CONTROL AND MANIPULATION OF LIFE: A CRITICAL ASSESSMENT OF GENETICS THROUGH THE PERSPECTIVES OF HANS JONAS, MARTIN HEIDEGGER AND MICHEL FOUCAULT

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I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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ABSTRACT

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This study is on the political and ethical aspects of recent advances in genetics. Its aim is to explicate the scientific and technological premises of genetics along historical, philosophical and political axes by employing the critical perspectives of Jonas, Heidegger and Foucault. Starting the discussion from a brief account of scientific and technological revolutions initiated in the 16th and 17th centuries, I defend the thesis that the idea of control and manipulation of life is not a novelty introduced by genetics, but a historical orientation underlying modern man's metaphysical reasoning. That is to say, 'the idea of control and manipulation of life' is not an unintended technological excess of genetic practices, and hence a transgression of our moral principles. Rather, this endeavour is a scientific and technological 'project' which has been at the very core of modern man's rational political agenda. Therefore, any attempts to understand genetics from a naïve Baconian utilitarianism and optimism fails to grasp its complicated political nature. For the ethical concerns to become more comprehensive, three genetic cases (prenatal screening tests, cloning, and genetic engineering) are examined in the light of the philosophical reflections of Jonas and Heidegger. Besides, following

Foucault's critical assessments of medicine and bio-power, a 'fourth spatialization of disease' is proposed at the end of the study in order to evaluate the transformations with the introduction of genetics into medicine. Consequently, it is argued that geneticized medicine might sign a new regime of bio-power –a reconfiguration of knowledge, power and subjectivity.

Keywords: Political Theory, Ethics, Hans Jonas, Martin Heidegger, Michel Foucault, Science as Research, Technology as Enframing, Genealogy of Power, Power-knowledge, Bio-politics, Medical Discourse, Prenatal Genetic Screening, Human Cloning, Genetic Engineering, Techné, Geneticization Thesis, Spatialization of Disease, Fourth Spatialization of Disease.

ÖZ

HAYATIN KONTROL VE MANİPÜLASYONU: HANS JONAS, MARTIN HEIDEGGER VE MICHEL FOUCAULT'NUN BAKIŞ AÇILARIYLA GENETİĞİN ELEŞTİREL BİR DEĞERLENDİRMESİ

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Bu çalışma genetik bilimindeki son dönem gelişmelerin politik ve etik yönlerini ele almaktadır. Çalışmanın amaçladığı genetiğin bilimsel ve teknolojik dayanak noktalarını tarihsel, felsefi ve politik bir eksen üzerinde –Jonas, Heidegger ve Foucault'nun eleştirel bakış açılarını ele alarak- gösterebilmektir. 16. ve 17. yüzyıllarda tetiklenen bilim ve teknoloji devrimlerinin kısa bir değerlendirmesiyle başlayarak tezimde savunmaya çalıştığım görüş: hayatın kontrol ve manipülasyon fikrinin genetiğin bizlere sunduğu bir yenilik olmadığı, aksine modern insanın meta-teorik uslamlamasının altında yatan tarihsel bir yönelim olduğudur. Diğer bir deyişle, 'hayatın kontrol ve manipülasyonu fikri' genetiğin uygulamaları sonucunda kazara ortaya çıkmış teknolojik bir ölçüsüzlük/aşırılık değildir. Aksine, bu çaba, modern insanın rasyonel politik gündeminin tam da merkezinde bulunan bilimsel ve teknolojik bir 'projedir'. Bu yüzden, genetiği Bacon-vari bir faydacılık ve iyimserlik ile okumaya çalışan her çaba onun karmaşık politik doğasını kavramakta başarısız olacaktır. Etik ile ilgili meselelerin daha anlaşılır olması için Jonas ve Heidegger'in felsefi düşünceleri ışığında şu üç örnek incelenmektedir: doğum öncesi genetik

tarama testleri, klonlama ve genetik mühendisliği. Ayrıca, Foucault'nun tıp ve bio-iktidar konuları üzerine görüşlerini takiben, genetiğin tıbbın içine girmesiyle ortaya çıkan değişimleri değerlendirebilmek adına 'hastalığın dördüncü tip mekansallaştırılması' tezi ileri sürülmektedir. Sonuç olarak, genetikleşen tıbbın 'bilgi, iktidar ve öznellik' alanlarını yeniden biçimlendirebileceği –ki bunun da bio-iktidarın yeni tip bir rejimine işaret ettiği- tartışılmaktadır.

Anahtar Kelimeler: Siyaset Teorisi, Etik, Hans Jonas, Martin Heidegger, Michel Foucault, Araştırma olarak Bilim, 'Çerçeveleyen' Teknoloji, İktidarın Soykütüğü, İktidar-bilgi, Bio-politik, Tıp Söylemi, Doğum Öncesi Genetik Tarama, İnsan Klonlama, Genetik Mühendisliği, Techné, Genetikleşme Tezi, Hastalığın Mekansallığı, Hastalığın Dördüncü Tip Mekansallığı,

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CHAPTER 1
INTRODUCTION

The development of the information technology –including gene therapy, genetic engineering, and new forms of biotechnology- has been one of the most significant historical events since the 1970s which has transformed our lives entirely. From the discovery of restriction enzymes in late 1960s and early 1970s to the first allowance of new genes to be introduced into human beings in 1990's in USA, and to the French case in 2000 in which infants with severe combined immune deficiency (SCID) were cured with a new technique of gene therapy (Kreuzer and Massey, 2001), the genetic science has transformed not only the understanding of medical treatment but also the perception of everyday life. In this new genetic way of thinking, first genes and then human genome are claimed to be the true models for the aetiological explanations[1], and genetic scientists have employed themselves with the task discovering 'the book of life'. However, for the genetic innovations and genetic language to attract a wider audience, more popular cases, such as the cloning of 'Dolly' or the discovery of 'homosexual' genes in 1990s, were to occur (Conrad, 2002: 78-79). Under the effects of such more popular and astonishing achievements, the ethico-philosophical debates on genetics grew fast especially with the acknowledgment of its potentiality for realizing utopian expectations, together with the discussions about socio-cultural effects of geneticization. As a result, lay talk has extracted terms and explanations more and more from the terminology of genetics.

[1] During most of the 20th century, it is stated that 'germ theory' (notion that microbes cause disease) was prevalent in the aetiological explanations –study of the causes of a disease (Conrad, 2002). However, with the advent of modern genetics in the second half of 20th century, 'gene model' (one gene-one trait) takes the place of 'germ model'. That is to say, new genetic diseases appear, and many other common diseases that already existed were redefined in genetic terms (Oliver, 2004: 23). Nevertheless, 'gene model' is challenged by 'genomics' in the 1990s. While genetics is the study of single genes and their effects, genomics is "the study not just of single genes, but of the functions and interactions of all the genes in the genome" (Guttmacher and Collins, 2002:1512). In this sense, the study of genome and its broader perspective offered the possibility of creating a more complex picture than the 'gene model' did. In other words, 'genomic model' was the biggest challenge to the genetic determinism and reductionism of gene model (one gene-one trait). Yet, genetic reductionism and determinism in molecular biology and in the area of health does not seem to have been overcome: "[G]enes are still the key to our health and illness and other factors are considered secondary" (2004: 22-23).

Among the social actors, the confidence in the claims of genetic causality has become stronger, and hence arguments with reference to genetics have gained more convincing power whether or not the discussants are well-informed. This growing tendency towards disregarding factors other than genes and genomes, and placing too much causal power onto them (i.e. in identifying illness) is labeled with the terms such as 'genetic determinism', 'genetic reductionism' and 'genetic essentialism' (Oliver, 2004; Ten Have, 2003). Furthermore, it would not be wrong to claim that certain religious and political authorities were even more successful in monopolizing the vocabulary of genetic science. I think that the penetration of genetic language and genetic discourses into the veins of social body in a few decades deserves special attention, and thus requires further questioning in terms of its political and social implications for both the present and the future. For this reason, my main concern in this thesis is to elaborate the close relation between today's metaphysical reasoning of modern man and his political life, and the field of genetics. Therefore, I will examine to what degree and how genetic science and technology have been associated with our social and political existence. To this purpose, let me specify my problem to be investigated and the main theoretical frameworks I will employ during my study.

It is obvious that the genetic science is a deep-rooted field of research having historical relations with other life sciences –such as molecular biology, plant biology, zoology and biomedicine- and its area of study ranges from transgenic transplantation of plants to genetic engineering of human beings. However, most of these concerns fall outside my research interest. This study, in fact, will solely deal with the area of genetic science that directly concerns human beings, that makes research into genetic diseases and monitors genetic risks, and manipulates his reproductive process through the prism of molecular genetics. Instead of turning the whole thesis into a dictionary of the professional language of genetic science and a long descriptive summary of its historical development, I will concentrate on the science of genetics as a field of knowledge which bears a strong relationship with power relations. In particular, this implies the task of understanding the 'successes' of genetic science –i.e., diagnosing genetic risks at the prenatal stage, and cloning

and modifying human genes- with the epistemological tools and the critical reasoning by reference to three essential thinkers of Western philosophy who devoted time to the issue of modern science, technology and power: Hans Jonas, Martin Heidegger, and Michel Foucault. I believe that each philosopher will provide a significant contribution to my attempt of answering the question concerning the ethical and political aspects of genetics. For a comprehensive analysis of the topic presented above, I will try to explore the historical, philosophical and political aspects of the subject-matter in three chapters. Now let me draw the basic route of argumentation in each chapter.

The following chapter (second chapter) is devoted to a historical endeavor to display the metaphysical roots of modern science and technology and the revolutionary transformations that gave birth to molecular biology and its scientific premises. Same chapter also includes the analytic frameworks of aforementioned three figures those focus on the history of modern man after the scientific and technological revolutions together with their conceptualization of the phenomena such as scientific progress, technological manipulability and power relations. The second chapter has three sub-titles in which each philosopher's radical criticisms of modern science and technology are delineated. Above all, all of these criticisms agree on the fact that any Baconian interpretation of science and technology is doomed to fail. Baconian optimism and its utilitarian perspective, suggesting that scientific progress brings about the improvement of human beings and society all together, is rejected for its insufficiency and irrelevance in assessing the current relationships between scientific knowledge and body politics. I begin with Hans Jonas' reflections on the meaning of scientific and technological revolutions rooted in the 16^{th} and 17^{th} centuries. His demarcation of modern science and technology provide a chance to evaluate three historical developments in a separate manner: the rise of modern science and its metaphysical outlook in the 17^{th} century; the articulation of technological revolution into the scientific revolution in the 19^{th} century; and, different technological stages emerged after the industrial revolution. Jonas' historical analysis displays that 'notion of manipulation' was a later occurrence, though modern science has contained 'the idea of manipulability' at its

theoretical core. Modern science, in its early development, had nothing to do with the realm of practice and had no technological intent. The early revolutionaries like Kepler and Galileo were busy with gaining knowledge of cosmos, nature and human body through experiments, rather than employing the methods of scientific knowledge for practical ends. Perhaps the most critical transformation with the rise of modern science was the emergence of a new orthodoxy of scientific outlook, which was characterized by distrust for the former knowledge and methods, a constant break with the past, and the self-confidence of modern man. Jonas argues that the constitution of a new scientific mentality was established by the search of new physics, and hence in the 19th century the classical Newtonian physics was replaced by a more complex knowledge of mechanics. Jonas indicates that new scientific mentality in the search for new physics has stressed the 'universality of laws', which implies the reduction of every phenomenon to one basic set of laws on the axiomatic basis of 'world of uniformity' and 'world machine'. To him, the scientific understanding of 'universality' and 'uniformity' is critical since it indicates that scientific revolution is now ready for the technological turn, from analytic knowledge (analysis) to the act of making (experiment). This is actually the transformation from 'experiment as a means of knowledge' to 'applied science as a means of use', which is a result of the alliance of modern science and technology under the conditions of industrial revolution. After this alliance, technological imperatives become more apparent. Taking a closer look to five technological stages after the industrial revolution (mechanical, chemical technology, electrical technology, electronical technology and biology), one can easily see the technological colonization of nature, human environment and his biological existence through each innovative stage. For this reason, Jonas' historical analysis of modern science and technology underlines the fact that the metaphysical and the technological intents of new scientific outlook made possible the discovery of molecular biology and development of new genetics, and accordingly the introduction of idea of manipulability into life sciences (i.e. engineering of the living).

The second section of the second chapter is on Heidegger's interpretation of modern science and technology, which brings a shift in the focus of my thesis from a historical account to a philosophical one. Heidegger seeks the essences of modern science and technology in a phenomenological manner. On the one hand, the essence of modern science, which deals with the exact calculations of natural occurrences, is *research.* On the other hand, the essence of modern technology is *enframing*. His arguments concerning modern science as research portray the basic assumption (nature as a ground-plan) and characteristics of this particular realm as a human activity (experimental method and constant activity), and Heidegger deepens the discussion about modern scientific outlook initiated by Jonas. Basically, he argues that only with the modern science as research it becomes possible to conceptualize nature as 'a closed system of spatio-temporally related unit of mass' which is assumed to be ordered by a mathematical projection, of which knowledge can be obtained through experimental method and constant research. In addition to his philosophical reflections on modern science, a probe into Heidegger's classical texts also gives a chance to question the position of modern man standing in the middle of a reified world. Heidegger uses the metaphor of 'world picture' to emphasize the objectification of things and their transformation into mere representations of modern man. Thus, observations and teachings about the world creates a world picture in which man finds a position to himself as subject and everything is transformed into a doctrine of man, into an 'anthropology'.

This anthropocentric portrayal of the world is further developed with his depiction of modern technology as enframing. By refusing any instrumental and anthropological definition of modern technology, Heidegger is in opposition to Baconian utilitarianism and its suggested optimism. In more concrete terms, he claims that modern technology has been stripped of any causality in the sense of 'poiẽsis', bringing-forth. Unlike the former forms of technology, modern technology does not have a reasonable demand from nature. Instead, it challenges-forth and sets upon the nature. Therefore, modern technology is no more a bringing-forth, but a way of challenging. His critique becomes complete and directly relevant to life sciences, when considered together with his reflections on the challenging character

of modern technology and the idea of manipulability which appear as the logical consequences of objectification of everything through the prism of scientific approach and from an anthropocentric view of the world. To illustrate, Heidegger claims that the building of water-power suppliers instead of water mills is the consequence of self-propelling technological mentality which challenges-forth the nature, and orders it to stand-by, to be immediately on hand. Whatever is ordered in this way, 'to stand there just so that it may be on call for a further ordering', is called 'standing-reserve'. This is one of the critical terms that Heidegger uses, since 'standing-reserve' implies a new category. Ordered as 'standing-reserve' has no end in itself, it is no more an object, but it is just a means in the service of ordering. 'Standing-reserve' seems to have serious anthropocentric assumptions in the sense that modern subject has control over the revealing Being as such. However, in fact, the modern subject is also challenged by a way of revealing to approach nature as an object of research, until the object disappears into the objectlessness of standing-reserve. Therefore, Heidegger believes that modern technology as a way of revealing which orders the beings is not a human activity, rather man himself is set upon by challenging character of modern technology to order the real as standing-reserve. Reducing the real into what is ordered is what Heidegger calls 'enframing'. In sum, his most radical declaration arises as: modern physics, which sees in nature a complex mathematical order that can be identified through calculation and that can be translated into a system of information, is the herald of enframing.

Following the historical and philosophical arguments of Jonas and Heidegger, for grasping the political aspects of modern science and technology and life sciences in particular, the question of knowledge and power as posed by Foucault is also examined in the second chapter. The reason of considering the work of Foucault stems from my conviction that the concept of bio-power has still explanatory power with respect to the scientific and technological advances in today's world. In this sense, the dissemination of genetic language and practices in a growing manner especially in the 'advanced liberal' Western societies can be evaluated cautiously without falling into the simplicity of Baconian progressive bias. I believe that certain critical terms in his work –such as genealogy, power-knowledge, discourse and bio-

power- help us to see the very political essence at the heart of genetics. Furthermore, Foucault's conception of power contributes to our topic which is missing in Jonas' and Heidegger's outlooks. Genealogical analysis takes the historical developments into account in order to delineate 'the domestication of past' and 'the normalization of the present'. According to Foucault, history does not include a monotonous finality and a progressive chain of events on the basis of utility. All meta-historical attempts to history endeavor to secure the current conditions of life and social practices. Genealogy of power rather focuses on 'the relations of power' by which values, norms and the criteria of truth are determined. It is the power of genealogical perspective that historical emergences are no longer explained by relying on the vocabulary of 'protected identities' and 'exact essences'. Instead, historical emergences, like modern genetics in the 1950s, are understood within the context of power relations. Therefore, neither modern science nor modern technology is neutral and independent from power relations, nor the subject is completely free from the play of dominations in a given historical period. This interrelatedness between modern science and technology and certain forms of power is identified with what Foucault calls 'power-knowledge' –they are inseparable and imply one other. Moreover, contrary to juridical notion of sovereignty and any optimistic/pessimistic evaluation of power, he takes power as decentralized and omnipresent, and positive and invisible. His analysis of power becomes more apprehensible with the examination of the practices and discourses under the title of bio-power. This is because bio-power tells us how the social body raised from 'the ashes of King's body' and became the new principle in the 19th century as something to be protected in a quasi-medical sense. The rise of social body and its protection through remedies and therapeutic devices were the signals of starting of a new era, the era of bio-power. As it is well-known, Foucault could not unfortunately develop a theory of bio-power as refined as he wished because of his untimely death. Yet, his work titled *The History of Sexuality* still provides sufficient clues about novelties of bio-power. Life itself becomes the new target in this era of bio-power. New forms of power identify themselves with the function of administering life, and they are further distinguished as *anatamo-politics of the human body* and *bio-politics of the*

population, the bipolar technologies of bio-power which aim to invest life. This is to say that, unlike the earlier political theorists, Foucault focuses on the mechanisms of normalization both operating on the bodies of individuals to optimize their capabilities for disciplinary and utilitarian purposes, and on the population to regulate and control the biological processes. In other words, the normalization thesis suggests that bio-power distributes the living into the domain of 'value' and 'utility' through norms. To conclude, Foucault's views on normalization and the genealogy of power highlight the geneticization process in general, by showing that it is not a politically neutral event in the course of history, but rather closely related to power relations in the way that healthy is distinguished from the sick, and the risky is distinguished from the predictable.

