should man as he developed in the course of evolution be kept alive and why should his genetical heritage be respected, that is why should life exist at all" (Technik, Ethik und biogentische Kunst - Betrachtung zur neuen Schöpferrolle des Menschen, in: Internationale Katholische Zeitschrift 13 (1984) 505).

According to Jonas and others the reason why genetic engineering more than nuclear engineering raises the question why man as he developed through evolution should be kept alive can be found in the fact that man can change his nature through direct interference with his genotype. Yet man may not do so: he has to break through the anthropocentricity of his understanding of life and the world and he has to conceive himself again as part of nature, as a creature if you like which adheres in its creative work - taking the position of a creator as Jonas says - to the given natural order.

Man has to ethically master his power over creation which he has gained because of his technological knowledge by showing a sense of responsibility towards the creation. The responsibility of man in this context is unique and unknown since the power which man has gained through technical and scientific progress is also unique and unknown. It allows man to essentially change and to destroy not only himself but also any life - at least any higher form of existence. What is morally good should therefore not only be interrelated with the well-being of man but man's well-being must form an alliance with the well-being of life as a whole. By broadening the definition of ethical responsibility non-human life gains a right of its own. As Jonas says: "By recognizing the rights of non-human life any arbitrary and unnecessary elimination of species is a crime, not to mention our own self-interest. Thus the transcendent obligation of man emerges to protect that "resource" which can hardly be restored and which is irreparable - the unimaginably rich gene pool which has been stored since aeons of evolution." (pp. 504-505; Meyer-Abich and Sitter - though differing in their reasoning - are even more radical in their demand of respect for the subject role of nature which is independent of man, which however forms an evolutionary cosmos with him. It is very difficult for man to fulfill his responsibility towards creation and its intact conserva-

tion since the ethical purpose and goal is determined in a false and backward way. The goal is unclear because that is considered as ethically good which has good consequences and only to a limited extent bad side-effects on the person affected by such actions. One does not make enough allowances for the negative consequences which certain actions might have in the long run on the ones further removed from us in time, on future generations. This danger of sowing disaster instead of blessings is necessarily inherent to modern technology: the more modern technology with its tendency towards size and quantity uses up the resources of nature and life which are essential for our survival the more the essence of nature and life is changed and finally destroyed.

It follows that instead of an ethic that lays emphasis on the ethical evaluation of the direct consequences of moral behaviour we need an ethic where the ethical evaluation of indirect late sideeffects is the main factor for evaluating the direct consequences. The ethic of effects which takes the sideeffects into critical consideration must therefore be replaced by an ethic of farreaching effects which judges the directly helpful effects on the basis of whether these farreaching effects are good or bad.

This is meant by Jonas when he says that the principle of loving your neighbour should be replaced by the principle of loving the furthest. If loving your neighbour is not adjusted to the love of the furthest it might happen that the obvious good deed we do for our neighbour turns out to be a misdeed for future generations. In modern technology there is an inherent tendency towards such abuse of the future in so far as beneficial actions for our neighbour do not take into account the requirements of the ethic of longterm effects. Modern technology cannot take this into account since its creations obviously benefit man. However one should rather renounce the use of modern technology as long as one cannot say with certainty whether it has any negative longterm side effects.

In respects to genetic engineering Jonas draws the following conclusion:

1. Skill and technology should not replace accident which is mainly responsible for the evolution of nature. He says: "Accident is the productive source of the development of species. Accident warrants that with each procreative act a unique individuum is born. Accident surprises us with ever new products that have never before existed."³ (a.a.O. 513)

2. "This world which has become devoid of any taboos must out of free will erect new taboos. We must realize that we have gone too far, we must actually realize that a too-far exists. Any action that interferes with the integrity of man is too far. We would only be botchers if we decided to interfere and we should never become masters of that field. Once again we have to learn what it means to tremble and to dread - and even without God we should know awe of holy realms. The boundaries which are such defined are so far that enough remains to be done.