In the third chapter, I pursue a descriptive analysis of two striking examples of recent advances in genetics, namely prenatal screening tests and cloning. Thus, except for some critical remarks and necessary recalls in this chapter, a more comprehensive interpretation of genetics with reference to three figures is left to the fourth chapter. I have chosen these examples because they are achievements made possible by the passage to a new technological stage in the 1950s: molecular biology. Prenatal genetic tests are employed to check the health of developing baby and to diagnose the probability of certain genetic diseases; while cloning is the technology of creating a genetically identical organism (i.e. DNAs, cells, animals or humans) *via* artificial ways. Since these genetic technologies deeply concern with the reproductive process, their application has been subject to social, legal and ethical debates in the public. For the prenatal screening tests, there have been long-lasting ethical discussions about the goals and the principles they should have. Though the discussants generally take side in the establishment of more liberal and open policies, and non-directive genetic counseling which leaves no room for genetic discrimination, a persistent fact is that these tests have always played a significant role in the management and supervision of reproductive process. Also, since these screening tests provide the knowledge of genetic risks for the fetus, high-risks at gestation have led to the termination of pregnancy. Therefore, the opponents in the public debate blame the termination of pregnancy on the basis of genetic knowledge

of being Godlike to decide who shall live, discriminative against the disabled people and a slide to positive eugenics. I want to argue that such worries which seem to be criticisms do not follow a genuinely critical way of reasoning. For the case of cloning, there is even no need to demonstrate its rising popularity since the 1990s. The same fallacy of replacing criticism with worries also happens with respect to cloning because the sides are those of either unconditional trust in scientific progress, or belief in theological dogmatism. I believe that a portrayal of scientific facts about the cloning technology can provide certain preliminary answers to the question concerning the future of ethics and politics. Accordingly, I start with examining the technical definition of cloning and its five areas of application –the areas of research, agriculture and domestic breeding, conservation of endangered species and the replication of elite animals, human medicine, and human reproductive clinics to overcome infertility. Needless to say, the fifth area of application implying the prospect of human cloning has attracted too much attention from both secular and religious viewpoints. Nevertheless, the criticisms for and against human cloning, just as the criticisms against prenatal screening tests, fail to notice the complexity of the case in relation to the geneticization of life. That is to say, new technological conditions (prenatal genetic tests and the prospect of human cloning) seem to be more complicated in structure than traditional ethicists and conservative thinkers could imagine, and deal with. Perhaps, a more comprehensive evaluation of technological advances can only be initiated by asking why genetic breakthroughs are so *desirable*.

Fourth chapter is devoted to the analysis of genetic engineering and geneticized medicine, relying on a reassessment of the views of Jonas, Heidegger and Foucault presented in the first chapter. Above all, genetics, in general, preserves the metaphysical premises derived from the scientific and technological revolutions, and geneticists continue to hold a mechanistic world view. That is to say, human body, both at the molar (population) and molecular (individual) level, is no more than an object to be manipulated and intervened. To illustrate, in accordance with the technological infinite forward-thrust, it is not surprising to hear utopian expectations regarding human engineering since the advent of molecular biology. Jonas was one

of those who first took genetic engineering into account, and examined it extensively. Thanks to his interest in genetic engineering in the early 1970s, we are given the opportunity to read his critical reflections firsthand. More importantly, his statements on the ethical transformations, the altering concept of *techné*, and the changing nature of human action with the rise of modern technology are quite instructive. Jonas believes that traditional ethics has no relevance with the new technological powers. This is because four fundamental characteristics of traditional ethics have been eliminated from the nature of human action along by the modern technological breakthroughs: First, the realm of *techné* is no more ethically neutral because conventional *techné* never involved with a permanent injury to the integrity of its objects. Second, former ethics was anthropocentric, meaning that traditional ethics was concerned only with direct dealings of man with man. Third, man was not an object of *techné*, now he is. Fourth, there was a closer proximity between human action and its consequences that one could see the (good or evil) results of his or her own action, now this proximity gets lost. Nonetheless, all these aspects of traditional ethics are gone as a result of our growing technological powers over the human and the non-human domains, which is nothing but a never-ending vocation into a fantasy of maximal control over life itself. This becomes even more evident when he examines eight most obvious differences between genetic engineering and conventional (dead-matter) engineering, which exhibit the new course of technological mentality and the new nature of *techné*. Perhaps, one of the most striking questions Jonas asks in this comparison is: 'in what image' human engineering would design the coming-to-be. I think this is a question at the heart of ethico-philosophical debates on advances in genetics. Yet, without a bio-politics of genetic advances, ethico-philosophical arguments might still remain insufficient and fallible. This is the point where we should incorporate Foucault's reflections on administering life.

It would not be wrong to say that we are at the edge of a very interesting turning point. No doubt, the immense accumulation of genetic knowledge and the rapid growth of genetic technologies have the capacity to shake the existing social relations, ways of thinking, living and doing, from their very roots. This new

genetically-defined historical period may require new juridical regularities and institutional rearrangements as well. Yet, I think that the central reasons behind the search for whole-scale transformation of life –what some call 'geneticization' process- lie in the novelties that genetics has introduced into the medical experience. This means a reconfiguration of doctor/patient relationship, re-identification of illness, and re-constitution of a rational medical language around genetics. I will suggest that this reorganization of medical experience can be best understood by relying on different 'spatializations of disease' conceptualized by Foucault in *The Birth of the Clinic*. Basically, Foucault delineates three types of spatializations of disease in the 18th and 19th century. I argue that we should see the emergence of a fourth one in the second half of the 20th century. Through the first spatialization, "the medicine of species situated the disease in an area of homologies in which the individual could receive no positive status" (1973:15). In secondary spatialization, on the other hand, the individual is freed from medical structures, any group gaze and hospital experience: "Doctor and patient are caught up in an ever-greater proximity…the doctor by an ever-more attentive, more insistent…the patient by all the silent…" (1973:15-16). And lastly, tertiary (third in rank) spatialization includes "all the gestures by which, in a given society, a disease is circumscribed, medically invested, isolated, divided up into closed, privileged regions, or distributed throughout cure centers, arranged in the most favorable way" (1973:16). Foucault claims that with the tertiary spatialization clinics and hospitals came to be the compulsory kernel of patients and of medical gaze –a gaze which 'dedicates itself to the task of absorbing experience in its entirety and of mastering it', which brings truth to light, and which can organize a rational language around the clinical experience. However, this corporeality of face-to-face conduct (of doctor and patient) seems to be decontextualized by the introduction of genetics into medicine. This is the novelty which is densely problematic, because it generates the conditions of a fourth spatialization of disease, in which the pathological is identified along a genetic axis even before one enters into the confines of clinic. Fourth spatialization of disease has brought new medical outlook and more advanced techniques. First, the identification of the pathological on a heredity basis made the illness no more an

individual matter. Reconceptualization of illness through molecular optics, molecular gaze, has shown that the heredity illnesses and risks can pass through one generation to another. As a result, since illnesses and risks become a familial matter, individual is summoned to act responsibly in the court of these heredity conditions. Second, the molecular gaze focusing on the causes rather than the consequences of diseases increased the importance of laboratories and laboratory work immensely. One may even wonder whether in the future laboratories will render clinics and hospitals useless and redundant facilities Third, since disease is increasingly described and rationalized at the molecular level, and since everybody is theoretically and genetically at risk in the present or future, the (governmental, commercial, and individual) investments in diagnostic tests and genetic treatments opened a big market as well. Fourth, patients do not remain as passive actors in the new medical experience. In fact, the identification of illness along genetic axis provides new modes of subjectification in Foucauldian sense that active participation outweighs passive reception. For instance, ill patients or 'asymptomatically ill' patients (persons genetically at risk) constitute networks of communication, both within their family and with other patients carrying the same disease through web forums and civil associations. Some ordinary citizens even invest huge amounts of money in genetic research for the development of medical treatment.

Consequently, the fourth spatialization of disease might signal a new configuration of 'knowledge', 'power', and 'subjectivity', which might imply a new phase of the regime of bio-power. I believe that further analysis examining to what extent these three elements are configured shall reveal the qualitative transformation of bio-political rationality with the rise of a new medicine.

CHAPTER 2

HANS JONAS, MARTIN HEIDEGGER AND MICHEL FOUCAULT: UNDERSTANDING MODERN SCIENCE AND TECHNOLOGY THROUGH THE LENS OF RADICAL CRITICS

From the 1990s onward, genetic science has made a considerable progress in terms of knowledge and (bio) technology. Cloning of 'Dolly', the discovery of 'Gay Gene', the developments in gene therapy and foetal gene testing are just a few examples of this progress. However, to what degree these technologies and knowledge are able to mold the life experience of modern individuals still remains a vital question. Therefore, it is an intellectual and ethical responsibility to investigate the field of genetics and its socio-political implications, before the practical applications of genetics become a daily routine of lay person of modern societies. Investigations about this matter may pave the way for widespread public discussions. Each intellectual endeavour, no doubt, will offer only a partial analysis of genetic science. In this sense, my study attempts to scrutinize the techno-scientific knowledge of genetic science on the basis of its political context and implications for power relations. This means to analyze the genetics with reference to power. My study stems from the presupposition that the question of genetic science and genetic knowledge is strictly allied to the question of power in the social structure of our societies.

The commonsensical perception, however, is to take these scientific developments as mere technological improvements in pursuit of human interests. Such a Baconian optimism, in my opinion, is hardly acceptable. Moreover, this utilitarian outlook which is also pragmatic in orientation indeed disguises the question of genetic science –and that of modern science and technology in general- in the maintenance and reproduction of power. Therefore, I find it relatively helpful to start with an analysis of modern science and technology for understanding the mentality behind modern scientific and technological revolutions which led to the emergence of specialized fields of study, and genetic science in particular. Portraying a critical account of modern science and technology will hopefully provide us a

preliminary insight into the intellectual climate which has drastically changed from the 17th century onward. The portrayal of historical and intellectual transformations is also aimed to indicate the role of power behind this process. Briefly, I will present in this chapter the critical outlooks on the issues of modern science, modern technology and their relation to power. Yet, I will confine myself to highly enlightening ideas of three substantial philosophers from the German and French traditions: Hans Jonas, Martin Heidegger and Michel Foucault. This selective reading is due to the fact that Jonas's philosophical remarks on modern science and his ethical concerns on genetic engineering, Heidegger's concept of 'enframing' concerning the essence of technology, and Foucault's illuminating thoughts on the relation between power and knowledge are particularly helpful and complementary to each other for a critical understanding of genetic science and its socio-political implications.

2.1. Hans Jonas' Critique of Modern Science

As a background and a good starting point for our discussion, Hans Jonas' article of "The Meaning of the Scientific and Technological Revolutions" may provide us with a better comprehension of the profound changes which have occurred in the 16th and 17th centuries and onwards. On the ground of his analysis, on which Heidegger's thoughts had serious impact, we may follow a critical chronological account of modern science and technology by distancing ourselves from the current progressive bias. On the one hand, this will probably open up the way of questioning the aims and techniques of manipulation and control, whether they are practiced over the nature, or man, which are central to the modern age. The critical chronological account of modern science and technology, on the other hand, will help us to see the process in terms of its different phases and will lay "the new philosophical ground", the new 'orthodoxy' from which molecular biology and biological engineering derive their premises and mode of functioning. I will start with the intellectual climate that led to the emergence of modern science and its premises. Then, with reference to the Industrial Revolution, the articulation of technological revolution to the scientific revolution will be my focus. Lastly, I will

explicate the technological stages (from mechanical stage to biology) after the radical departure from the former technology with the alliance of modern science and technology. The whole picture together with these stages characterized by different levels of technologies will indicate both the historical background preceding genetic technology and the cognitive impulse behind the developments in molecular biology.

2.1.1. The Rise of Modern Science

Scientific and technological revolutions of modern age, which are European in origin, have gradually undermined the prevailing conditions of worldly life together with the mental existence. As a matter of fact, the agents of these revolutions helped to reorganize the existing relations of social body by gathering a tremendous knowledge of nature and inventing a set of instruments for practical use within concentrated time, in comparison to the inventory of already accumulated knowledge and technical instruments in use for centuries. Therefore, these revolutions brought about a total transformation of the environment, the behavior and the thought in general (Jonas, 1974: 47). However, though scientific and technological revolutions had a profound impact on every aspect of life, from philosophy to everyday practices, the relation between modern science and technology remained relatively unrevealed, and thus, not widely known.

Contrary to the common belief, the process of the scientific and technological revolutions and the relationships between modern science and technology are indeed more complex than they seem and more decisive for our lives. As Jonas explicitly states, modern science was not concerned with the realm of practice, or had no technological intent at the beginning; rather, the scientific revolution first appeared in thought and it gradually transformed the world-view, the metaphysical outlook and, the conception and the method of knowledge (1974: 47).[2]

With this initial revolution in thought, Jonas implies that the notion of manipulation was not an immediate consequence of modern science. This is because modern science dealt with the cosmology and the related fields at the beginning which can not be manipulated. However, it was only with the technological

[2] See also; Whitehead, 1967: 1-19.

revolution, as a delayed effect of the scientific revolution and the pioneer of the modern age, the idea of manipulation and control became more manifest. To Jonas, even though it was a delayed effect, the seeds of technological revolution were somehow always resting within the rise of modern science. Thus, the technological revolution should not be taken as an accidental phenomenon, but only as a later occurrence.

To prevent any misinterpretations, it should be stated that the rise of modern science has contained "manipulability at its theoretical core and, in the form of experiment, involved actual manipulations in the investigative process." (Jonas, 1974: 48). However, at the beginning, the practical intent for Galileo (1564-1642) and others was to gain knowledge through experiments; rather than employing the method of knowledge, experimentation, for practical ends. In Jonas' words;

> "[T]echnology was thus implied as a possibility in the metaphysics, and trained as a practice in the procedures of modern science. Its eventual emergence into the extra-theoretical sphere of vulgar utility, as an instrument of power on the broadest scale, was no more than drawing the conclusion from the intellectual premises which the scientific revolution had established." (1974: 48)

In other words, later phase of technological revolution completed the metaphysical meaning of scientific revolution by making technology a new instrument of power. Modern science, starting from its early stages and gradually removing the theological pressure over its research areas, has achieved to grasp the outside reality within a mathematical complexity. Old-fashioned and traditional understandings and explanations of the nature and the motions of celestial bodies left the ground to a new scientific outlook which was skeptical to the old findings and more inclined to objectify the subjective perception of Man[3]. Moreover, the new scientific outlook was highly equipped in terms of knowledge and instruments in

[3] Distrust to the subjective perception of Man in the sixteenth and seventeenth centuries was overcome by instituting the principle of universality, which means to exclude errors resulting from the deficiencies of subjective perception (Whitehead, 1967:3). This was to secure the outside reality from the subjective perceptual experience, and in turn to take a more accurate picture of it. For this reason, Man of Enlightenment set his object of analysis on a more universal objective basis.

comparison to the previous stages. As a matter of fact, the accumulation of knowledge was accelerated only when the technological factor became a part of the play with the industrial revolution, changing the external conditions of life gradually in accordance with the premises of scientific revolution. The articulation of technological factor and its practical intents to the modern science also led to the erection of a self-feeding necessity, a new 'orthodoxy', which gradually took possession of the process (Jonas, 1974: 48). The scientific revolution, which had been started by the revolutionaries such as Copernicus (1473-1543), Galileo or Descartes (1596-1650), was carried on by later protagonists without having the same cognitive intentions of the original intellectual figures. As the successive generations entered into such a ready-made world of innovations, the revolutionary character of the movement at the beginning had already been lost and there remained a new orthodoxy. Though this new orthodoxy was still the continuation of scientific revolution, subsequent agents of scientific inquiry were devoid of the initial intellectual inspiration. In more concrete terms, with the articulation of the technological factor into the scientific inquiry, this initial scientific inspiration to gain knowledge of the research subject has been replaced with the practical goals to control and manipulate it.

As a result, following the rise of modern science and the technological innovations in 16th and 17th centuries, the modern mind substituted the old agenda of thoughts and values with the new one. The 'wisdom' of the past had disappeared and instead it was replaced by the idea of '*Modernity as an asset*', which was the combination of distrust against the past and self-confidence of the modern man (Jonas, 1974: 50). Nonetheless, the break with the past did not occur only once at the beginning of modern age; rather, as a principle of innovation it became a constant element of the successive centuries[4]. This, in other sense, meant an everlasting critique of the previous phases with the motivation of the further advance. As Jonas comments about the effect of scientific and technological revolutions on our conception of history:

[4] Heidegger calls this principle of innovation 'constant activity' which is a characteristic of modern science. That will be discussed later on in focusing on his analysis of science as research.

> "In the sign of permanent progress, all history becomes what Nietzsche later called 'critical history'. This may be a kind of 'orthodoxy' itself, that is, a settled routine but surely is a very dialectical kind. It made the revolution permanent, irrespective of whether its agents were still revolutionaries." (1974:51)

Thus, gradually, there remained no field of human affairs that was not affected by those changes. The wave of novelty distorted the old judgments and insights. As a result, the conception of universe and of individual were rediscovered and redefined. As Jonas states, the search for new ways became normal, whereas almost everything familiar and commonsensical became insecure. To illustrate, at the very beginning of scientific revolution, skepticism to the traditional explanations led to the publication of two books in 1543: Copernicus' '*On the Revolutions of the Celestial Orbs*' and Vesalius' '*On the Fabric of the Human Body*'. Those two books symbolized two sides of the scientific revolution respectively: the macrocosmic and the microcosmic, the abstract and the concrete, the mathematical and the empirical, the construction and the observation (Jonas, 1974:52; Whitehead, 1967:1). However, it was the first of these two books, the search for a new physical cosmology that gave the scientific revolution its revolutionary character. Aristotelian physics, which had prevailed for centuries, was no longer satisfactory in search of a new cosmology. For that reason, great figures in that era, such as Copernicus and Kepler tried to overcome this arduous task, the search for a new physics for a new cosmology, yet their answers remained descriptive rather than explanatory. Nonetheless, to a certain extent, Galileo managed to solve this problem by founding the basis of a science of motion, which was a decisive contribution to the rise of modern science (Jonas, 1974: 59).