The human condition always calls for improvement. Let us try to help. Let us try to prevent, to soothe, and to cure. But let us not try to become a creator, to interfere with the essence of our existence, the seat to the secret." (a.a.O. 517)

3. Medicine that wants to help should renounce the use of - what seems to be legitimate - genetical repair possibilities. Sometimes it should even resist the temptation to help since the danger of predominantly negative longterm effects cannot be excluded when man interferes with genetically deviating developments. Man might then forget about the conservative spirit of genetic repair and be filled with creative arrogance. "We are not permitted to do so - neither thanks to our wisdom, nor to evaluative judgment nor to our discipline - and no longtime cherished awe protects us from the enchantment of an easily committed sacrilege."(a.a.O. 516)

As a conclusion we can say that Jonas stands in the reverential christian tradition. This is basically the same tradition that caused Paul VI to issue "Humanae vitae" inspite of the vote of the majority of the commission that was formed to deal with the question whether contraception should be allowed under certain circumstances.

Based upon the same reasons developed so eloquently by Jonas, the present Pope has repeatedly emphasized that we should respect the natural order of the sexual act. According to his opinion this deontologically wise ban is teologically justified if we consider the mainly negative consequences of not adhering to the ban. Not everybody might agree with it and understand it if the persons concerned just consider the immediate helpful consequences of not adhering to the ban. With the understanding that we should erect taboos around certain realms of nature goes the conviction that we do not have the wisdom, the value judgment or the self discipline to handle them in a responsible way.

2. Using nature for the realisation of human rights

2.1. The change of paradigm of understanding nature

Yet behind this notion of the holiness of certain realms of nature we find an understanding of absolutely obligatory (divine) moral and ethical laws which are - even within the catholic church - controversial. According to this understanding nature - that is creation - has a value of its own independant of the use man makes of it. In contrast to that many ethic philosophers and theologians believe that nature can only be considered as holy in so far as it serves the free and purposeful development of man. Thus the controversy about the ethically appropriate evaluation of genetic engineering is basically a controversy about the ethically appropriate relationship between man and nature. To what extent may man interfere with his own nature and with the creation?

In our effort to find an answer one thing is absolutely not controversial: we are natural beings and we can only develop as befits our human dignity and freedom in connection with nature. We have to affirm that we are bodily beings. Therefore we should make allowances for our bodily existence; we should not try to be liberated from it. Therefore we should never act in such a way as to mistread our natural dependances.

There is no question that we cannot annul the natural laws to which we are subject and which we try to grasp ever better by the help of modern science. Only if we apply these natural laws can we be technically creative.

Yet one thing is controversial: is it the will of God that by the help of the natural laws we utilize nature in such a way that human rights can be realized as extensively as possible? Or should we hold sacred an ethical order of nature with which God has endowed creation and which we may not trespass upon? The problem is whether God has surrounded certain realms of nature with moral taboos. Is there a moral barrier which forbids us under any circumstances to interfere with the biological nature of procreation, the chemico-physical structure of the nucleus or the biological structure of the living cell nucleus as such or at least the human cell nucleus?

Should we leave the evolutionary activity which from a superficial point of view is an evolutionary, genetical accident to itself and not influence it according to our understanding?

Or should we handle all natural events in such way that it is appropriate to the equal, free and useful development of the present and future generations? Are we allowed to dispose of our bodily nature as it is meaningful for the full realisation of human rights?

(Does theonomy, the divine legislation on the ethically right behaviour of man which all theologians acknowledge, mean that we should submit to the heteronomy of a given ethical order of nature? Or does it mean that we should put the natural laws to whose heteronomy we are bound at the service of the reasonable, ethically autonomous development of bodily man?)

2.2 Understanding nature within the paradigm of human rights

It seems indeed to be appropriate to proceed from the assumption that human nature is only sacred in so far as it is contingent to the equal, unprevented und useful development of all living and future human beings. Man is a natural being who is subject to certain biochemical and biophysical as well as biopsychical and biosocial laws. At the same time man is a person who constantly uses nature by manipulating and

controlling it in the interest of his personal development. He needs to do so in order to survive and to live befitting a human being. In the interest of a human, personal development man has to control and manipulate nature in such a way that his capacity to act is widened and not restricted or destroyed because of improper use of nature - in particular his own. With the growing awareness of our environment and man's dependancy, this determining factor of the human condition has been sharpened. Man is a natural being who has to live by nature and in accordance with nature. We can destroy the natural conditions for a human life. If man is to have a future befitting human dignity then nature has to be conserved in such a way that it allows for human life at all.

But in this context of an awakened ecological understanding one thing became clear: if man is to survive befitting his dignity and status then there needs to exist an ethic guided by human rights and dignity. More than ever before ethics has to care for the universal human well-being - if our descendants are to live in human dignity. Since the fate of man is interrelated with the fate of nature this kind of ethic has to include the respect for nature. We have to respect nature in its being (as God's creation), at the same time we have to make use of it (as God's servant) - for the sake of the equal development of all human beings. (As God's servants we are the lords and administrators of creation. We should not leave nature as it is but we should shape it in such a way that it serves the development of human culture.)

If one interprets the blessing of creation in such a way one can only support new technologies in so far as they support man in his role as the lord of creation. That is to say one can only support new technologies if they benefit everybody concerned equally instead of being an obstacle. New technologies should be supported if they help pulling down obstacles of the free and equal development of man. They have to be rejected if they prevent the equal development of one and all, thus undermining the subject role of man.

If one checks whether the application of new technologies assists man in his subjective, personal development or whether it leads to the detraction from man's subjective role, one more question needs to be answered: Which effect does the one who applies a technology have on the one to whom it is applied? With the help of practical reasoning one can then find out whether the subject role of the concerned persons is being upheld, developed, impeded or even negated. With such an approach the basic ethical question is solved which always begins with the effects of man's actions on the equal, free development of all people concerned.

2.3 Evaluation of human-genetical technology from an ethical point of view

If one examines in this way the ethical implications of human-genetically effective actions one proceeds from a human-genetical as well as ethical normative understanding as to which evolution should be considered eugenic and which dysgenic.

According to human-genetical understanding an evolution is considered eugenic if it serves - following genetical criteria - the preservation and development of the human gene pool. In contrast to that an evolution is dysgenic which according to mainly biological criteria negatively influences the preservation and development of the human gene pool.

This means that from a biological point of view eugenic evolution is only ethically justified if it adheres to ethical criteria. In the same way a - from a biological point of view - dysgenic evolution cannot be ethically desirable since there does not exist a direct contradiction between that which is genetically and ethically right but there can rather be an indirect and partial contradiction. Thus the transmission of hereditary diseases cannot be ethically desirable. Yet this does not mean that any, from a biological point of view eugenic transmission is right and thus desirable from an ethical respect. Thus for example the eugenic - in the biological context - breeding of human beings is surely not desirable according to our ethical understanding.

Knowing this, applied - and ethically responsible - human genetics strives as a praxis oriented medical discipline to promote an eugenic evolution as much as is desirable from the human point of view, and to prevent a - mainly oriented at the biological - dysgenic evolution.

If we want to evaluate whether a - biological - eugenic evolution would assist the purposeful promotion of man's subject role or whether it would become an obstacle - that is whether it is to be rejected from the point of view of human rights - it is important to determine in which way man can influence and form biological evolution. Man is only responsible for genetic evolution to the degree that he can shape it freely.

In order to determine the possibilities of man to shape his genetic evolution one distinguishes between three kinds of human-genetically important activities of man for which he is individually and socially responsible:

1. manipulations of nature which are not directed at any particular genetic purpose, which can however have grave side- or long term effects of genetic nature (Chapter 3)
2. manipulations of nature which have genetical objectives, as a way of realising their goal they try to influence the gene structure symptomatically (Chapter 4)

3. manipulations of nature which have direct genetical objectives, they try to influence the genetic structure causally (Chapter 5)

With this distinction as a basis we will examine in more detail some important ethical implications.

II. Ethical consequences

3. Ethical implications of ethically not orientated yet effective action

Every day manipulations of nature with unintended genetical side and long term effects happen on a great scale that have a far reaching genetically important impact. In many ways our actions have an effect on human evolution. Genetic evolution is indirectly much influenced by whether we beget children or not, whether we immigrate or not, are involved in wars or not, how we organize our economy and give development aid etc. Modern medical aid selectively favours certain individuals whereas others have to suffer the consequences. This is for example true for people with inherent diseases who only have a chance to procreate because of medical, economical and social progress.

The genetically far reaching consequences are tremendous, they are of greater importance for the appropriate use of human genotype than our directly gene oriented activities. In spite of that the genetic consequences of the indirect gene oriented activities have hardly been dealt with. Their ethical relevance has hardly been discussed.

If a dysgenetic propagation is to be prevented - as far as possible - the question has to be asked which importance ought to be attributed to the genetic far reaching consequences of decisions relating to ethically indirectly gene oriented decisions. Such side effects might immediately not be recognized as particularly important.