The new conceptualization of motion, in fact, promoted three important developments signifying a profound transformation in the scientific mentality: (1) the geometrizing of nature and the mathematization of physics. Geometry was believed to be the true language of nature and thus should be the method of investigation. Descartes had a significant role in transforming this growing conviction into a metaphysical principle through splitting reality into two mutually exclusive realms;

res cogitans (the world of mind) and *res extensa* (the world of matter). According to Descartes, the world of matter was nothing but extension. Therefore, the determinations of extension, geometry in specific, are required for the knowledge of the external world; (2) the requirement of a new mathematics for the analysis of motions: although Descartes' analytical geometry was the first step, a new mathematics for the analysis of motions (of sun, moon and planets) was necessary. The invention of infinitesimal calculus was the answer to this sophisticated mathematical task by Leibniz and Newton; (3) the rise of a new method of discovery and verification, the experimental method. Different from the observation of nature "in its unprocessed complexity, and also from any nonanalytical trying-out of its responses to our probing interventions", the controlled experiment was aimed to display the action of single factors in an artificially simplified nature. Such as Galileo's inclined plane, experiment requires the theoretical analytic approach (Jonas, 1974: 62-63).

These three developments as a consequence of the search for a new physics were the obvious signals of methodological and cultural shifts in intellectual outlook after the scientific revolution. These shifts – from the divine world to the acceptance of a mechanistic universe, and from the belief in the uniqueness of human existence at the center of universe to the denial of traditional cosmology and its assumptions- characterized the nature of knowledge in the modern age (Harman, 1983: 2). In addition, these cultural and methodological shifts attributed new roles to the scientists. They were no longer passive spectators, but active operators striving to "assert the independence and integrity of the methods and theories of science" (Harman, 1983: 3). Therefore, the mechanistic world view of nature forced the scientists to develop their mathematical tools as well as the technological instruments in order to explain the operational rules of nature. Moreover, the more accurately these rules were calculated; the closer was the modern man to the position of controlling nature's ordinary course of becoming.

2.1.2. The Roots of Technological Revolution

The search for new physics, starting from the 16th and 17th centuries, had been further supported by the classical Newtonian mechanics in the 18th century; and from the 19th century onward, this search has yielded a more complex knowledge of mechanics with the discoveries, such as electromagnetism, radiating energy and nuclear forces. However, it was not the discoveries and inventions that made the process after scientific revolution more crucial for the modern man, but the postulates of improved mechanics which led to a complete transformation of intellectual mentality. The postulates of improved mechanics, which concerned the order of things, provided the necessary mental strength and material conditions for the burst of the technological revolution in the 19th century. Therefore, the historical process after the scientific revolution should not be assessed in a progressive bias by looking at the improving technological devices of the modern age. Rather, to the extent we grasp the transition to a different mode of mentality; we may be safe from a kind of historicist reading of modern science and technology which assumes an organic succession of developments. For this reason, let me focus on this new scientific mentality. The two other complementary issues, the postulates of improved mechanics and the relation of this emerging knowledge to power will be portrayed mostly in the following sections concerning the reflections of Heidegger and Foucault.

First of all, the new physics stressed on the universality of laws, this entails the reduction of every phenomenon to one basic set of laws. The laws of mechanics assumed a world of uniformity and a world machine. Such an understanding of universality inevitably proposed a consistent mode of knowledge that can be applied to all phenomena. Thus, no matter what is observed, everything turned to be an object of knowledge. As a result, nature was freed from its teleological meaning, whereas man was freed from metaphysical reference. In other words, this was a turn from a providential understanding of nature to the analysis of mechanics of things,

including man, which stemmed from the idea of assumed regularity of external reality[5] (Jonas, 1974: 69).

It should be stressed once more that the new (modern) scientific outlook took nature as a mere object, distancing itself from religious symbols and teleological explanations of nature. Therefore, things around mankind started to be measured as "the random concurrence of many causes", and man remained as the sole subject and the sole will (Jonas, 1974: 71). As a result, as the nature became objectified in the service of knowledge, the man became master over nature. To Jonas, this indicates that the scientific revolution was indeed ready for the technological turn which penetrated into it later on. As a matter of fact, the technological revolution was a turn from analytic knowledge to the act of making –from analysis to experiment. Yet, the passage to 'synthesis' was only possible when the 'analysis' of a given case was completed; and that paved the way for the technological turn from 'experiment as a means of knowledge' to 'applied science as a means of use' (Jonas, 1974: 71). Moreover, according to Jonas, this line of transformation led to the reorganization of sciences, most of which have automatically begun to serve for application in the 20th century: " Practice in the service of theory, which is what experiments are, is readily converted into theory, in the service of practice" (1974: 71). What came into life after industrial revolution was an associated body of modern science and technology, sharing the same practical goals. This alliance also represented an important turning point in the modern age: the initial aim of investigation of nature was now transformed into an open claim on nature in order to manipulate and control it.

To prevent any misconception concerning the evolutions of modern science and technology, Jonas states that the interpenetration of modern science and technology occurred effectively in the 19th century; almost two centuries after

[5] In this sense, Descartes' distinction of *res cogitans* and *res extensa* – the world of mind and the world of matter; Kantian transcendental idealism; or Darwinian explanation of evolution which was an extension of Newtonian physics to the life forms, were in concord with the idea of universality and the understanding of history as an aggregate mechanics in which any configuration is just a passage to another one (Jonas, 1974: 70). In simpler terms, in both life and historical sciences, the emphasis became to be the regularity of nature and the role of man in the acquisition of its universal knowledge. Thus, the new scientific mentality searching for the regularity of things included the possibility of reasoning about the future implications of things together with the idea of control and manipulation of them.

modern science had become to flourish[6]. To Jonas, on the one hand, till that time the purpose of most of the inventions were 'theoretical' and 'cognitive' rather than 'practical'-such as chronometers, telescopes and microscopes. He insists that even the magnetism and electricity, or thermodynamics, remained nonpractical until the second half of the 19th century (1974: 73). On the other hand, any technological application of growing sciences of zoology, botany, mineralogy and geology was not even predictable in the 19th century. They were still descriptive, classificatory and historical. However, when geneticism came into play, these growing sciences entered into a new level:

> "Only when the first two –zoology and botany- were by geneticism transformed from morphological into causal systems and subsumed under the norms of classical mechanics (in a bold extension of its terms), could the idea of a science-informed biological technology arise." (Jonas, 1974: 73)

The introduction of geneticism into the life sciences was an important turning point in the history of modernity, which had profound impacts on the successive generations of the 20th century. The new mode of mentality, having an insatiable hunger for knowledge and the desire to control, focused on geneticism so as to see the causality of living organisms under the norms of mechanistic understanding. For this reason, modern mentality did not hesitate to utilize the knowledge of geneticism in the service of practice. Thus, in concord with the aims of manipulation and control, an engineering of the living arose out of the conjunction of genetic knowledge and mechanistic world view.

To sum up, Jonas argues that it was not until the industrial revolution that science and technology could form an alliance. Before the 19th century, on the one hand, science had not significantly inspired technology, though it received some help

[6] For Jonas, the only exception within his critical account is medicine since theory and practice in this discipline were always combined. In other words, medicine alone does not conform to his analysis of interpenetration of modern science and technology due to the fact that every scientific investigation into the human body (theory) simultaneously affected the art of healing (practice). This is why he offers to call medicine a 'technology' and consequently evolving modern medicine the first case of a scientific technology (Jonas, 1974: 73). However, his arguments on medicine is not strong as those of Foucault, and thus, hardly helpful in understanding medical power as a political technology governing (as well as controlling and manipulating) the life itself.

from it in the form of investigative instruments; yet, on the other hand, technology moved forward in those centuries on its own[7] (Jonas, 1974: 73). Thus, he concludes that the alliance of the knowledge of nature and the art of invention came into existence in the 19th century particularly with the rise of industrial revolution.

2.1.3. After the Industrial Revolution

It is clear that the industrial revolution was a rupture from the past in terms of the novelty of technical methods, and it signed the birth of modern technology. The use of 'artificially generated and processed natural forces for the powering of work-producing machines' were the typical features of modern technology. No doubt, as Jonas stresses once more, steam engine was a turning point in that sense, which radically differs from former methods of labor-saving activities, such as animal traction, wind and water. Nevertheless, according to Jonas, the Industrial Revolution, this radical departure from the former technology, was followed by other stages: (1) mechanical stage, (2) chemical technology, (3) electrical technology, (4) electronical technology, and (5) biology. Let me open up these stages briefly and conclude with the genetic programming, which is an extension of molecular biology.

First, the mechanical stage was characterized by the machines "powered by mechanics of volume expansion under heat – thus operating with the familiar solids and forces and on the familiar dynamical principles of classical mechanics" (Jonas, 1974: 75). Those machines were mainly used for the production of goods and their transportation. Nevertheless, the introduction of machines entirely changed the mode of production and the condition of human labor. As a matter of fact, in this initial stage, the engineer was still an empiricist, not in need of abstract and sophisticated theories. However, the sciences of chemistry and electromagnetic radically changed

[7] Before the close alliance between modern science and technology, technology did not depend upon science. Thus, inventor was largely an empiricist who continued 'the tradition of the ingenious artisan' (Conant, 1965: 29). In other words, the inventions –such as steam engine, the loom, the lathe, and many other machines- which characterized the industrial revolution "were invented by practical men and based upon art, observation, and common sense" (Wiesner, 1964: 38). Wiesner also states that it was the middle of nineteenth century when extensive practical use was made of the accumulating scientific knowledge, and men began to exploit the available knowledge of chemistry and electricity for useful purposes (1964: 39).

the direction of technological advance and resulted in the first wholly science-generated technologies for large-scale utilization (Jonas, 1974: 75-76).

Both chemical and electrical technology appeared in the second half of the 19th century. With the chemical technology, small-scale investigations were used for large-scale applications. That is to say, scientific research ceased to be theoretical and cognitive activities; and the tasks of research became identical with the interests of industry. During this process, the manipulative aspect turned to be superior to the cognitive aspect. Electrical technology, on the other hand, introduced the first wholly science-generated creation. Thus, for Jonas, man had advanced from the initial stages of utilizing and exploiting to the level of creating by molding the nature of things with the help of chemical technology, and this artificiality in turn was even furthered by electrical technology.

Fourth, electronic technology was a new phase of the scientific-technological revolution, differing from electrical technology in terms of technique and purpose. Electronical technology was low tension engineering in terms of technique and a communicative engineering in terms of purpose, when compared with the high tension engineering and power engineering of electrical technology. The distinctive feature of electronic technology is more identifiable when the following distinction is introduced: whereas the power engineering and chemistry concern the natural needs of man –food, clothing, shelter, locomotion and so forth-, "communication engineering answers to needs of information and control solely created by the civilization itself which made this technology possible and, once started, imperative" (Jonas, 1974: 79). In other words, the self-feeding necessity of modern age, the new orthodoxy after the scientific revolution, achieved a great success by enlarging the scope of control with the advent of electronic technology.

After these stages, we come to the last stage of technological revolution which is relevant to the topic of my study directly: 'biology', in which man becomes the focus and object of knowledge. For Jonas, especially after molecular biology has come into the scene, the genetic programming appeared as a theoretical possibility. This motivation was not a surprise for Jonas, since the moral ground for human engineering has already been prepared by neutralizing man as an object of inquiry. In

other words, the limits that had been there before modern times have already been violated by the scientific revolution. Thanks to the adherents of technological progress, such as Francis Bacon, and to their optimistic outlook, the speed of technological change was able to convince man of the possibility of everything, including human engineering. However, this optimism – the possibility of genetic programming with the advent of molecular biology which "has been rendered possible by the metaphysical neutralization of man"- prepared a crucial problematic for Jonas: while it gives us "the license to do as we wish, at the same time denies us the guidance for knowing what to wish" (1974: 79). In other words, he argues that when the actual techniques are ready for genetics, human engineering in specific, men will not be ready for their responsible use. Thus, to Jonas, the new microbiology in the evolution of technology is twofold: physical feasibility and metaphysical admissibility. In fact, what leads Jonas to a more cautious stance is the gap between physical feasibility and metaphysical admissibility: whereas fictions become real in terms of techniques, men still remain in a perplexed state of mind. Put differently, "the anti-essentialism of prevailing theory surrenders our being to a freedom without norms" (Jonas, 1974: 80). Thus, according to him, while the modern technology promises everything to be possible due to ever-changing techniques, philosophy seems to fail its first cosmic task of responding to these technological changes which altered the very nature of human life and human action. It is the silence and incapability of philosophy to the rapid technological changes that makes Jonas more cautious and even pessimistic about the future.

In sum, Jonas gives us a chance to scrutinize the history of modern science and calls attention to the recent technological changes in his times –biological engineering in particular. His cautious remarks on biological engineering that portray a dark picture of future will be largely discussed in the third and fourth chapters from a critical perspective. Despite the apparent pessimism in his philosophical texts, Jonas' significant place in my study arises from his critical attention to modern science and technology, as well as his emphasis on the ethical responsibility concerning the implications and consequences of modern scientific and technological adventures. Also, Jonas's arguments which are in opposition to the optimistic but

naïve expectations from modern technology lead us to another philosopher and his mentor, Martin Heidegger. Heidegger's essays on modern science and technology especially will guide us to concentrate on the question of technology which is one of the pillars of my study.

2.2. Martin Heidegger's Radical Criticism of Modern Technology

In this section, some valuable philosophical remarks of Heidegger on the essence of modern technology will be discussed and elaborated, hoping that this will make the critical history of modern science and technology extracted from Jonas more complete and understandable in wider sense. Heidegger's critique of modern science as research, the position of modern subject in the 'world picture', and the enframing character of technology respectively will be the focus. The content of his critiques will indicate that modern science and technology together with the anthropocentric understanding of the world have offended the traditional interpretation of life in general. Accordingly, the rise of modern science and technology left behind a world image in which the nature and man are in a constant conflict and man is armed with the newer technologies of control and manipulation.

2.2.1. The Essence of Modern Science: Science as Research

It is well-defined in Heidegger's 'The Age of World Picture' that modern science separates itself from the *scientia* of Middle Ages, or Greek science in terms of the search for exact calculations of natural occurrences[8]. This exactness, from the viewpoint that relies on progress, was understood as the correctness of knowledge in modern science. According to Heidegger, any comparison between modern science and the science of antiquity or Middle Ages, in terms of exactness, can blur the essence of modern science and make it incomprehensible – since , for instance, Greek science had nothing to do with the notion of exactness and hence it was an irrelevant category for Greek antiquity. Thus, what is required is "to come upon the metaphysical ground which provides the foundation of science as a modern

[8] See also; Heidegger, Martin. "Propositions about 'Science'." *Contributions to Philosophy (From Enowning)*, translated by Parvis Emad and Kenneth Maly. Bloomington and Indianapolis: Indiana University Press, 1999

phenomenon", because only then, he argues, the essence of modernity can be recognized from out of that ground (2002: 58).

Heidegger's answer to the question concerning the essence of modern science is research. In order to understand the essence of modern science, one should understand the essence of research and what it consists of. As already mentioned in presenting Jonas' arguments, modern physics stands before us as the knowledge of nature depending on the assumption that "corporeality manifests itself immediately and universally in all natural things" (Heidegger, 2002: 59). Thus, nature is assumed to be "the closed system of spatio-temporally related units of mass" in which anything taken as a subject-matter can be specified in advance through physics and for physics as something already known (Heidegger, 2002:59-60). As a result, every natural event becomes a harmonic part that fits into this ground-plan of nature[9]. This self-referential character of physical knowledge makes the external reality, the natural events, visible only if they are viewed from the perspective of this ground-plan. The ground-plan of nature, in addition, is secured through the obligation of physical research in advance. That is the rigor of research which takes part in each step of investigation (Heidegger, 2002: 60). Hence, in his words: "Science becomes research through the projected plan and through the securing of the plan in the rigor of procedure." (2002: 60).

Second essential characteristic of research, according to Heidegger, is the concern for method – experimental method in particular. First of all, research into facts within a projected region, in the realm of nature that is objectified, is "the setting up and confirmation of rule and law[10]" (Heidegger, 2002: 61). This requires explaining the projected domain by means of method: "The method by means of

[9] Heidegger indicates that at the very core of this dramatic transformation lies Newton's doctrine of motion. Newton's axiom begins with "corpus omne" (every body) which means that earthly and celestial bodies become obsolete and they are taken as one category (1972a: 262). Accordingly, modern science projects a universally valid ground-plan for all things and the essence of beings as a whole becomes accessible only to the degree they are accordant to this ground-plan (Heidegger, 1972a: 245). Thus, each body is neutralized into one ground-plan. That is why, he believes science is "*not a knowing* in the sense of grounding and preserving an essential truth", but "a derived *mechanism* of a knowing, i.e., it is the machinational opening of a sphere of accuracies within an otherwise hidden…zone of truth (truth about 'nature', 'history', 'right' for example)" (Heidegger, 1999: 101).

[10] Heidegger defines the rule as "the fixedness of the facts and the constancy of their change as such"; whereas the law, "the constancy of change in the necessity of its course" (Heidegger, 2002: 61).

which a domain of objects is represented has the character of a clarification [*Klärung*] from out of the clear, of explanation [*Erklärung*]" (Heidegger, 2002: 61). However, to Heidegger, explanation has two functions. It describes the unknown through the known, and simultaneously it confirms the known through the unknown. In the natural sciences, explanation is possible only through investigation, and investigation through experiment (Heidegger, 2002: 61). However, this does not mean that natural science first became research through experiment; on the contrary, the knowledge of natural science that has already transformed itself into research made the experiment possible[11]. So, experiment, which is a logical consequence of the essence of research, is set up to "represent a condition according to which a specific nexus of motions can become capable of being followed in its necessary course, which is to say that it can be mastered, in advance, by calculation." (Heidegger, 2002: 61). Therefore, the modern research-experiment is not merely a more accurate observation; rather, it is for the confirmation of law within the projected domain and "in the service of an exact projection of nature" (Heidegger, 2002: 62). This mentality, in turn, gives modern man the sense of mastery over nature. Thus, each time the clarification of the unknown and the verification of law is achieved, Man is a bit closer to control and manipulate the nature. Put differently, after nature as a new project became the subject of modern scientific experiments and explanations, the idea of manipulability at the theoretical core of modern science became more visible.

The third characteristic of modern science is constant activity which means research is not simply an amalgamation of results; rather, the methodology, by which each specified domain is conquered, permanently uses the results to direct itself towards a new procedure through which 'knowing establishes itself' (Heidegger, 2002: 63). In other words, there are always the possibilities of new procedures that can be adapted by the methodology. Thus, Heidegger calls this intrinsic character of research the 'constant activity' which also necessitates the process of

[11] Here, Heidegger does not mean that experiment is a peculiar character of modern science. There are, of course, experiments before the modern science, but what is crucial about the experimental-research is "the manner setting up the test and the intent with which it is undertaken and in which it is grounded" (Heidegger, 1972a: 248).

institutionalization. With the institutionalization of sciences, the practices find the appropriate 'coherence' and 'unity'. Furthermore, the institutionalization of constant activity of modern science as research, in turn, creates a pressure over a scholar in such a way that a scholar no longer stays as a scholar. Constant production of new procedures out of the results of research pushes the scholar into another stamp: a researcher who is "constantly on the move" and "no longer needs a library at home" (Heidegger, 1938: 64).

The following paragraph from the article of 'The Age of World Picture' can sum up the characteristics of modern science according to Heidegger, which have been discussed so far:

> "Modern science simultaneously founds and differentiates itself in the projection of particular object domains. These projections are developed by the appropriate methodologies which are made secure by means of rigor. Method establishes itself at any given time in constant activity. Projection and rigor, method and constant activity, each demanding the other, make up the essence of modern science, make into research." (Heidegger, 2002: 65)

To conclude, in general, modern science differentiates itself from its antecedents by its manner of measuring, experimenting and conceptualizing. To Heidegger, this manner is ordered by what he calls the 'mathematical projection' (Heidegger, 1972a: 244). 'Mathematical' refers to the way something is learned, and 'projection' means "the fundamental presuppositions and expectations science entertains with respect to the 'thingness' of things" (Heidegger, 1972a: 244). Mathematical projection opens a domain where things show themselves. That 'which things are taken as' and 'what and how they are to be evaluated' is fixed beforehand in this projection. Thus, the projection is axiomatic. Since it is axiomatic, mathematical projection sketches "the basic blueprint of the structure of everything and its relation to every other thing" in advance (Heidegger, 1972a: 268). As a result, nature is outlined in a consistent universality by the axiomatic project, and hence, all bodies according to relations of space, time and motion appear to be meaningful only within this plan. Since bodies only show themselves within this projected realm, bodies are no longer concealed beings or have concealed capacities. This

mathematical projection also prefigures how bodies show themselves; therefore, "the project also determines the mode of taking in and studying of what shows itself, experience, the *experiri* " (Heidegger, 1972a: 269). This capacity of determining the inquiry gives it the power of setting up its own line of questioning through which nature must respond in any way. Therefore, on the basis of the mathematical understanding, "the *experientia* becomes the modern experiment" (Heidegger, 1972a: 269). Heidegger states that it is mathematical project which makes modern science experimental. In other words, "the new form of modern science did not arise because mathematics became an essential determinant"; rather, "that mathematics, and a particular kind of mathematics, could come into play and had to come into play is a consequence of the mathematical project" (Heidegger, 1972a: 269). Therefore, the novelties in mathematics (such as Descartes' analytical geometry, Newton's infinitesimal calculus and Leibniz's differential calculus) were fruits of "the basically mathematical character of thinking" (Heidegger, 1972a: 269). Heidegger's analysis of modern science as research and its metaphysical ground shows that all bodies in the nature were interpreted as having uniform and regular existences. This assumed uniformity and regularity of the nature was believed to bring to light only by means of mathematical thinking. Accordingly, the importance of mathematical thinking for my study is that when the human body was articulated entirely into the agenda of mathematical projection, it (human body) was analyzed just like any other bodies in the nature. To illustrate, the reproduction process, the mechanisms of inner body, the muscular structure and the skeleton structure became to be examined according to the metaphysical character of modern science as research. Moreover, the constant activity of scientific research for the unknown about human beings later extended its scope into the realm of sub-conscious in 19th century and into the genetic structure of human life in 20th century.

2.2.2. The Position of the Subject: The Representative of the World Picture

Science as research, which is collected knowledge through calculation, does not separate nature and history as two different fields of research. Rather they are treated in the same way as the objects of explanatory representation (Heidegger,

2002: 65). Thus, what characterizes the science as research is the conceptualization of things around us, including man, Being[12] of the beings in general, in such a general mentality of objectness. Furthermore, this objectification of beings is accomplished only when the representations of the Being are calculated in a certain way. This was literally the victory of modern science as research in which the Being turned into an object of representation and truth into the certainty of representation[13]. This new understanding of beings and the conception of truth in this sense which constitutes the metaphysical ground of research, in turn, determines the essence of modernity in general (Heidegger, 2002: 66). Here, what Heidegger means by modernity is a way of understanding and appropriating the nature and whole reality.

As a matter of fact, the modern age goes through a dramatic change concerning the essence of humanity altogether in the sense that man transforms himself into the *subject,* who now becomes the referential center of all other beings and the only being upon which every being is founded. However, according to Heidegger, such an all-encompassing transformation is only possible when the understanding of beings as a whole has been altered. He uses the metaphor of 'world picture' to emphasize this total transformation in the modern age, which includes entirely a different process than the ancient and medieval ages and their corresponding ways of reality. This new role of man as subject can be illustrated by comparing it with the Greek conception of humanity. In the Greek tradition, man is the receiver of beings who "has to gather and save, catch up and preserve, the self-opening in its openness" in order to fulfill his essence (Heidegger, 2002: 68-69). Thus, this ancient man opens himself to what is present, but not in the sense of a representation which requires a subjective perception. On the other hand, modern man relates the things that belong to the category of present-at-hand to oneself, the representative, and "forces it back to oneself as the norm-giving domain"

[12] Briefly, what Heidegger understands from Being is the basis on which beings are already understood. Being (with capital 'b') is like a filter (of social meanings, practices and projections) through which the world of things are transformed into understandable beings. Also see the section 2.3.5, where Heidegger's history of Being and the meaning of Being are further discussed in comparison with Foucault's analysis of 'normalization' and 'power-knowledge'.

[13] As Heidegger argues in its philosophical breadth: it was the metaphysics of Descartes, for the first time, which defined the being and the truth in this respect (2002: Appendix 4-8-9; 1972a: 273-282).

(Heidegger, 2002: 69). By this way, he states that, "man becomes the representative [*Repräsentant*] of beings in the sense of the objective" (2002: 69). Everything stands as an object before man which is, at the same time, represented by him. Heidegger calls this process of objectification of beings as a whole 'world picture' in which man finds a position to himself as subject. As a result of this process – the world becoming a picture and man laying the role of subject-, "observations and teachings about the world transform themselves into a doctrine of man, into an anthropology" (Heidegger, 2002: 70). This change in outlook brings along, for Heidegger, the motive to grasp the world and evaluate the other beings around from the standpoint of and in relation to man. So, modern man turns into a representative who "gives every being the measure and draws up the guidelines" (Heidegger, 2002: 71). In brief, Heidegger's critique of modernity and science as research indicates that man becomes the only privileged representative of things around himself. Modern man portrays a world picture in which he sets the rules and laws, and searches for the order of beings with reference to these rules and laws in such a way that he himself also could not escape from this axiomatic project[14]. In other words, in this gradual process of objectification and representation, men become the objects of analysis and hence of control and manipulation. Now, let me present an illuminating concept of Heidegger, enframing, and his views on the essence of modern technology which are quite relevant to the issues already discussed. This relevancy stems from the fact that technology as enframing furthers the objectification of both the nature and man. The enframing character of technology indeed challenges the ordinary course of bodies and orders them for further use, just like a river which is challenged and ordered as a water-power supplier.

[14] Here, I would like to express my gratitude to one of my professors. Even though I have not argued explicitly the conceptions of 'biologism' and 'machination' in my study, I am grateful to Hasan Ünal Nalbantoğlu for introducing me Heidegger's critiques of 'biologism' that denotes a discussion of the theme of biological organisms and nature, and of 'the mechanistic conception of vital process' structured by a calculative and objectifying kind of thinking. These critiques can be found in Heidegger's two significant works of 'Contributions to Philosophy (From Enowning)' and 'The Fundamental Concepts of Metaphysics'.

2.2.3. The Question Concerning Technology: Technology as Enframing

Heidegger's analysis of science and modernity is not complete insofar as his understanding of technology is not concerned. Therefore, Heidegger's illuminating article of 'The Question Concerning Technology' here will be examined in continuity with the theses developed in 'The Age of World Picture'.

In 'The Question Concerning Technology', Heidegger suggests to develop a free relationship to technology: "The relationship will be free if it opens our human existence to the essence of technology…When we can respond to this essence, we shall be able to experience the technological within its bounds." (Heidegger, 1972b: 287). He separates 'technology' and 'the essence of technology' from each other since technology and the essence of technology is not equivalent, and the essence of technology has nothing to do with the technological. Thus, for Heidegger, we can only experience the essence of technology if we cease to conceive and push forward the technological. He makes the point that any conception of technology as something neutral makes us blind to the essence of technology. What Heidegger means by questioning the 'essence' of a thing is pursued by asking directly the question what that thing is. Therefore, when he raises the question concerning technology, he questions what the technology is in a phenomenological way (1972b: 288). To be able to connect the preceding discussion on modern science with the question concerning technology, it should be stated that there is a close link between the whatness of technology and modern science as research in the sense that the metaphysical ground of modern science as research moulds the very essence of technology too. Put differently, the modern physical theory of nature paves the way not simply for technology, but for the essence of technology. In order to understand Heidegger's basic argument that 'technology is no mere means, but a way of revealing'; we should clarify the concepts of causality and instrumentality for the sake of grasping his definition of technology in a correct manner.

In conventional understanding there can be found two straight answers to the question what technology is, one instrumental and the other anthropological: (1) Technology is a means to an end, and (2) Technology is a human activity (Heidegger 1972b: 288). Indeed, two answers belong together since it is the human activity that

sets goals and employs the means towards prescribed ends. As a result, the relation of man with modern technology is very much conditioned by this instrumental conception of technology. And this approach engenders a general conviction that "everything depends on our manipulating technology in the proper manner as a means" (Heidegger, 1972b: 289). However, instrumental definition of technology still does not reveal the essence of technology.

Heidegger's refusal of accepting the instrumental definition of technology in the search for technology's essence leads him to a discussion concerning the means and ends, and hence to questioning of cause and causality. This is because what lies beneath the instrumentality is causality. According to Heidegger, without questioning and clarifying the concepts of causality and with it instrumentality, the accepted definition of technology remains groundless and obscure (1972b: 290). Thus, he starts with questioning what 'cause' really means beyond 'the doctrine of four causes'[15] that had been taught by philosophy for centuries. At the end of his discussion, he concludes that the conventional meaning of causality as 'bringing about or effecting' was a misinterpretation due to the modern departure from the Greek thought. Let me briefly focus on his way of reasoning that explains this modern departure.

Contrary to the meaning of causality as effecting, the relation between classical notions of four causes is indeed understood as 'co-responsibility' and 'indebtedness' in Greek thought. Thus, Heidegger finds the meaning of instrumentality -which is based on causality- in Greek philosophy as being responsible and being indebted (1972b: 292). Then, these four causes are understood as responsible of bringing something into appearance. They together 'let the thing come forth into presencing'. In this sense, the unison of four causes "let what is not

[15] These four causes had been originally developed by Aristotle and taught after his death. Namely, these four causes are "1) the *causa materialis*, the material, the matter out of which, for example, a silver chalice is made; 2) the *causa formalis*, the form, the shape into which the material enters; 3) the *causa finalis*, the end, for example, the sacrificial rite in relation to which the chalice required is determined as to its form and matter; 4) the *causa efficiens*, which brings about the effect that is the finished, actual chalice in this instance, the silversmith" (Heidegger, 1972b: 289-290). Heidegger claims that it becomes impossible to understand the essence of technology in relation to this doctrine of 'fourfold causality' since the meanings of instrumentality and the cause have begun to be conceived in a completely different fashion in the modern age.

yet present arrive into presencing", which is '*poiẽsis*', bringing-forth (Heidegger, 1972b: 293). However, this bringing-forth has a different scope in Greek mentality. It includes not only 'handicraft manufacture', and 'artistic' and 'poetical' bringing into appearance, but also 'Physis'[16] which is understood as physical whole of nature. In other words, to the Greek philosophy, what comes into presence (*poiẽsis*) is indeed indebted to the unison of four causes. Thus, poiẽsis (bringing-forth) is conceived as a reasonable demand from the nature. From this perspective, genetic inquiries into the human body for the interventionist purposes (i.e. for reprogramming the genetic structure) are found challenging and unreasonable.

When bringing-forth is considered in its full scope, it would be better grasped that bringing-forth only happens as something concealed comes into unconcealment. Heidegger further develops his argument by calling this coming as 'revealing' within which it (coming) rests and moves freely; and thus, every bringing-forth is grounded in revealing[17] (1972b: 293-294). At this point, we should look into the relation between revealing and technology. The following discussion on the essence of technology and modern technology developed by Heidegger will be a guideline for our analysis of genetic science.

Technology, indeed, stems from the Greek, and from the word *technikon*, meaning which belongs to *technẽ* (Heidegger, 1972b: 294). The word *technẽ* implies both the activities and skills of the craftsmen and the arts of the mind and fine arts. In this sense, *technẽ* belongs to bringing-forth whether it is handiwork or fine arts. So, when essence of technology is inquired, Heidegger reaches at bringing-forth. And since every bringing-forth is grounded in revealing, technology is also a way of revealing. Therefore, we arrive at the basic argument in the article that 'technology is no mere means, but a way of revealing'. In other words, at the very core of *technẽ* lies revealing, not merely using of means or making and manipulating. For this reason, as Heidegger argues: "Technology is a mode of revealing. Technology comes

[16] It is the arising of something out of itself. For instance, the bursting of a blossom into bloom is also a bringing-forth.

[17] This revealing indirectly helps us to understand what the truth is. As Heidegger differentiates clearly, "the Greeks have the word *alẽtheia* for revealing. The Romans translate this word with *veritas*. We say 'truth' and usually understand it as the correctness of representation" (1972b: 294).

to presence in the realm where revealing and unconcealment take place, where *aletheia*, truth, happens." (1972b: 295). In other words, to simplify, from Heidegger's approach we may argue that technology establishes a particular relationship with the things around us.

Then, modern technology too is a mode of revealing. However, according to Heidegger, the revealing of modern technology is not a bringing-forth, in the sense of *poiẽsis*: "The revealing that rules in modern technology is a *challenging*, which puts to nature the unreasonable demand that it supply which can be extracted and stored as such"[emphasis added] (Heidegger, 1972b: 296). To illustrate, in contrary to the old water mill, a water-power supplier, which is a product of modern technology, unlocks the energy from the water in order to store it. Therefore, the revealing in modern technology unfolds itself in a challenging way, and hence it is no more a bringing-forth. In other words, the revealing that holds sway throughout modern technology has the character of *setting-upon*, in the sense of a *challenging-forth*. In the simplest way what Heidegger implies is that modern technology *sets upon* nature. Everything becomes an object before this way of looking, and thus they can be manipulated in the sense of challenging. For instance, earth now becomes a coal mining district, the soil a mineral deposit, or river a power plant (Heidegger, 1972b: 296-297). The sequences of challenging are drawn by Heidegger in the following manner: the energy concealed in nature is unlocked, transformed, stored up, distributed and switched about ever a new. And each part of this process is still a way of revealing. However, this revealing never comes to an end. This permanent attitude of challenging nature happens through regulating the very course of its own 'manifoldly interlocking paths'. Of course, this regulating itself is everywhere secured, for its own sake. Thus, regulating and securing, as Heidegger brilliantly remarks, become the primary characteristics of the revealing that challenges (1972b: 297-298).

He passes to another critical remark as a consequence of the discussion above. As a result of modern technology's character of setting upon that challenges, "everywhere everything is ordered to stand by, to be immediately on hand, indeed to stand there just so that it may be on call for a further ordering" (Heidegger, 1972b:

298). And whatever is ordered in this way is called 'standing-reserve'. What is crucial in this term is that whatever is available or ready for a certain function or service in the sense of standing-reserve no more 'stands over against us as object'. Things around us are surely objects in themselves, but when they are regulated and secured in the sense of challenging as a standing-reserve, they immediately loose their ends in themselves and become a means in the service of ordering.

In this picture, according to Heidegger, man has a unique position. Because man becomes the actor in this challenging setting-upon through which the real is revealed as standing-reserve, he succeeds to remain out of this standing-reserve. However, interestingly, "man does not have the control over unconcealment itself, in which at any time the real shows itself or withdraws" (Heidegger, 1972b: 299). In other words, though it is man who drives technology forward and has a role in ordering as a way of revealing, the unconcealment – within which ordering unfolds- is never a human handiwork. This is because man finds himself in an already unconcealed realm. Heidegger's answer to the question how this revealing happens if not a handiwork of man is that man "has already been claimed by a way of revealing that challenges him to approach nature as an object of research, until even the object disappears into the objectlessness of standing-reserve" (1972b: 300). Then, modern technology as a way of revealing which orders the beings is not just an human activity coordinated by man as subject who controls only the objects or things. This challenging character of modern technology should be rather conceived as something which sets upon man to order the real as standing-reserve. Thus, Heidegger concludes that challenging-forth is what gathers man into ordering, and this challenging claim which gathers man to order the real as standing-reserve is named as 'Ge-stell' [Enframing] (1972b: 300-301). In Heidegger's own words: "Enframing means the gathering together of that setting upon that sets upon man, i.e., challenges him forth, to reveal the real, in the mode of ordering, as standing-reserve" (1972b: 302). In simpler terms, through enframing we become to reduce what is real into what is ordered.

In this sense, enframing implies the way of revealing that rules throughout the essence of modern technology. And, it has nothing to do with the technological in the

sense of technological novelties. Thus, any of the definitions of technology, be it instrumental or anthropological, is indefensible for Heidegger as to portray true essence of technology. As mentioned before, this enframing character of technology is not something accidental. As both Jonas's introductory history of modern science and technology and Heidegger's argumentation concerning modern science as research indicate, modern physics treats nature as something calculable in its exactness. Therefore, as nature becomes identifiable through calculation, at the same time, it turns into something orderable as a system of information. This is why Heidegger calls modern physics, the herald of enframing.