In this context one ought to question which ethical obligations arise when nowadays many people can procreate who in former times - under worse medical and social conditions - would have died before reaching the procreative age. Which consequences does this have for those who have improved these better conditions, and what does it mean for those who profit from the improved living conditions?

4. Ethical implications of gene oriented yet genetically only symptomatical effective actions

With the help of conservative human genetics one can mainly seek to influence genetical evolution by trying to

prevent propagation - which will have biologically dysgenic consequences - and to promote propagation which will probably have biologically eugenic consequences. With these possibilities at hand the following problem arises: in how far is it reconcilable with human rights on the one hand to prevent the attempt of propagation with dysgenetic consequences and on the other hand to assist the attempt of propagation with probably biologically eugenic effects?

4.1 Goals of genetic counselling with respect to human rights

Applied human genetics tries to lessen or exclude the dysgenic consequences of a directly gene oriented behaviour by recognizing its dysgenic consequences and limiting or rather preventing all activities that might have dysgenic effects. This is the purpose of a diagnosis of hereditary diseases based upon conventional methods and eugenic counselling.

The ethical problem comes up in such counselling when one needs to decide under which circumstances we act ethically responsible and propagate if a serious hereditary disease exists.

Indeed the human right of propagation is in the final analyses not based upon man's good or bad capacity to propagate but rather on his personal ability to act responsibly thus making use of propagation that befits human dignity. Yet the right to responsible propagation is genetically limited by the ability to have eugenic offspring in biological respect. From this formal right to decide oneself as whether to have offspring or not - materially this is limited by the capacity to have biologically not seriously damaged offspring - follows that from an eugenic perspective one cannot take the responsibility of having children who will morally suffer from serious hereditary diseases.

In case of hereditary diseases better arguments ought to be found to justify propagation. However this does not mean that there might not be other reasons than merely eugenic ones to beget a child who most certainly will suffer from hereditary disease. Thus the fact that someone will surely have children afflicted with a hereditary disease does not deny the right of propagation. Yet the person who for sure knows that his children will be afflicted with hereditary disease is morally obliged to justify himself if he wants to have offspring.

Since the probable occurrence of hereditary diseases in most cases is not certain but can only be predicted genetic counselling is confronted with a special problem: the question arises as to how the right of propagation is to be judged ethically if most probably the offspring will be seriously afflicted with hereditary disease.

According to tutiorism, for the sake of the whole, the child and the parents, a child may only be procreated from an genetical perspective if it is morally sure that the child is not afflicted with hereditary disease. Yet from the point of view of probabilism a child may already be begotten

for the sake of the whole, the child and the parents from a genetical perspective if the child probably will be healthy. The moral opinion as to whether one may beget a child that might be afflicted with hereditary disease is not unanimous.

From this follows that the formal right of self-determination of propagation is only conditionally limited under certain circumstances for medico-eugenic reasons.

As to genetic counselling this means that the counsellor has the right and the obligation to inform about the risks of dysgenic propagation, yet because of their genetic understanding they have no right to make a judgement as to whether the decision the person seeking counselling takes is ethically right. They should therefore restrict themselves to do eugenic counselling in the medical sense, consciously refusing to lead to an evaluation of the ethically right behaviour of those seeking advice. The decision whether one can take the responsibility and propagate life is dependant not only on genetic factors. It is also influenced by many other factors that have to be taken into account if an appropriate ethical judgement has to be taken.

4.2. The limitations of breeding

The correction of genetically faulty development is only one aspect of the effort to symptomatically influence genetic evolution. Some geneticians have time and again played with the thought - or even tried - of influencing the human genotype positively and eugenically and to breed human being according to their idea. Any kind of breeding has the purpose of producing beings with specific genetical characteristics by directly influencing propagation. Yet these characteristics are determined by the breeder without taking into consideration the subject role of those begetting children and those being begotten.

By the help of modern propagation engineering breeding becomes much simpler and more effective. Three factors are important:

1. Genom analyses allows for an improved choice between the embryos desirable for breeding. Interconnected with that is the elimination and selection of embryos undesirable for breeding.
2. The possibility of accelerating the procreation of valuable embryos from the point of view of breeding by using donor mothers or by implanting extra-corporally begotten embryos to a mother.

3. The possibility of accelerating the breeding of valuable embryos by cloning blastocytes in an early stage of development.