In addition to these definitions, Heidegger states that: "Enframing, as a challenging-forth into ordering, sends into[18] a way of revealing" (1972b: 306). Every sending that gathers is a destining. As every way of revealing, "enframing is an ordaining of destining" (Heidegger, 1972b: 306). Bringing-forth (*poiẽsis*), in this sense, as a way of revealing, is also a destining. However, destining in the sense Heidegger uses is not identical with fate. It does not compel. For this reason, according to Heidegger, "man becomes truly free only insofar as he belongs to the realm of destining and so becomes one who listens, though not one who simply obeys" (1972b: 306). Destining, at any given time, starts man on a way of revealing; however, in modern age, it pushes forward man into what is already revealed in ordering and thus blocks the other possibilities. Thus, there is always the danger that man can misconstrue what is unconcealed, because everything that presents shows itself in the light of cause-effect coherence, or in terms of instrumentality, as a result of the exactly calculable status of nature.

The danger, to Heidegger, shows itself in two ways. First, what is unconcealed is not an object any more, but a standing-reserve for man, which means "man in the midst of objectlessness is nothing but the orderer of standing-reserve" (Heidegger, 1972b: 308). Also, according to Heidegger, the time, when man himself will become a standing-reserve, is approaching. Second, man as subject designates the world as his construction; and thus, he believes to encounter only himself

[18] 'To send' here means 'to start upon a way'. He calls "the sending that gathers, that first starts man upon a way of revealing, destining" (Heidegger, 1972b: 305-306)

wherever he looks. For this reason, at the same time, man attends to the challenging claim of enframing so decisively that he fails to discover in what respect he 'ek-sists' (Heidegger, 1972b: 308-309). For Heidegger, ek-sistence means standing out into the truth of Being. Ek-sistence is, thus, the essence of human being. Man ek-sists if only he opens himself to the ecstatic inherence in truth of Being. In this sense, he rejects the anthropocentric view that human being is the lord of the beings; rather, he believes, human being is the shepherd of Being (Heidegger, 1998: 260). According to Heidegger, contrary to every existence, ek-sistence is "ek-static dwelling in the nearness of being…the guardianship, that is the care for being" (1998: 261). Here, his emphasis on ek-sistence is an attempt to grasp the worth and essence of Being. However, such an attempt leads him to think against 'values' – concerning culture, art, science, human dignity, world and God. Not because these values are valueless, but they are robbed of their worth (Heidegger, 1998: 265). Because every valuing is a subjectivizing and subjectivizing does not let beings be in themselves. Rather, it closes them as objects. Therefore, he states that "thinking in values is the greatest blasphemy imaginable against being" (1998: 265). Thinking against subjectivizing, thinking against values means to bring the clearing of the truth of Being before thinking, and this is possible when human being can stand out into the openness of Being and insofar as he is the ek-sisting one. In such an understanding, human being never holds the primary role as a subject over the beings (Heidegger, 1998: 266).

To sum up, technology is not something demonic for Heidegger, but the essence of modern technology as enframing is the danger for our times. These two attitudes namely, bringing-forth and enframing, should not be mixed. Each is a way of revealing and both have the character of destining. But, enframing is a revealing that challenges (and controls and manipulates), and at the same time, blocks '*poiẽsis*' (bringing-forth). In this sense, wherever enframing rules, human being withdraws from his ek-sistence wherein other possibilities of revealing are withdrawn at the same time. Thus, the relevance of Heidegger's criticism of modernity in general to my study is its persuasiveness in drawing the position of modern subject in the 'world picture' and the process in which nothing escapes from being ordered as a standing-reserve. The originality of Heidegger's essays for my study stems from

their emphases on the enframing character of technology and the mathematical projection of modern science, both of which in certain respects refer to the criticisms of the instrumental rationality of modern mentality and the subject as the sole representative of the world of things. However, the role of power in Heidegger's criticisms is relatively veiled. Thus, for the purpose of making the role of power more obvious in our study, I will concentrate on Foucault's analysis of power. My particular attention to Michel Foucault especially issues from the fact that his striking essays on power are complementary to the arguments of Jonas and Heidegger.

2.3. The Question of Power and Knowledge in Michel Foucault

Against the Baconian pragmatism and optimism in terms of the rise and development of modern scientific knowledge, Foucault, like Jonas and Heidegger, pursues a critical perspective in order to unveil the manner knowledge has been produced and employed. In general, Foucault explicates the question of knowledge with that of power. One should also note here that, perhaps because of Nietzschean influences on both, Foucault's critical outlook show similarities with Heidegger's way of thinking and criticizing modernity in certain respects. Respectively, in this section, the focus will be on his genealogical perspective, the power-knowledge relation and his conceptualization of power, and the notion of discourse. Lastly, I will try to sketch the similarity between Foucault's analysis of bio-power as an attempt for normalizing and Heidegger's analysis of technology as enframing.

2.3.1. Genealogy

The idea of genealogy, in general, opposes the historical outlook of which intention was to search for origins and pure forms in history. Instead of looking for pure forms and origins, Nietzsche proposed a genealogical perspective arguing that the so-called immobile forms have either never existed or changed throughout time. Furthermore, contrary to a progressive reading of history, his inquiry underlined accidents, breaking points and ruptures in history. In other words, Nietzsche was against the conventional and teleological reading of history, the aim of which was to secure existing conditions of life by following a linear development and to seek a

progress or a monotonous finality on the basis of utility. In fact, to Nietzsche, history is not compatible with the idea of origin which assumes that "things are most precious and essential at the moment of birth[19]", since "the origin always precedes the Fall" (Foucault, 1977:143). The idea of origin presumes a continuous distanciation from the moment of birth, and creates a field of knowledge which functions to recover what has been lost in mean time. Nonetheless, the truth resulted from the errors of search for origin "cannot be refuted because it was hardened into an unalterable form in the long baking process of history[20]" (Foucault, 1977: 144). Therefore, the vital question arises: whether the history becomes a history of an error we call truth (Foucault, 1977: 144). To avoid from the same error of conventional history, Nietzsche attempts to find the singularity of events through a genealogy of values, morality and knowledge. Genealogical perspective, thus, seeks to break 'the harmonized relation between the past and present by rejecting the protected identities, exact essences of things and a meta-historical development' (Foucault, 1977: 142). This approach assumes that an evolutionary understanding of history leads only to the domestication of the past, and hence, the normalization of the present. As a result of evolutionary account, present context is made a natural consequence of the domesticated past through selecting the most appropriate and most familiar stories. As Foucault states clearly, this outlook ends up in writing the history of the past in terms of present. However, to Foucault, what should be done is to write "the history of present" (1979: 31).

For this aim, Foucault proposes a radical genealogy. He takes the idea from Nietzsche that relations of domination determine the criteria of truth, norms, values and etc. Accordingly, Foucault claims that a domesticated path between past and present is not only discursively constructed for securing the present conjuncture, but it is a consequence of power relations. In other words, the traditional account of history should not be read simply as a methodological mistake, but as a way of attributing logic to emergences[21] and making them comprehensible in terms of

[19] Foucault refers to Nietzsche's *The Wanderer and His shadows* (1977: 143).
[20] Foucault refers to Nietzsche's *The Gay Science* (1977: 144).
[21] Foucault uses 'emergence' as the moment of arising which is always produced through a particular stage of forces. In other words, emergence is the entry of forces into the historical scene. Emergence is

present, which in turn, stabilizes the existing power relations and makes them secure. Hence, the passing events in the complex course of descent should be considered as dispersions, accidents, minute deviations, complete reversals or errors (Foucault, 1977: 146). In other words, both the heterogeneity of emergences and singularity within themselves are needed to be identified. Identification as such means refuting a general permanent rationality in history in order to see the regimes of truth surrendering and administering our lives, and to accept that there is only one single drama is ever staged, "the endlessly repeated play of dominations" (Foucault, 1977: 150). It is this domination of certain men over others, which makes the differentiation of values, morality or knowledge possible throughout history. Thus, to the extent the play of dominations is portrayed and its role on the constitution of social reality is shown, the genealogy of Foucault becomes more comprehensible. Furthermore, Foucault's genealogy does not presuppose subjects establishing a *neutral* relationship with the existing and circulating discourses, widespread beliefs or local understandings. Rather, this relationship itself is constituted *partially* by the play of dominations. For instance, the institutionalization of medicine and the dissemination of medical knowledge were not neutral events in the course of history, and independent from power relations. Medicine was more than an art of healing. Rather, it functioned to discipline the human body and the population by means of medical discourses, and in turn, to stabilize and secure the certain forms of power relations. Therefore, a genealogical reading of history indicates that institutions, such as hospital and asylum, are not apolitical bodies. Instead, these institutions guide the power relations with the knowledge they produce and they mediate the normalization of social life with the practices they exercise. In this sense, Foucault's way of reasoning has a convincing strength in explicating the inner relation between power and knowledge, and in explicating the problematic aspects of normalization.

'the eruption of forces' or 'their leap from the wings to the center' which are vigorous and fresh (Foucault, 1977: 148-150)

2.3.2. Power-Knowledge

Foucault's genealogy clearly reveals a different kind of relation between power and knowledge in comparison to the usual understanding of 'power and knowledge' which has been figured in two alternative ways since the 17th century. First is the defense of progress, or the Baconian pragmatism, which constituted an optimistic relation between power and knowledge. This claim presupposed the idea that the growth of the scientific knowledge would bring about the improvement of human beings and society all together. Second is the pessimistic one in contrariness to the Baconian optimism, and it takes power as a restricting and repressing barrier before the progress of inquiry. Therefore, this second view points to illegitimate exercises of power which suppress the progress of knowledge and human equality (Hiley, 1984: 199).

The post seventeenth century thought, in general, has been preoccupied with the analyses which particularly focused on the problem of legitimacy of power with respect to the theories of rights, law and sovereignty (Hiley, 1984: 199) However, according to Foucault, any juridical notion of sovereignty that presupposes the individual as a "subject of natural rights or original powers" should be abandoned, because juridical model only "aims to account for the ideal genesis of state" and "makes law the fundamental manifestation of power" (1997: 59). Instead of a philosophico-juridical discourse organized around the problem of sovereignty and law, Foucault proposes an analysis in which power should be thought in terms of force relations and as inseparate from knowledge. Let me focus on this thesis of inseparability briefly, and then focus on his account of power.

In one of his interviews, Foucault explicitly states that power and knowledge are not free from each other:

> "Knowledge and power are integrated into each other, and there is no point in dreaming of an aim when knowledge will cease to depend on power…It is not possible for power to be exercised without knowledge, it is impossible for knowledge not to engender power." (1980b: 52)

Power and knowledge, in other words, directly imply one another (Foucault, 1979: 27). Knowledge can only have the right to enter and diffuse into the social realm through the approval and exercise of power; and in turn, it enables power to rule over the population at the macro level and over the individual at the micro level. Because of this inseparability, Foucault uses these two terms united as 'power-knowledge' in order to emphasize their togetherness.

Because of the power-knowledge unity, no information and knowledge can escape from power; and thus, the object of knowledge becomes an object of power as well. Then, each particular topic, the object of power-knowledge, is given a frame and inserted into rhetoric of governmentality through discourses (which will be detailed in the section 2.3.4). To bring Foucauldian analysis to the content of our study, human gene, one of the recent objects of power-knowledge, is still discursively on construction in our times. Therefore, we are still confused about how to perceive genetic studies on human biology. However, whatever the outcome will be, we should question the existing genetic discourses telling what to do with the genetic knowledge and technology, since questioning means revealing the ways in which power expects individuals to relate themselves with this field of knowledge. Now let me focus on what Foucault understands from power.

He conceives power as something relational and constituted as a network. This is to say that the control of power is not gathered in the hand of any particular group or structure. Rather, power is decentralized and omnipresent. This is why it does not function just from above to below, or the other way around, but in both ways. Moreover, Foucault's account of power has a disciplinary dimension, but not in the sense of repression or violence – though these are some of its tools. He calls it disciplinary because the aim is to control and regulate both the individual body and the population[22]. However, power does not function in a repressive way through censorship, blockage and exclusion: If the exercise of power were so, "it would be a fragile thing…in the manner of a great Superego, exercising itself only in a negative way" (Foucault, 1980b: 59). Thus, Foucault rejects any one-sided and repressive definition of power and instead defines the exercise of power as a mode of action

[22] See section '2.3.3. Bio-power'.

upon the action of others (1982: 221). This makes power invisible when it is not exercised. In addition, the exercise of power is positive and productive rather than repressive since a domain of freedom is a necessity for its exercise. This definition depends on the idea that power is "exercised only over free subjects and only insofar they are free" (Foucault, 1977: 221). This is not a paradox, because it refers to a condition reciprocally constituted between modern forms of power and individuals. Free individual subjects are the very conditions of the existence of power, since they are the reasons and guarantees of the maintenance of productivity, efficiency and security of power relations. As a result, individuals are made both *subjects* and *subjugated* for the maintenance and reproduction of power. I think that the relation between individual subjects and power can be portrayed more clearly with reference to the emergence of a coherent political technology in the seventeenth century, what Foucault calls 'bio-power'.

2.3.3. Bio-power

Bio-power represents the rise of a different type of power in European history. It differentiates itself from the classical age and from the sovereign power. Bio-power, inherently, has connections with the development of capitalism, the rise of modern nation-state and industrialization. This term is intentionally selected by Foucault to imply a different relation of power with the realms of life and body. Arguably, his contributions on this matter are directly relevant to our topic, because they examine the birth and development of control and manipulation of life, population and bodies. The distinctive characteristic of bio-power is that it is concerned with both the individual and the social body. This power-type mobilizes the body both in the totalizing and individualizing ways.

For Foucault, there occurred a dramatic change in the conceptualization of body following the 17th century. The political reality of King's body under the monarchy - that had to be protected at the expense of others' lives- was replaced by the 'social body' in the 19th century. And accordingly, "the rituals that served to restore the corporal integrity of the monarch" was replaced by "remedies and therapeutic devices" such as the segregation of the sick, the monitoring of contagions

or the exclusion of delinquents (Foucault, 1980b: 55). This is because the new principle in the nineteenth century was no longer the protection of King's body, but of the social body which "needs to be protected, in a *quasi-medical sense* (emphasis added)" (Foucault, 1980b: 55). This is the positive character of bio-power, and as we have seen above, Foucault's conception of power is distinct from the views that portray power as always something negative or repressive.

Also, this new phenomenon of social body should not be considered as the effect of a consensus just like in contract theory, but as that of the corporeality of power operating over the very bodies of individuals. Therefore, power should not be considered as -in classical approaches- something gathered in and held by a particular group and structure. Neither is it exercised from the top to bottom. Rather, Foucault proposes relations of power which is moving in both ascending and descending ways, both from below and above. Thus, power relations can not be reduced to the state and the sovereign authority, or to the superiority of some privileged groups. Moreover, relations of power diffuse into life, and penetrate into every existing social relation:

> "Between every point of a social body, between a man and a woman, between the members of a family, between a master and his pupil, between every one who knows and every one who does not, there exist relations of power which are not purely and simply a projection of the sovereign's great power over the individual; they are rather the concrete, changing soil in which the sovereign's power is grounded, the conditions which make it possible for it to function." (1980b: 187)

Let me now present the logic and the manner behind the process of bio-power. As Foucault shows us in the last chapter of *The History of Sexuality*, the life itself becomes the new subject of this new form of power, starting from the seventeenth century. However, this was not due to the awakening of the humanitarian feelings that made possible, i.e., the elimination of death penalty and the protection of life process. Instead, this was because "power gave itself the function of administering life, its reason for being and the logic of its exercise" (Foucault, 1980a: 138). Hence, it was this administering function of life which in

turn made it more difficult to apply death penalty or execute the punishments as a spectacle in public space after the 18th century.

In more concrete terms, Foucault states that this power over life, bio-power, beginning to evolve in 17th century has taken two basic forms. These two forms, though they were not antithetical, constituted two poles of development linked together, namely, *anatomo-politics of the human body* and a *bio-politics of the population* (Foucault, 1980a: 139). The first of these forms concentrates on the body as a machine[23]. Therefore, the main concerns of anatomo-politics are the body and "its disciplining, the optimization of its capabilities, the extortion of its forces, the parallel increase of its usefulness and its docility, its integration into systems of efficient and economic controls" (Foucault, 1980a: 139). On the other hand, the second form, bio-politics, reveals itself in regulatory controls of the population. This is to intervene into and supervise the conditions of biological processes, such as "propagation, births and mortality, the level of health, life expectancy and longevity" (Foucault, 1980a: 139). Thus, the administration of life has been achieved through these two forms of bio-power; by disciplining the body and regulating the population. This great 'bipolar technology'[24] characterized a power whose purpose was no longer to kill, but constantly invest life (Foucault, 1980a: 139). Put differently, the administration of bodies and the calculated management of life became the new focus of social control and intervention. Consequently, all the disciplines and institutions developed through and after the classical period –such as universities, secondary schools, barracks, clinics, prisons – were obliged to find solutions to the problems of birthrate, public health, housing, criminality, migration and so on. Hence, the burst of diverse techniques for achieving the management of life - the subjugation of bodies and the control of population- marked the beginning

[23] This metaphor, body as a machine, was to be discussed at length in medical sociology after Foucault. For instance, the language of reproductive genetics was claimed to privilege an individualistic and mechanistic view of a gendered body. Within this paradigm, which is not new in medicine, the doctor was the mechanic who fixes the body-machine (Ettorre, 2002: 66). Moreover, the hypotheses of anatomo-politics and bio-politics were very much cited and developed by various authors (Gastaldo 1997; Armstrong 2002; Helén 2004). In short, one should argue then Foucault had serious effect on the way we understand control and manipulation brought by modern medicine.

[24] What Foucault implies by 'bipolar technology' is that which is "anatomic and biological, individualizing and specifying, directed toward the performances of the body, with attention to the processes of life" (1980a: 139).

of a new era: the era of *bio-power* (Foucault, 1980a: 140). Because of the reasons given, 'bio-power' implies a typical modern form of power-knowledge unity. It operates and succeeds through normalization. Normalization means that bio-power distributes the living in the domain of value and utility through norms (Foucault, 1980a: 144). In other words, this new type of power colonizes every aspect of life in order to maximize utility and docility. Then, it measures, defines, classifies and judges by means of the standards of normality originated from discursive truth claims. In the long run, every deviation from the standards achieved through knowledge become to be labeled as abnormality. Also, every abnormality appears as if it is a case that needs to be fixed by the appointed institutions. In this sense, bio-power does not only invest bodies, health, living conditions and so on, but also continuously regulate and correct life as a separate domain to control. As Hiley states, this unique disciplinary character of bio-power functions to achieve the Enlightenment dream: "a society in which everything is regulated, calculable, rationalized and efficient" (1984: 193). In this picture, one should not miss the role of discourses in the maintenance of this Enlightenment dream. Thus, discourses through which power-knowledge diffuses itself into the everyday life deserve a special attention.

2.3.4. Discourses: The Arena of Truth Games

Foucault's analysis of power indicates that discourses are the arenas in which power-knowledge relations display themselves. Power-knowledge reveals itself through discourses which constitute the mechanisms of control and of normalization process operating over individual bodies. Indeed, it is discourses that enable power relations a ground upon which knowledge is produced, because discourses provide regimes of truth, and they maintain and stabilize the criteria of truth. On the other hand, discourses represent general definitions out of which knowledge is produced. So, there is a similar relation between discourse and knowledge, as between power and knowledge[25].

[25] Also see the section 'Discourse and Standards of Normality' in; Çevik, Neslihan K. "A Foucauldian Reading of Genetic Science: Archeologizing the Science of the Gene." M.A diss., Bilkent University,

It would not be wrong to say that discourses are the visible sites of power-knowledge interaction; they are the spaces in which the regimes of truth operate. In Foucault's own terms:

> "In a society such as ours, but basically in any society, there are manifold relations of power which permeate, characterize, and constitute the social body, and these relations of power cannot themselves be established, consolidated nor implemented without the production, accumulation, circulation and functioning of a discourse." (1980b: 93)

Therefore, in order to analyze the relations of power, the regimes of truth which 'normalize' our bodies and our relation with the other human beings *via* discourses should be examined. Discourses put boundaries to the representation of everything, whereas truth regime determines which one of the discourses is valid. This is more of a game of truth since there is no truth other than created by power-knowledge. Thus, each regime of truth in turn serves to the intensification of power through internalization of discourses by the subjects.

Mental healthiness, for instance, requires to be represented so as to display a state of mental condition. There is no self-evident definition of mental healthiness, but only through the medical discourses the state of being mentally healthy is fixed to a meaning by reference to gathered knowledge about craziness. Such a fixation is the effect of power-knowledge, and hence it also functions to achieve the normalization of mental healthiness. With reference to the true discourse of healthiness (no matter it refers to the general condition of *mind* or *body*), the ones who do not fit this criterion are labeled as 'unhealthy' and hence 'abnormal'. The same process of normalization, according to Foucault, operates in the case of criminality (*Discipline and Punish: The Birth of the Prison*) and sexuality (*History of Sexuality: An Introduction*) as well. When a definition of madness, crime or sexuality, is made and internalized by the subjects, the normalization process poses itself both from the inside (among subjects *via* discourses and their internalization by

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2003. I should say that my brief explanation of the notion of discourse in Foucault is quite inspired by this well organized section. On the other hand, Çevik's study was truly helpful to the improvement of my initial thoughts.

subjects) and the outside (through the institutions or juridical structure). However, the standards of normality dwelled in discourses are not stable. Rather, they are continually in transformation and hence always flow into something else due to the dynamic nature of power relations[26]. In this sense, Foucault's genealogy of power examines critically the transformations of the standards of normality, and looks into the play of dominations since this play acts as the catalyst to determine these standards of normality in different historical periods.

After presenting the significance of discourses in understanding power-knowledge, the first chapter of my study will continue and finish with a comparison between the critical comments of Heidegger and Foucault on the key issues of modern science and technology in general which have been discussed so far, hoping that this will give us the chance to summarize their philosophical remarks and relate them to our main focus, genetic science and genetic engineering in the following chapters.

2.3.5 Heidegger and Foucault on the Control and Manipulation in Modern Science and Technology

The intent in this last section is to discuss the 'normalization' in Foucault's analysis of bio-power together with the 'total mobilization' in Heidegger's analysis of technology. I agree with Hiley[27] and Dreyfus[28] who claim that finding a connection or similarity between the arguments of these two figures seems possible.

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[26] Such a critique of power, individual subject and functioning of discourse, of course, is a partial denial of Kantian idea of autonomous subject and of other Enlightenment ideals, such as the universality of morality and values. Thus, Habermas accuses Foucault of engaging in a 'total critique of modernity' and labels him, along with Derrida, among the 'young conservatives' (Habermas, 1981). And, to Habermas, the young conservatives are merely anti-modern. Like Habermas, Charles Taylor criticized Foucault's anti-Enlightenment commitments, and found Foucault's theory of power incoherent (Hiley, 1994; see also Giddens, 1994). On the other hand, accepting the problematic aspects of 'normalization' and 'unfreedom' in Foucault's account, Hiley argues that both Habermas and Taylor have failed to "appreciate the way in which his (Foucault's) critique of the human sciences and the analysis of modern power is connected with the Enlightenment goal of autonomy" (Hiley, 1994:176).

[27] Hiley, David R. "Foucault and the Question of Enlightenment." In *Michel Foucault: Critical Assessments, Volume 1,* edited by Barry Smart. London and New York: Routledge, 1994: 165-180.

[28] In http://ist-socrates.berkeley.edu/%7Ehdreyfus/html/papers.html ; Selected papers of Hubert L. Dreyfus: "Being and Power: Heidegger and Foucault" and "Heidegger and Foucault on the Subject, Agency and Practices".

Hiley underlines that Foucault's major concern in *Discipline and Punish*, *The History of Sexuality* and, various lectures and interviews was "the emergence and maintenance of a uniquely modern form of discipline, control and normalization-the emergence of bio-power" with the complicity of human sciences (1994: 172). As we have already discussed, Foucault argues that bio-power functions through a bipolar technology by disciplining both individual subjects and populations thanks to its relation to human sciences and its utilitarian purposes. Hiley explicates this utilitarian characteristic of bio-power: "it functions globally by colonizing every aspect of life to maximize utility at the same time that it maximizes the docility of the body" (1994: 172). In this sense, Heidegger's analysis of technology, which defines the modern technology as 'enframing' which organizes everything as a standing-reserve, seems to have many common points with the Foucault's analysis of bio-power. Let me briefly explicate these similarities.

Heidegger's history of Being shows us that how things have turned into objects in the process of modernity under the technological imperative. On the other hand, Foucault's emphasis turns from things to selves and how individuals become subjects[29]. Also, while history of Being reveals an ordering of beings as a standing-reserve, Foucault's genealogy of power unveils the illusion which convinces us see ourselves as free acting subjects. In this sense, both are critical about the Cartesian idea of 'self-transparent' subject and the Kantian ideal of autonomous agent. Moreover, in a similar fashion, Foucault stresses the bipolar technology of bio-power which functions to control every aspect of life with the complicity of human sciences, whereas Heidegger arrives at a similar conclusion through the critique of science as research which is objectifying and the essence of technology which is enframing. Here, what Heidegger means by Being should be delineated briefly in order to make the comparison more clear.

Being, as Dreyfus states, is "that on the basis of which beings are already understood". Thus, Being has been understood differently in any given time in history. Heidegger's comparison of Greek culture and modern culture is an example

[29] Foucault states that his main goal has not been to analyze the phenomenon of power. Instead he argues, his objective "has been to create a history of the different modes by which, in our culture, human beings are made subjects." (1982: 208)

of how different cultures allow people and things appear in different meanings. Thus, understanding of Being, which is conditioned by a set of social meanings, practices and projections, serves as a background for how beings are understood. Thus, Dreyfus explains that understanding of Being creates a 'clearing', which both limits and opens up "what can show up and what can be done". However, for Heidegger, from Plato on, philosophers replaced the clearing with "a highest being that is the ground of beings and the source of their intelligibility"[30]. For instance, while for Christians it was creator God, after Enlightenment it was man himself. In a similar way, Foucault's genealogy of power indicates that everyday life is organized around discourses and regimes of truth enabling us what to think, what to do and how to be. Thus, like clearing, discourses are enabling, and also productive –while they are limiting at the same time. Furthermore, perhaps due to the influence of a Nietzschean philosophy, both thinkers conceive history as an endlessly repeated play of dominations: neither Foucault's genealogy of power nor Heidegger's history of Being searches for fixed entities or origins. Therefore, their understandings of clearing and discourse, and Being and power relations imply a process of becoming throughout time. Accordingly, in both philosophers' texts, the idea that human body, morality, values and knowledge have been in an endless recurrence of constitution and destruction is present.

Furthermore, their account of modern science and technology converge in certain respects. Heidegger's understanding of modern science as research implies the production of a self-referential knowledge. This is because the self-evident character of mathematics and its axiomatic mentality dominates both natural and historical sciences. What Heidegger means is that modern science as research describes the unknown through the known, and simultaneously it confirms the known through unknown. So, every anomaly faced within the axiomatic project has a meaningful explanation only through referring to its own rules and laws. Similarly, Foucault sees social sciences –such as social psychology, psychiatry, criminology, pedagogy and etc- as the creators of their own anomalies, such as delinquent, insane

[30] In http://ist-socrates.berkeley.edu/%7Ehdreyfus/html/papers.html ; Selected papers of Hubert L. Dreyfus: "Being and Power: Heidegger and Foucault"

and criminal. Then, creating anomalies makes it possible to treat each abnormal case with the relevant scientific diagnosis in compliance with the scientific norms and methods. Only by this way, for instance, delinquency has been achieved to be taken as a criminal case, or madness as a scientifically defined medical case. Here, the similarity is that both figures are critical about the modern mentality displayed in the control and manipulation brought by modern sciences –its objectifying everything as a subject-matter of science and ordering them in a certain way. In brief, as Dreyfus states[31], Heidegger sees this tendency towards total ordering in technology as 'total mobilization'; whereas, Foucault labels this totalizing tendency of power as 'normalization'.

In his analysis of modern technology, Heidegger claims that the enframing character of technology challenges everything and orders them as a standing-reserve. Beings are ordered to stand-by, and thus to be ready at hand so that they can be called for a further ordering. Therefore, everything which is identified through calculation turns into something orderable in a system of information. In a similar fashion, Foucault invents the term power-knowledge to emphasize the role of knowledge in setting everything into order and thus into a rhetoric of control and manipulation. In this sense, bio-power, a modern form of power-knowledge, produces reality by intervening and ordering. Therefore, 'enframing' and 'bio-power' have the similar characteristic of closing the possibilities other than those which are unconcealed to beings. For this reason, the processes of 'total mobilization' and 'normalization' implicitly reject the idea of autonomous individual. On the one hand, enframing also gathers man into ordering and governs him as a standing-reserve. Hence, he can not escape from loosing his ends and becoming a means of utilitarian goals. On the other hand, Foucault stresses power relations in which individual becomes both subject and subjugated, and the normalization process (bio-power) which functions to govern the lives of subjects. In this sense, both philosophers are critical about the Enlightenment ideal of autonomous subject since such an idea of

[31] In http://ist-socrates.berkeley.edu/%7Ehdreyfus/html/papers.html ; Selected papers of Hubert L. Dreyfus: "Being and Power: Heidegger and Foucault"

autonomy fails to point at the invisible practices of control and the exercises of power in the process of ordering and governing the beings.

Lastly, Foucault and Heidegger do not criticize the use of technological devices, but the manner they are used. Heidegger tries to free thinking from the technological understanding of Being, which is basically enframing. Foucault, on the other hand, criticizes knowledge and information gathered and used by natural and social sciences in the name of efficiency and optimization. In sum, what they criticize is the modern world that we are born into, and its systematic perception in which everything is organized by an instrumental rationale. However, the crucial point in the picture they draw is that such an instrumental rationale for the organization and management of life becomes more desirable in the daily life. Therefore, due to the motivational accordance between the modern scientific mentality and power relations in the era of bio-power, each technological development is appreciated both scientifically and politically. In this context, the idea of genetic manipulation and intervention is not astonishing, but something expected.

CHAPTER 3
RETHINKING GENES AND GENETIC TECHNOLOGY: MANIPULATION AND INTERVENTION THROUGH PRENATAL SCREENING AND HUMAN CLONING

In the early 1970s, the Research Group on Ethical, Social and Legal Issues in Genetic Counseling and Genetic Engineering of the Institute of Society published a report in *New England Journal of Medicine*. The report was signed by a group of scientists and academicians –one of whom was Hans Jonas whose work has been examined in the previous chapter. This report underlined the ethical and social problems in screening[32] for genetic disease and disorder[33]. The motive behind this report was that, almost for two decades before the report, genetics had improved dramatically and opened new possibilities of techniques and diagnosis which were yet questionable in certain respects. Nevertheless, these novelties were only the precursor of upcoming genetic technologies and genetic intervention in the future. As a precaution against potential troubles manifested by genetic screening, the report aimed to focus on "the problems of stigmatization, confidentiality, and breaches of individual rights to privacy and freedom of choice in childbearing" (Etzioni, 1973: 240). The report also included a set of principles on which the signatories come to an agreement for guiding the operation of genetic screening programs.

I believe that the preliminary and provisional findings of the report are very significant in presenting a critical approach to the genetic advances in the 1970s.

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[32] *Prenatal screening* tests are used to check the health of the developing baby. These tests are usually done in early pregnancy, before 20 weeks. There is no guarantee that prenatal screening tests tell certain problems the developing baby has. Instead, they only give the probability of a disease. Thus, further investigation is usually required and recommended. Nevertheless, it is known that prenatal screening tests have a higher chance to detect chromosomal problems, such as Down Syndrome (see: Prenatal Screening and Prenatal Diagnosis, http://www.ahsc.health.nb.ca/prenatalscreening/).

[33] "*Genetic diseases* are inherited disorders. It is possible that most of us actually have genes for inherited disorders but are *heterozygous* for these disorders: That is, we have a dissimilar pair of genes for an inherited disease or trait. If a gene is *dominant*, it will be expressed, or shown, in a heterozygote; if it is *recessive*, it will *not* be expressed in a heterozygote. However, even though heterozygotes may not show a trait themselves, they are *carriers* who can pass the gene for the disorder along to their offspring. If two parents are heterozygous for a disorder both pass on the gene for the disorder to an offspring, that person will be *homozygous* for the disorder –will have an identical pair of genes. A disease or trait will always be expressed in a homozygote" (Pence, 2004: 396).

Also, findings of the research group may provide a chance to see the major controversial issues of the 1970s in terms of ethical and social dilemmas, which are still mostly unresolved in the 2000s. Thus, I will examine this report; though it is 30 years old, it is related to the analysis of current 'Prenatal Genetic Screening', which is one of the two subject-matters in this chapter. The other subject-matter is one of the most striking developments in our times, 'Cloning' –in specific, the prospect of human cloning. Focusing on these two sets of practices and ethical problems they create will help to explicate our major problematic: the contribution of genetic technologies into the general aim for 'controlling and manipulating of life'. Then, in the light of discussions and critiques of Prenatal Genetic Screening and Cloning, I will turn back to three figures who guided our discussion in the second chapter, namely, Hans Jonas, Martin Heidegger and Michel Foucault. However, since these figures did not live long enough to witness the latest technological changes in genetics, I will try to understand these radical alterations from the lens of these authors to the extent their critical approaches let such an attempt.

3.1. Prenatal Genetic Screening

Respectively, the focus will be on the goals of prenatal genetic screening and the principles sketched for the design and operation of screening programs. In this way, moral, ethical and political questions pertinent to prenatal genetic screening will be clarified to a certain extent. After delineating the importance of genetic technologies for the reproduction process (which means to argue reproductive genetics in general) and the chief techniques of prenatal screening, certain criticisms directed to prenatal screening will be outlined and interpreted.

3.1.1. The Report on Ethical and Social Issues in Screening for Genetic Disease

Before outlining the principles for the design and operation of screening programs in the report, let me identify the goals of genetic screening. In the report, the most distinguishable goals of genetic screening in the 1970s are considered as (1)'improving the health of persons who suffer from genetic disorders and who carry genetic diseases', (2) 'allowing them to make informed choices' and (3)'alleviating

the anxieties of people (individuals, families and communities) who might face serious genetic disease' (Etzioni, 1973: 242). In other words, first of all, genetic screening should be used to collect knowledge about genetic diseases, though no therapy may be available. Second, by genetic counseling, individuals or families, i.e. couples planning to have a baby, are supposed to be informed for responsible decision-making. Third, though signatories are aware of the fact that it is a complicated and complex issue and sometimes practically and morally unacceptable, "substantial reduction in the frequency of a recessive disease[34] is possible by prenatal screening and selective abortion, or by counseling persons with the same trait to refrain from marriage or childbearing" (Etzioni, 1973: 243). Nevertheless, despite their proposed benefits to individuals and families, the goals of genetic screening are not immune from moral problems. Thus, the authors of the report determined certain principles for the design and operation of screening programs.

There are actually eleven principles around which the signatories compromised. I shall say that each principle indicates the necessity of liberal and open policies in genetic screening programs. Let me briefly mention these principles which are decided to be the guidelines against the misuse and misinterpretation of information derived from genetic screening.

(1) *Attainable Purpose*. This means a continually self-constructing screening program design in the light of program experience and medical developments. For instance, "sickle-cell[35] screening programs might profitably enlarge their scope to

[34] "*Recessive diseases* are *single gene disorders* –which are caused by defects in one particular gene- that occur only when an individual carries two malfunctioning copies (mutant alleles) of the relevant gene. Such individuals are described as homozygous, and arise most frequently as the offspring of heterozygous parents - parents who each possess one normal allele and one mutant allele...In most cases, the parents are perfectly healthy because the mutant allele has no adverse effect when a normal allele is also present. The parents are said to be carriers of the disease. Examples of recessive diseases include cystic fibrosis, spinal muscular atrophy and phenylketonuria" [Emphasis added] (The Wellcome Trust, http://www.wellcome.ac.uk/en/genome/genesandbody/hg06b008.html.).

[35] *Sickle-cell disease* (SCD) or sickle-cell anemia is defined as an autosomal recessive blood disease. Such person has to have two copies of the sickle cell version of the beta-hemoglobin gene (HbS) to develop the disease. Thus, carriers of one copy of the 'sickle' variant –in other saying, carriers of the sickle cell 'trait'- do not suffer from the disease. Screening of this deadly disease started in 1970s (see: http://www.genome.gov/Pages/Education/Kit/main.cfm?pageid=99, The Human Genome Project).

include other hemoglobinopathies[36] as well as general screening for anemia" (Etzioni, 1973: 244).

(2) *Community Participation*. Communities (i.e. lay, religious, medical communities) affected by screening should be involved in formulating program design and objectives. Also, the screening program and its objectives should be open and clear to the public that self-determination in the choice of this type of medical service can be possible.