The breeding of human beings with specific characteristics is to be refused from the point of view of human rights if the interests of the breeders are to the debit of the people used for breeding and those produced by it. That is to say, someone taking a spouse just because he/she is fascinated by the genotype of the future children may only do that if:

1. he respects in procreative activities the subject role of his/her spouse towards him/her and the children and if
2. the child is mainly begotten for the sake of the development of the child and only for one's own sake as can be reconciled with the subject role of the child.

The breeding of human being has to be rejected ethically if it serves the interests of the breeders; that is, if the unprevented subjective development of the persons involved in procreation and the begotten children is subject to the goals of the breeder. With forbidden breeding subjects are always determined independantly of their own will and their own interests; they are influenced in a way that contradicts their own interests and will. In this respect with breeding the subject role of the breded ones is disregarded. Such a kind of breeding gravely injures the right of bodily integrity.

Thus the problem of human breeding is not inherently connected with gene engineering. However this problem is intensified by the new possibilities of propagation technology. Franz Böckle rightly remarks: "The decisive borderline between permitted and not permitted interference with the genotype is not determined by the question whether manipulation is "direct" or "inderect"; it is not a matter of a difference between "old" and "new" genetics. The decisive difference is not the method but the goal. Furthermore possible consequences have to be considered."⁶(Genetische Eingriffe und menschliche Personalität, in: Herderkorrespondenz 39 (1985) 32).

5. Ethical problems of direct manipulation of the gene structure

In contrast to the symptomatical treatment of the genotype through interference with propagation according to

genetical considerations, the new genetics tries to manipulate the genotype by the help of direct interference in it. To achieve this one tries to:

1. to determine the causal relationships of the genotype through genom analyses and to draw the relevant conclusions;
2. to clone the genotype - if possible
3. to cure or change the genotype - if possible.

We should remember that though genom analyses and cloning constitute a direct interference with the genotype, they do not directly change the genetical structure of the genotype. Gene engineering tries to achieve a change of the genotype by recombining the fragments of the genetical structure. A genetical change of the genotype already takes place with each sexual procreation when feminine and masculine germ-cells become one in the natural course of fertilization. Yet this change of the germ material comes about by using gene technologically appropriate methods, that is recombining fragments of the genotype in such a way that either certain beings are preserved in their integrity while they are at the same time changed or to create new beings with new, unique life functions. Just as it is possible with conventional technology to make machines - by recombining fragments of anorganic matter - that constitute artefacts, it is also possible by the help of gene engineering to create living beings through recombining fragments of genetic substance, beings which do not exist in nature and are artefacts.

5.1. Ethically relevant problems of genom analyses

Genom analyses serves

1. the research into genetical genotypes
2. the diagnoses of genetical attributes in particular the diagnoses of hereditary diseases as well as the fixing of the gender of embryos.

At a first glance genom analyses is an ethically indifferent procedure which does not seem to raise any particular ethical problems.

Because of genom analyses it often happens that in the interest of research embryos are manipulated in such a way that they died or are killed or that for the sake of fighting embryos with undesired genetical characteristics embryos with inherent defects or a certain gender are killed.

Furthermore genom analyses is used as a preventiv measure with newly born, also with adults in order to plan life better:

1. as with looking for a job. For with certain jobs the health of people who have certain genetical characteristics is much more endangered. In the interest of their health it is better for such people to refuse such jobs. The case is different if all health risks can be excluded for them.

2. as with insurances for people who are burdened with certain hereditary diseases that, present greater risks for their life than with others.

3. as with the planing of marriage and propagation of people whose genotype is affected.

4. as with planing life when faced with hereditary diseases that might only break out in adult age and cause serious problems.

Finally genom analyses represents a necessary prerequisite for directed measures of breeding human being through cloning and for interference with the genetic structure.

As a consequence of this application of genom analyses the following ethical problems arise:

1. Should genom analyses actually be applied? Considering the possible misuse of it we are faced with the question whether this analyses ought to be rejected because of the predominantly negative long term effect.

2. How can we be sure that the immense knowledge genom analyses gives us on the thus analysed people is not misused?

5.1.1 The problem of basically permitting genom analyses

In view of the fact that by improving and applying genom analyses the necessary conditions for genetic engineering are fulfilled - the long term consequences of which might be helpful or desastruous for the realization of human rights - we are faced with the question whether genom analyses should be allowed are not.