(3) *Equal Access*. Simply, every one should have equal access to the information about screening and screening facilities.

(4) *Adequate Testing Procedures*. Testing procedures should be accurate in order to prevent the risk of misinterpretation. For instance, the test should accurately "distinguish between those carrying the trait and those homozygous for the variant gene" (Etzioni, 1973: 245).

(5) *Absence of Compulsion*. What signatories agreed on is that screening programs can not have policies either imposing constraints on childbearing or stigmatizing couples who are aware of the genetic risks and yet desire to have their children. This principle depends on the group's belief that it is unacceptable to set 'standards of normalcy' based on genetic constitution.

(6) *Informed Consent*. Those tested or legal representatives of minors should be informed and should also consent to screening.

(7) *Protection of Subjects*. To reduce the risk of possible psychological and social injury, research subjects should be protected according to the guidelines.

(8) *Access to Information*. A screening program should fully and clearly reveal its policies "for informing those screened of the results of the tests performed on them" (Etzioni, 1973: 246). Accordingly, all unambiguous results are supposed to be made available to the person or his legal representative.

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[36] *Hemoglobinopathies* (Hemoglobin Disorders) occur when the genes that produce hemoglobin are defected. In other words, defects in these genes can produce abnormal hemoglobins and anemia (In http://sickle.bwh.harvard.edu/hemoglobinopathy.html, Information Center for Sickle Cell and Thallasemic Disorders).

(9) *Provision of Counseling*. This principle set constraints on genetic counseling. The report suggests that genetic counseling should be informing and non-directive. It should not make decisions for the person.

(10) *Understandable Relation to Therapy*. Persons to be screened should be informed about all the risks and benefits of the therapy. In addition, signatories state that the acceptance of research therapy does not mean to participate in screening, or the acceptance of screening does not mean a tacit approval of relevant therapy.

(11) *Protection of Right of Privacy*. This is the principle of confidentiality. In other words, public-health information should be kept secret and individual privacy should be protected due to ethical and legal reasons.

The findings of the report of 1972 were an obvious sign of uprising awareness of the potential effects of genetic screening programs. However, in the context of overall genetic improvements, screening technology was merely the tip of the iceberg. The initial set of principles –drawn for the design and operation of screening programs- presented above, though critical and precautionary, could not decelerate the rapid and unbridled fostering of genetic research in general. Rather, some of the signatories and subsequent generations have witnessed that the pendulum swung from genetic screening to genetic intervention. As a matter of fact, genetic manipulation and intervention have always been in the agenda of genetic research and one of the stirring sources of scientific and dystopian fictions[37]. However, it was with the articulation of genetics into the reproduction process when distinct religious, secular and lay communities paid a considerable attention to the very corporeality of

[37] After the discovery of double-helix structure of DNA and the role of nucleic acid responsible for transmitting hereditary characteristics in 1953, genetics stepped up from observational inference to molecular biology (Pence, 2004: 395). This branch of biology (dealing with formation, structure and function of macromolecules essential to life), of course, intrinsically has included 'research' and 'experiment' manipulating and intervening at the molecular level. However, the idea is not new. In his unfinished utopia of *New Atlantis* (1624) Francis Bacon describes Salomon's house, where the best and the brightest citizens of this mythical land attend and in which scientific experiments are employed in order to understand and conquer nature. Then, the collected knowledge is applied for the betterment of society. Baconian optimism in the 17th century, nevertheless, has been gradually replaced by dystopias and pessimistic fictions and scenarios of future, such as Aldous Huxley's *Brave New World* and Andrew Niccol's movie of *Gattaca*, in the 20th century. Dystopias and pessimistic scenarios depicted the dangers of genetic technology in the future's world, i.e., where social stratification would be on the basis of genetic information of people leading to an absolutely normal society under totalitarian arms.

genetic manipulation and intervention. Thus, I find it productive to continue with a detailed analysis of genetic reproductive technology and its relation to ART (assisted reproductive technology). This will help to clarify my emphasis on the fact that life itself has extravagantly turned into an object of scientific control and manipulation. More importantly, an analysis of reproductive genetics in general may help to elucidate the opaque relation between power and genetics that most of the ethical and social critiques fail to remark.

3.1.2. Reproductive Genetics and Assisted Reproductive Technology (ART)

Reproductive genetics can be defined as "the utilisation of DNA based technologies in the medical management and supervision of the reproductive process" (Ettorre, 2002a: 65). In this sense, reproductive genetics includes information on genes (i.e. through prenatal screening and testing), cloning (asexual reproduction), stem cells and related topics. This means that it touches the very core of our existence, the ability of human being to reproduce. On the other hand, Assisted Reproductive Technology (ART) is a general term referring to methods to achieve pregnancy by artificial and partially artificial means. Simply, ART is a fertility treatment. ART typically applies in IVF, *in vitro* fertilization, or so-called test tube fertilization[38]. However, there are also several variations and procedures other than IVF which are appropriate for individual patients' unique conditions. Furthermore, Assisted Reproductive Technology also permits doctors to screen or test embryos through preimplantation genetic diagnosis to help couples select healthy embryos for implantation or to detect abnormalities during early stage of gestation. From a technological perspective, it can be argued that advances in genetic reproductive technologies would gradually extend the scope of ART and raise the probability of pregnancy and healthy birth. However, one may also argue from a

[38] In vitro fertilization (IVF) was a milestone in the advancements of modern science and technology, though it brought new questions with it. It was 1978 when the first birth happened in England by means of IVF. The birth of Louise Brown proved that "a human egg fertilized in vitro –in glass dish- and transferred to a woman's womb could implant and develop into a normal baby" (Singer, 1994: 93). Nevertheless, this new reproductive technology opened ethical and social problems which are embryo-oriented (Singer, 1994); parenthood-oriented (Heitman, 2002; Fassler, 1993); and religion- and gender-oriented (Garrett et al., 1989; Farquhar, 1996).

critical perspective that there appears an unprecedented type of craftsmanship, making of life, at the venue where ART and reproductive genetics meet. Following the second line of thought, I think that there are two important phases in the process of this new type of craftsmanship: the widespread application of *in vitro* fertilization (IVF) and the actualization of cloning which contributed to 'the medicalization of infertility' and 'the geneticization of reproduction', respectively. Since cloning will be widely discussed in this chapter, let me briefly argue the initial phase, *in vitro* fertilization.

First of all, as a medical treatment to infertility, IVF has played a great role in the craftsmanship of life. This technique has changed the concept of reproduction and infertility forever along with concerned moral, cultural and social values. Second, physicians involved in ART have not only gained 'wealth' and 'prestige', but also 'power' over the creation of life and the control of it (Heitman, 2002: 58). More importantly, 'the creation of extracorporeal embryos through IVF' and 'freezing embryos for future use'[39] triggered the increase of philosophical debates on the meaning and whatness of life as well. Note that, recalling the debate on Heidegger in the first chapter, 'the frozen embryos stored for future use' well fits to his analysis of 'standing-reserve'. Briefly, frozen embryos for future use are likely to verify Heidegger's suspicions concerning modern technology in the sense that life in general becomes truly and literally no more than an orderable category in the hand of mankind. Therefore, life becomes a means in the service of ordering, whereas man (embryos-to-be-man) becomes a standing-reserve. This is to enframe the future from the present. Embryos challenged-forth as standing-reserve imply that the rules and laws constituting the complex system of human life are achieved to a great extent, and thus, that human life would be controlled and manipulated almost analogous with the principles of modern physics.

[39] Frozen embryos are used as a reserve in order not to subject a woman to another operation, though freezing embryos is a risky process and not always successful (Garrett et al., 1989: 168). However, interestingly, there are interesting cases seeking hope in this developing technology. To illustrate, the possibility of frozen embryos gave rise to an unusual request of a father who had lost his son in a car accident and he wanted his son's sperm obtained after his death and frozen for later use (Nolan, 1993: 78). Though the father's requests were ambiguous in terms of legal and ethical issues, this example may indicate our imagination in terms of control over life.

3.1.3. The Importance of Genetic Information: Medicine, Risks and Techniques

Precisely, what I mean by genetics is indeed 'modern genetics'. With the discovery of the genetic code of DNA in the 1950s, the 'traditional' genetics and the early experiments of Gregor Mendel[40] in the 1860s were gradually replaced by a 'new genetics' (Cranor, 1994). This new genetics was able to "make biochemical alterations of the actual DNA in cells so as to produce novel, self-producing organisms" (Ettorre, 2002b: 18). This novelty paved the way for the processes of genetic engineering and the development of biotechnology as well: "The ultimate result was that scientists introduced human choice and design criteria into the construction and combination of genes" (Ettorre, 2002b: 18).

The impacts of biotechnological improvements in genetics starting from the 1950s have been spectacularly influential upon both the consciousness of people and the organization of medicine and medical ethics, especially in the Western world. Furthermore, biomedicine, which is defined as the medical arm of genetics that depends upon the advancements in molecular biology, is said to have increasingly gained "a status analogous to that of the established Church in the medieval period (Ettorre, 2002b: 18-19; Currer and Stacey, 1991: 1). In other words, as the genetic technologies became more reliable and desirable among medical scientists and among lay people, i.e., for the prevention of genetic disease and disorder, genetic information inevitably turned out to be the basis of medical treatment and a political source of governing. However, the genetic information collected from research subjects through genetic screening brought new questions and risks with it.

As already argued in the section 'The Report on Ethical and Social Issues in Screening for Genetic Disease', there is a high risk of misuse and misinterpretation of the genetic information. No doubt, notwithstanding the degree of risk, the misuse and misinterpretation of genetic information are known to bring about important social consequences. The risks are said to be, first, the misinterpretation of the

[40] Gregor Mendel (1822-1884) is a very well-known figure in the history of genetics. His studies are recognized as Mendel's laws of inheritance. However, following his death, "during the 1880s, chromosomes were first discovered in cell nuclei"; and around 1900, "it was hypothesized that chromosomes carried genes" (Pence, 2004: 397). Even though these were a rediscovery of Mendel's law of inheritance in some respects, this new field of study was named as *genetics* (Pence, 2004: 397).

clinical meaning of 'trait' and 'disease' which probably leads to the stigmatization of research subject (Etzioni, 1973: 248). Second is the undesirable labeling of individuals on a genetic basis, which can be defined as genetic discrimination (Etzioni, 1973: 248; Ettorre, 2002b: 19). Third, with reference to the last principle of report, Protection of Right of Privacy, the signatories were aware of the risk that protection of privacy and confidentiality do not necessarily prevent subjects from "a felt sense of stigmatization" or from "personal anxieties stemming from their own misinterpretation of their carrier status" (Etzioni, 1973: 248). Lastly, there is also the risk of stigmatization from the "restrictions on young children's physical activities under normal conditions because of sickle-cell trait, or from denying life-insurance coverage to adult trait carriers" (Etzioni, 1973: 248-249).

On the basis of these risks of misuse and misinterpretation, many objections have been raised to the prenatal genetic screening and to the reproductive genetics in general. I will mention these objections in the next section; but before that, let me introduce the main techniques of prenatal screening briefly which have dramatic impacts on the transformation of medical organization of childbearing. I believe a portrayal of these techniques might capture the attention and the imagination.

The prenatal screening techniques used for foetal analysis to detect foetal abnormalities have increased dramatically since the late 1950s (Farrant, 1985; Reid, 1991). Moreover, gradually, with each new medical technology and genetic development, the purpose which was the detection of foetal abnormalities has turned into the avoidance of common genetic diseases in the community (Wetherall, 1991). Therefore, there is a growing belief that all pregnant women should come under the 'genetics' umbrella (Ettorre, 2002b: 23).

As already mentioned in the very first pages of this chapter, prenatal screening is able to tell the risk of disease, which is yet uncertain. Therefore, molecular genetic tests are recommended for further investigation. This is to identify an abnormal condition in the foetus, which is called *prenatal diagnosis* (Ettorre, 2002b: 27). The chief methods of prenatal diagnosis are 'second trimester ultrasound screening', 'amniocentesis' and 'chorionic villus sampling'.

Second trimester ultrasound screening is used to "discover developmental lesions and major congenital malformations" and to "assess foetal development and anatomy at 18-20 weeks of gestation" (Ettorre, 2002b: 27). Second, *amniocentesis* is a method of prenatal diagnosis which may be performed in the third and second trimester:

> "Amniotic fluid is drawn from the amniotic sac around the foetus with a long needle through the pregnant woman's stomach. Because the fluid contains foetal cells, it is used to obtain genetic knowledge about the foetus. Amniocentesis can detect Down's syndrome, blood type metabolic problems (i.e. Tay-Sachs disease) and neural problems." (Ettorre, 2002b: 27-28)

Lastly, *Chorionic villus sampling* (CVS) is performed at the tenth to twelfth week of pregnancy in order to view foetal chromosomes:

> "In this procedure, physicians remove a tiny sample of chorionic tissue with a small tube that is inserted into the vagina through the cervix to collect (with suction) a tiny sample at the edge of the placenta…Karotyping, the arrangement of chromosome pictures in a standardised way, is prepared from the tissue sample…Unlike amniocentesis, CVS is unable to detect neural tube defects and the risk of miscarriage is slightly higher than amniocentesis." (Ettorre, 2002b: 28).

For both amniocentesis and CVS, it is stated that "there is a risk for miscarriage and foetal loss rate at 0.5-1.0 per cent and 1-3 per cent respectively" (Ettorre, 2002b: 28)[41]. Thus, the last two genetic tests are performed to ensure the birth of a normal baby, though the positive results might be gained at the expense of loosing a 'normal' foetus. In addition, prenatal screening and diagnosis of foetuses allowed another remarkable development: the selective abortion of affected, abnormal foetuses. This is a vital point since, whereas selective abortion generally expresses an explicit desire of having a 'normal' and 'healthy' baby, it also implies a societal feeling of aversion to the disabled or sick baby as well. For this reason, I think, prenatal screening and diagnosis have an unconditional tendency to give license or permission to life on the normative basis of geneticized medicine. Thus,

[41] See also; Advisory Committee on Genetic Testing, 2000.

intended and unintended consequences of prenatal screening should also be evaluated from a historical and critical perspective in order to grasp the ethical and political dimension of reproductive genetics in general.

3.1.4. The Critical Agenda of Prenatal Screening: Controversial Points

Recall that the principles drawn to be the guidelines in the 1970s were aimed to frame the design and operations of prenatal screening. Since then, antagonistic comments multiplied as a result of the uprising awareness of possible risks that genetic technology might bring. Though there happened no serious break in the improvement of genetic technology, counter-arguments have played a critical role in its limited consumption and in the dispersion of debate in public. I believe that in general, the dissemination of oppositionary ideas is not only intellectually and discursively necessary for critical reasoning, but also morally compulsory for the sake of ones stigmatized by the applied genetic technology intruding daily life. Accordingly, in the following, I will remark some controversial points in prenatal genetic screening and a relevant significant issue, selective abortion.

Needless to say, among the ones who oppose genetic screening and selective abortion are a considerable number of disabled people. This fact is not surprising since genetic screening and selective abortion together may imply such an arrogant assumption that "it would have been better if every disabled person had never been born" (Glover, 2001: 434). Besides, genetic screening and selective abortion together attract many objections since these two are found; (1) Godlike to decide who shall live, (2) discriminative against disabled people in general, (3) and inclined to positive eugenics (Glover, 2001: 434-436). Now, I will discuss these objections and relevant critiques, not only from the perspective of disabled people but also from a general moral viewpoint concerning human life.

First, genetic screening was condemned since it is believed to play a Godlike role and to transgress religious and moral values by deciding who shall live. However, though this objection seems a strong response, such a line of thought fails to grasp the complexity of the matter. Moreover, objections as such are mainly composed of pros and cons; and thus, the debate is inclined to be squeezed within a

liberal-fundamentalist tension (Farquhar, 1996). Thus, "playing the God" objection is not very clear and convincing. Let me clarify what I mean. On the one hand, there are cases in which disability is disastrous and genetic screening might be helpful. For instance, Dystrophic Epidermolysis Bullosa (EB) is a genetic disease "in which the skin of the sufferer is lacking in certain essential fibres…it is incurable" (Glover, 2001: 431). In the severe forms of EB, death is sudden and painful after birth. Thus, there is a growing sympathy for genetic screening and diagnosis in order not to let the baby and parents suffer from this tragic and sorrowful experience. On the other hand, I think, "playing the God" objection not only fails to notice the historical and political aspects of prenatal screening and selective abortion, but also blurs them. No doubt, the simile 'Godlike' is intentionally used to arouse public interest in the medical practices of genetic screening. Nevertheless, this objection misses the historical point that modern man has already sit on the throne of God to use a metaphor, since the time of constituting his 'own' metaphysics of mechanistic world view and possessing the desire to manipulate and control life extensively[42]. Of course, such a mathematical and calculative thinking has concurrently been accompanied by a political project aiming to govern both the environment and population. That is why; 'Godlike' objection is a weak contention. Generally speaking, this objection has a tendency for particularizing and demonizing the technological improvements such as genetic screening and cloning, while it misses the more complex picture –the historical and political reasons behind the modern scientific and technological mentality engaged both with the modern institutions of the Western world and with the daily reasoning of lay person, which are discussed to a certain extent in the first chapter of my thesis.

Second objection emphasizes that "opting for the existence of normal people rather than disabled people" can be considered as a civil rights issue, and selective abortion as a violation of the rights of people with disabilities (Glover, 2001: 434). Thus, genetic screening is believed to result in discrimination against disabled people in general. Also, it is defended that having a severe disability does not mean to be treated as a second-class citizen. In other words, supporters of this objection

[42] See also; Nettleton, 2004.

generally find a legitimate ground for their critiques in the context of genetic screening leading to abortion (Glover, 2001: 434-435). Here, I content myself with arguing that genetic discrimination against people with disabilities is in fact a societal issue and results from "the paradigm of health or well-being as well as the universal, medically describable paradigm of human physical ability" which is culturally shaped (Ettorre, 2002a: 70). In this sense, this objection which claims equal respect and non-discriminative policies and attitudes is truly an opposition to the social perception of disability and disabilism. I think the following quotation which defines the notions of disability and disabilism is highly enlightening:

> "Disability is not the condition or functional consequence of being physically or mentally impaired. Rather, dis-ability refers to the disadvantaging affects – referred to by many- as the 'social barriers' – faced by people with impairments flowing from disabilism: the ideological antipathy to what is considered to be undesirable physical, sensory or mentally-related difference or 'abnormality' in western culture." (Ettore, 2002a: 70) [43]

From a critical perspective, we may claim that isolation, separation and exclusion (and also abortion) of disabled bodies ideologically function to protect the social body in a *quasi-medical* sense from the undesirable 'abnormalities'. This 'abnormality' might be a physical or mental disability, or anything that is culturally defined as 'undesirable' and 'disadvantaging'. Thus, people with disabilities are in fact disabled by the cultural ideals on the body and by the paradigm of 'normality'. At this point, normality of the language of medicine merges with certain cultural prejudices. Thus, selective abortion is more than a jurisprudential dilemma and civil rights issue; it is also a culturally determined problematic *ab initio*.