Indeed it is questionable whether genom analyses rather promotes than prevents the protection of life in the long run or whether it rather prevents than promotes it. The answer to this question determines whether genom analyses is rejected or wellcomed. If one draws the conclusion that genom analyses in the long run interferes with the protection of life instead of promoting it, genom analyses will be rejected. If however someone comes to the opposite conclusion, genom analyses will be basically wellcomed.

To reach a realistic decision on the ethical justification of genom analyses and its development one has to prove that the advantages of it do indeed outweigh its disadvantages or one has to prove that the disadvantages of genom analyses outweigh its advatages. It would indeed

be a contradiction to reason and thus unreasonable to do something disadvantageous without having any reason instead of something advantageous. This would be the case if one were to dispense with genom analyses inspite of its overwhelming advantages or if one were to apply it inspite of its long term negative consequences. In order to determine whether the application and improvement of genom analyses is ethically justified, it is necessary to weigh the risks and chances of a long term use of it.

Such an evaluation must not only be based upon expertise; its result will rather be mainly grounded in an individual - and also ideological - interpretation of the probable consequences of genom analyses. For that reason the result of such an evaluation can only lead to a subjective, ideologically based, that is an ethical certainty about the usefulness of genom analyses.

Very often, or rather as a rule, theoretical reasoning cannot lead to a subjectively certain evaluation on whether the development of genom analyses serves or damages the protection of human life. Mainly - or as a rule - both the disadvantages and the advantages of genom analyses will appear to prevail and to be most probable.

According to tutionism genom analyses may only be applied if it is proven that its application mainly furthers the protection of life. Yet according to probabilism genom analyses may already be applied because of the immense chances if its advantages most probably outweigh its disadvantages.

5.1.2. Informational self-determination and genom analyses

Thanks to genom analyses one can gain - in future even more - a lot of information about the health risks of persons afflicted with hereditary deseases. Such a knowledge can be of great importance in the ethical decisions of persons afflicted with such a desease or for their fellow beings or even institutions. At present the main arguments are:

1. Genom analyses should only be voluntarily. Such an argument can be agreed with since everybody has the right for bodily integrity and protection of his privacy as well as informational self-determination. The question could even arise as to what extent freedom is infringed upon by the peer pressure to undergo voluntarily such an examination (as the trade unions fear). Yet the decisive question remains: In how far is a person morally obliged for the sake of the own self and the concerned fellow man to undergo the examination and to lay its results open?

2. Another point is that the results of genom analyses should not lead to the discrimination of the analysed persons. Thus the results have to be protected in agreement with ethical considerations that are obligatory for responsible use of data.

In this context the decisive problem is: to what degree may and should a sick person be treated differently than a healthy one? In how far may health risks be kept secret for the sake of the persons concerned? All of these are problems which have already been dealt with in medical ethics in another context.

5.2. The problem of cloning

Cloning represents a direct interference with the causal development of the genotype. We distinguish between two types:

1. The multiplication of embryos by splitting them before they are axially differentiated (as a rule in the eight-cell-stage, "embryo splitting").
2. The reproduction of genetically unchanged genotype by transferring nuclei of body cells in de-nucleoid egg cells (asexual reproduction).

This technique is already quite far advanced. At this stage cloning is already applied to mammals. It might not take long till biologists can use cloning for any type of organism.

The main problem will probably be the application to man. If there are egg cells and a method of how to let them mature, it will be possible to get in any age an offspring that is identical with itself. Such an egg cell only needs to be fertilized by a somatic nucleus.

Both types of cloning violate the subject role of man. The inherent rights of man are not properly represented. We can only arbitrarily assume a subjective interest of an embryo in multiplication of its genotype; this is not founded in entrusted responsibility. To be merely a poor copy of a being that has been realized must stifle the sense of authenticity, the freedom of knowing oneself, of discovering oneself and one's potential.

The appearance of twins etc. in nature is a fact. Yet to imitate and apply nature becomes ethical action. This has to have a purpose that is reasonable and may for that reason be advanced. We may do anything that is recognized as being purposeful. Yet we also realize that not everything we do is realized has a reasonable purpose. We realize that there is no use to realize our capacity arbitrarily and contraproductively. This happens if we reproduce the same genotype without consideration of the resultant human beings.

5.3. Cure and change of gene structure

Furthermore the possibilities of direct interference with human cell organisation as a means to cure genetically

faulty developments and to improve human genotype are being discussed. There are three methods of doing so:

1. Exchanging body cells with other body cells that have been bred by the help of methods of genetic engineering.
2. Modification of germ-cells through gene modification of a gene situated at a particular genom.
3. Modification of germ-cells through gen-surgery where one gene is substituted by another one or another part of a gene.

5.3.1. Genetic treatment of body cells

In genetic treatment of body cells, genetically afflicted body cells are substituted by genetically healthy ones that have been bred and transferred by the methods of gene engineering. Instead of the afflicted genotype sound genotype should in future find expression in the patient. The corrected attribute is not transferred to the offspring.

Whether this substitution should take place has to be ethically judged according to the same criteria that are valid in organ transplantation. In such a case a disease that so far has been treated only symptomatically is cured causally so that a serious condition can be helped. The practical problem of such a therapy consists in thoroughly evaluating the risks of the operation since a wrong decision can have disastrous consequences for the patient concerned.

With this problem - in a more simplified form - intensive medicine is confronted already nowadays. Time and again they are confronted with the question whether they should try to cure a seriously ill person who would surely die without intensive care and might only have a better future because of it. Such an intensive care can have two effects: either the patient is reborn because of the therapy or he is condemned to a tragical existence violating human dignity which is nothing but vegetating. Instead of a natural death the patient has to live in agony.

Very often intensive medicine tends to take the risk in case of doubt so as not to lose the chance of regaining life, they risk the artificial prolongation of torturous existence but at the same time they try to limit it. Very often the risk pays off for the patient, yet sometimes the patients have to suffer pain which they would not have had to undergo with another kind of treatment. The procedure that leads to this result is controversial. If one day there should exist real chances to cure people with the help of gene-therapeutical operation the same problems would arise as are presented to modern top research - is one allowed to take the calculated risk of failure if one might achieve a great success?

5.3.2. Modifications of germ-cells

In addition to that the possibilities of genetic germ-flow therapy are discussed. Intact human gene information is to be transferred to the gene information of embryos that have afflicted genes; e.g. in phenylketonuria that leads to mental deficiency. Such a therapy would have to be preceded by a gene test, then the transferred information could be inherited by future generations. This kind of manipulation of the genotype could be called justified if it is taken unbiased and if it leads to the development of the bearer of the genotype yet not at the cost of others.

Mainly because of three reasons interference with the germ-flow is rejected:

1. One cannot predict to what extent such interference changes the personality and causes irreparable damage. Because of the risk involved it has to be rejected for the sake of the development of the persons concerned.
2. There is a danger that these measures are misused for breeding human beings. Thus they should be rejected as a protective measure so that no misuse of power can happen for the sake of the individual and the whole.
3. In order to develop gene therapy properly experiments with human embryos would be absolutely necessary. Since the protection of life has priority over health reasons these experiments have to be rejected.

As a matter of fact our knowledge about the cooperation of the innumerable amount of informations contained in a gene is still so incomplete that it is not clear which positive consequences an interference with the human germ-flow would have at the present moment. Yet it is plausible that this could have extremely negative consequences. For that reason interference with the germ-flow for therapeutical reasons is prohibited at the moment since it is not clear whether it would really serve therapeutical reasons that could justify accepting the negative consequences that would result from it.

In spite of that it is appropriate to ask whether one may use gene therapy if a real chance exists that by doing so people may be able to beget offspring which they would never be able without a causal change of the genotype. However the prerequisite is that such interferences can only be permitted from an ethical point of view human embryos are not being experimented with in an unethical way. Practically speaking this is a rather hypothetical prerequisite.

5.3.3. Prohibiting the breeding of super man

Any kind of interference with the genotype by means of gene-modification for gene-surgery has to be absolutely

rejected if a superman is to be created. This would interfere with the subject role of the resultant breded man who has an equal right to development as any other person.

It is theoretically possible for man to direct the change of their genotype into a certain direction. They may however only change their genotype autonomously if criteria exist that would allow man to develop his nature with more dignity. At the same time man would have to have the power to change human nature in such a way that all of mankind could realize themselves with more dignity. At the moment we have neither the criteria nor the power. And there is no reason to think that things will change pretty soon. The vision of a superman who is superior to us physically, psychically and in personality is a vision and it most probably will always remain so.

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