Third, genetic programmes –such as gene therapy and genetic screening of embryos- are believed to "lead to eugenic policies that are positive rather than negative; that is, designed to 'improve' people who suffer from no medical disorder" (Glover, 2001: 436). In articles examining human genome research and 'craftsmanship' over human evolution, there appears a common point that discusses

[43] Ettore quotes this paragraph from; Thomas, C. "The Baby and the Bath Water: Disabled Women and Motherhood in a Social Context." *Sociology of Health and Illness* 19, 5: 622-43.

threats of 'eugenics'. This is largely because of the sensibility stemming from the memories of terrible experiences that eugenic policies had brought about especially in the Western world[44]. Therefore, I would better start with defining 'eugenics' in order to evaluate the objection which states genetic screening may slide to positive eugenics.

It was 1883 when the term 'eugenics' (cultivation of race) was coined by Francis Galton, cousin of Charles Darwin, in *Inquiries into Human Faculty and its Development* (Bernasconi, 2003: 32). The word 'eugenics' was derived (by Galton) from the Greek *eugenes* meaning "good in stock, hereditarily endowed with noble qualities" (Bernasconi, 2003: 32). It is known that some forms of 'eugenics' have long been practiced in the history, such as 'infanticide', 'the murder of the weak' and 'the monstrous at birth'[45]. These forms of practices have been labeled as *negative eugenics*, which literally means to eliminate some trait from human progeny. However, negative eugenics later transformed into positive eugenics. *Positive eugenics* was analogous with 'animal breeding' and encouraged the reproduction of the most fit (Roper, 1913: 16). Moreover, Galton's account of positive eugenics differentiated itself from the preceding accounts[46] since he systematized the ideas and practices of 'selective breeding' according to new knowledge about the evolution of man and animals provided by the theory of Charles Darwin[47]. Galton's positive eugenics established a link between 'eugenics' and 'the idea of evolution' relying on the principle of the survival of the fittest; and Galton's argument was proposing a 'conscious evolution' which encourages both selective breeding and human control

[44] Despite the fact that eugenic movements and modern eugenics were very much identified with Nazi Germany, Pence states that it was United States where eugenics was most widely championed at the end of nineteenth and beginning of the twentieth century (2004: 397). In addition to that, there were also worldwide eugenic organizations in Austria, Scandinavia, Italy and Japan beginning from the early 20th century.

[45] Examples are taken from Bernasconi (2003: 33). Here, he refers to the Roper's book of *Ancient Eugenics* (1913: 7-16).

[46] Though the eugenics, as a modern field, was formulated by Galton, the idea of selective breeding goes back to Plato, who believed that human reproduction should be controlled by government. Plato recommends a system of eugenics as a substitute for the family, in the section 'Marriage and the Family' of *The Republic*, in which the best of men are mated with the best of women as often as possible, whereas the inferior men with the inferior women as seldom as possible (Plato, 1974: 240). According to Plato, the offspring of the best is more valuable, and thus it deserves to be brought up.

[47] See also; 'eugenics' in Wikipedia, at http://en.wikipedia.org/wiki/Eugenics#Galton.27s_theory.

over natural selection (Bernasconi, 2003: 33). Of course, the imminent aim of Galton's intentions was to produce a highly-gifted race of men (Galton, 1869: 1). This means to encourage the reproduction of intellectually gifted people and welcome the eradication of 'inferior' races. Though it is said that Galton was unclear about the methods to be used for the reproduction and eradication process, in the twentieth century three methods have been developed in the name of the eugenic movement: 'lethal chamber', 'segregation' and 'sterilization' (Bernasconi, 2003: 34).

Whether the aim is to eradicate the inferior ones (negative eugenics) or to improve the frequency of desirable traits by encouraging the reproduction of individuals with these traits (positive eugenics), eugenics in general can be identified as 'the technology of the production of human beings'. Thus, eugenics is inevitably both an ethical and political issue, and has always been under critical consideration. After the Second World War, critical legal measures have been taken gradually in most of the Western countries in order not to let eugenic policies repeat themselves again as once happened in the Nazi Germany. In addition, after the 1950s, as a result of the genetic inquiries into human body and the advent of genetic screening, traditional ethics was abandoned in favor of 'bioethics'[48] since traditional ethics no longer met the technological challenge brought by new information and new techniques. Nevertheless, despite these juridical and ethical measures, new forms of technology and economic competition are said to impose their own rationale against the rules setting limits to eugenics. In more concrete terms, according to Bernasconi;

> "*Eugenics is the technology of the reproduction of human beings*. However, eugenics should not be understood as humanity's attempt to recreate the human being according to a plan. There is no plan. Technology has its own momentum and does not submit to a decision in the way it once did[49]…Furthermore, we have developed a conception of ethics as setting

[48] Kemp argues that 'bioethical turn' refers to a shift in philosophically grounded ethical debate since "ethical considerations are increasingly concentrating on the protection of living organism and their corporeal life against interventions that reduce them to objects of unrestrained manipulations and transformations" (2003: 21). However, no longer does the protection of the living body include merely the corporeal life of autonomous individuals, but it also includes the life of not-yet-come into life –such as fetuses (2003: 22).

[49] Note that, Bernasconi believes, this character of technology represents a radical transformation of the relation between *techné* (both the activities and skills of the craftsmen and the arts of the mind and

> limits, but the laws of economic competition seem to override all our attempts to impose such limits. It is as if the very capacity of human thought to approach issues technologically deprives those human beings of the ability to determine what to do with it. It is as if technology takes over so that it ceases to be our instrument and we become an instrument of it." [Emphasis added](2003: 36)

I think Bernasconi's critique of eugenics in certain respects conforms to Heideggerian critique of modern technology in his famous article 'The Question Concerning Technology' which has already been argued in the second chapter. Let me specify the points of continuity from Heidegger to Bernasconi. First, Bernasconi seems to share a Heideggerian claim that 'any conception of technology as something neutral makes us blind to the essence of technology' by arguing that new forms of technology are not ethically neutral and technology has its own momentum. Second, Bernasconi's statement that market economy and technology have the power to override all attempts for imposing ethical limits on eugenics recalls another Heideggerian notion: 'modern technology has the character of *setting-upon*, in the sense of a *challenging-forth'*. Recall that, Heidegger believes, this challenging-forth orders everything as a standing-reserve for further ordering. This means that everything becomes a means in the service of ordering. Though Heidegger states that it is man who drives the technology forward and has a role in ordering, he can not have a complete control over modern technology since he exists in an already unconcealed world where he is also 'enframed' as 'a means in the service of ordering'. In a similar fashion, Bernasconi believes human beings become an instrument of technology and not the other way around. As a result, these observations suggest the weakening of '*social control*' in which "one is directed by some leader, party, church, or government", and simultaneously the strengthening of '*technological control*' under which "it seems the system is allegedly voluntary, but one is made an offer one cannot refuse" (Bernasconi, 2003: 36). The crucial point of technological control is that 'it makes us want what we might otherwise never consider'. For instance, though pregnant women voluntarily choose to undertake

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fine arts) and *phronesis* (good reflection about everything around oneself based on rationality) as set out in Aristotle's *Ethics* (2003: 36).

prenatal genetic screening tests, each technological advance in medicine indeed make them feel more obliged to take advantage of it.

This line of argument concerning the dangers of the rise of technological control, also points to another transformation: emergence of a 'new eugenics' in place of old conception of eugenics. Unlike Galton's positive eugenics, new eugenics is no longer a matter of selective breeding and is not limited to enhancing the best of the gene pool; rather, with the advances of genetic engineering, new eugenics in principle is open to everyone (Bernasconi, 2003: 37). Therefore, new eugenics promises to offer in principle the conversion of unfit cells to the highest genetic level by means of genetic technology. In this sense, some may argue that the horizons of the new eugenics are boundless since in theory we have the potential to add new qualities to genes which is yet utopian. However, new eugenics in practice may connote two critical points in terms of genetic screening. First, class-based societies of the Western world will eventually face the fact that 'equality in principle' does not lead to equal sharing of the advantages of genetic screening. In fact, the rich are more advantageous to benefit from the health and genetic services provided under the conditions of market economy. Though the poor or less wealthy have the right of access to these services, it is the power of money which is determining. The second critical point is that the decrease in *social control* over individuals exercised by political authorities went hand in hand with the fortification of the doctrine and practice of individual choice. In other words, new forms of technology (new eugenics, genetic screening, selective abortion and etc.) have been turned into a matter of individual choice. This second point is also a strong link connecting prenatal screening and diagnostic techniques to a Foucauldian analysis of subjectivity and bio-power. That is, briefly, pregnant women are *subjectivized* as 'consenting' and 'choosing individuals', who can assess the risks and technical process and decide whether to undertake the procedures of screening and testing, as well as abortion (Helén, 2004: 35). Of course, this is only possible with liberal principles (such as the principles outlined in the report at the very first pages of this

chapter) supposing that risks and technical process of these procedures should be open and comprehensible to the average mind[50]. As a result;

> "[B]oth the 'ethical' discourse and the practical guidelines underline repeatedly that, in individual cases, the execution of any procedure – screening, diagnostic testing, or especially, abortion- should be based on the personal judgment and decision of a pregnant woman who has received 'adequate' and 'non-directive' information about the procedure in question" (Helén, 2004: 37).

In other words, although the guidelines and general framework of prenatal screening and diagnostic techniques are set by public authorities together with authorities in medicine, ethical responsibility and risks are individualized (Helén, 2004: 37). Therefore, risks are taken by 'the mother' and 'the family'. The individualization of risks and ethical responsibility has close affinity with the positive character of bio-power in Foucauldian sense. Recall that power does not have to remind its presence to the subjects because of its growing presence in individuals' lives. As a result, Foucault argues that "power does not have to take care of the life it regulates and normalizes" (Brown, 2000: 45). This is at the same time the reason why power becomes so decentralized. That is to say, the traditional responsibilities as well as risks of power are now taken upon by individual subjects

Consequently, the third objection to prenatal screening and diagnostic techniques, which is 'slide to positive eugenics', might be transposed into 'slide to new eugenics'. This is because new eugenics is no longer a matter of selective breeding and of enhancing the best gene pool. Rather, new eugenics is very much interested in manipulating of and intervening into life, i.e., through providing 'the unfit' (cell, tissue, organ, and body) the possibility to reach higher genetic levels by means of genetic engineering. In this sense, new eugenics has an inclusive character which embraces both the ones who are classified as 'fit' and 'unfit' in terms of

[50] Helén also notes that there are two significant factors, articulation of which led to contemporary liberal abortion legislation in some states of USA and in Europe. First is "the medical ethics originating in the Nuremberg code, introduced in 1947, that emphasizes the patient's right of choice and consent with regard to any medical examination and operation"; second is the feminist movements since the late 1960s that act for the women's right to rule their own body and to make reproductive choices (2004: 36-37).

genetics. However, the manipulative aspect of genetic technology has shifted into another level in the last decade. With the cloning of Dolly, modern scientific knowledge improved the project and concomitant technology of 'making of life' a step further. Now, I will focus on the prospect of human cloning as the second subject-matter of this chapter.

3.2. On the Prospect of Human Cloning

Ian Wilmut and Keith Campbell at Roslin Institute announced the successful cloning of a sheep –Dolly, born on July 5, 1996- in the *Observer* on February 23, 1997 (Baldi, 2001: 50). This first case of cloning was a result of genetic experiments continuing for at least forty years. Yet, the cloning of Dolly not only made the possibility of human cloning as something achievable, but also reminded us the fact that human beings would soon have to face their clones[51]. Thus, the post-Dolly world housed certain critical questions which are not easy to answer for the time being, but definitely vital for the future generations. Some of these questions can be arranged into groups as in the following: First are the questions concerning ontological and theological meaning of the child born in this way –the clone baby (NBAC, 1998; Brock, 1998; Cahill, 2005). Second group of questions refer to the psychological impacts of having been cloned on the clone child (Paul, 2005; Harris, 2004)) – i.e., "if we could choose the genetic makeup of a child, would unconditional love for children become rarer than it is now?" (Nussbaum and Sunstein, 1998:13). Third includes the sociological consequences of human cloning. To illustrate, since cloning in principle entirely removes the need for fertilization and the dependence on sexual

[51] Though the possibility of human cloning caused public anxiety and intense debate, the idea of cloning and fears about creative arts were not peculiar to modern times. There was familiarity with the ideas of cloning at least in certain mythological stories. To the Greeks, gods and heroes had both 'natural' and 'unnatural' ways of reproducing, and peculiar means of birth: for instance; Athena was released from the forehead with a hammer, Dionysus was sewn up in one's father's thigh, and "the Athenians were, in their civic mythology, a nation descended from male clones, very proud to have no jot of the female in their make up." (Nussbaum and Sunstein, 1998: 12). Moreover, the Greeks relation to metalworking and other creative arts was molded by the idea that "new arts are all new transgressions, each bringing divine punishment in its train", showing that the Greeks took lessons from what happened to Prometheus, whose liver eaten out by an eagle for giving people fire (Nussbaum and Sunstein, 1998: 12). Nussbaum and Sunstein believe the scientific advances of modernity gave these anxieties already found in the Western tradition of thought a new intensity and specificity.

reproduction, it might undermine our traditional understanding of reproductive practices. Because of the reason given, cloning appears to have the potential to transform the parental relationships as we know it and to give rise to the emergence of single parenthood, which signifies drastic changes in the institution of family. Fourth, for religious traditions and theologians who take the godly 'first creation' for granted, post-Dolly world brought intense and confusing emotions because of 'the second creation' by human hand. And, the last group of questions concern the political dimension of human cloning, which contributes to the realization of a more calculable and manipulative society by decreasing the factor of chance to a minimum level in human reproduction.

To some of these questions concerning what human cloning might bring in the future, scientific facts seem to provide clear answers in certain respects and help to ease our minds. However, scientific facts do not have the capacity to respond to ethical, social and political questions. Thus, let me start with presenting these scientific facts first and then continue with religious and secular arguments seeking answers for the dilemmas human cloning would create.

3.2.1. Facts on Cloning

The article of National Bioethics Advisory Commission (NBAC) clearly states that, in its most simple and strict sense, cloning refers to "a precise genetic copy of a molecule, cell, plant, animal, or human being" (1998: 29). Nonetheless, creating genetically identical copies of whole organism differs from plants to more complex vertebrates. It is scientifically known that many horticultural and agricultural strains can regenerate from a small cutting and many simple invertebrate species (i.e. certain kinds of worms) from a small piece, whereas vertebrates have lost the ability to regenerate themselves (NBAC, 1998: 29).

In spite of the fact that a single adult vertebrate can not have the ability to generate another whole organism, the cloning of vertebrates is possible through natural ways. The proof of (human and animal) cloning in nature is the existence of 'identical twins'. The formation of genetically identical twins is completely a natural event stemming from the separation of a single embryo into halves at an early stage

of development (NBAC, 1998: 30). On the other hand, via artificial ways, scientists have realized the possibility of cloning human and animal cells and genes for several decades at the 'molecular' and 'cellular' levels[52]. Furthermore, they developed a more sophisticated form of cloning animals in the early 1980s which is known as 'nuclear transplantation cloning' (NTC). Let me briefly explain some technical details of NTC, since it is the form of cloning that enables the cloned cells to develop into a baby.

First of all, nucleus of somatic cells is *diploid* meaning that it has two sets of genes, one from the mother and one from the father. On the other hand, germ cells (egg and sperm) have a *haploid* nucleus containing only the maternal or paternal genes. In the light of these scientific facts, the process of NTC can simply be drawn. In NTC, there are actually three basic steps. First, the haploid nucleus of an egg is removed; second, egg is replaced with the diploid nucleus of a somatic cell which contains a complete set of chromosomes; and lastly, "the activation of cell division cycle of the egg with the new nucleus" is triggered (by an electrical impulse) to begin embryonic development, before it is implanted into a surrogate mother (Baldi, 2001: 50-51). As a result, the baby reproduced in this way carries the genetic characteristics of the donor cell, and thus has a single genetic 'parent'. Similarly, in the cloning of Dolly was used a donor nuclei as the source, and Dolly was born as a genetic copy of her mother (the donor of the cell). What was unique about the cloning of Dolly, however, was that for the first time a successful cloning was achieved through employing an 'adult cell' instead of 'embryonic cells' (Wilmut et al., 1998; Wilmut et al., 2000). Using an adult cell in a successful cloning was something innovative and stunning in terms of its results, one of which is worth mentioning here.

[52] On the one hand, molecular cloning is simply the cloning of DNA (deoxyribonucleic acid) which is the basis of genes. Making large quantities of identical DNA is a widely used technique in scientific experiments especially for the production of important medicines such as "insulin to treat diabetes, tissue plasminogen activator (tPA) to dissolve clots after heart attack, and erythopoietin (EPO) to treat anemia associated with dialysis for kidney disease". On the other hand, in cellular cloning, "copies are made of cells derived from the soma, or body, by growing these cells in culture in a laboratory" (NBAC, 1998: 30). However, since these two forms of cloning do not deal with germ cells (egg or sperm), cloned cells are incapable of developing into a baby.

> "Given the fact that cells develop and divide after fertilization and differentiate into specific tissue (e.g., muscle, bone, neurons), the development of a viable adult sheep from a differentiated *adult cell* nucleus provided surprising evidence that the pattern of gene expression can be *reprogrammed.*" [Emphases added] (NBAC, 1998: 31)

Broadly speaking, since the time when Briggs and King cloned frog eggs in the 1950s, cloning has developed to a level that the pattern of genes expression can be reprogrammed. In the light of current knowledge, Ian Wilmut and his colleagues believe that, there is no reason not to think that any mammal can be cloned in principle by nuclear transfer (Wilmut et al., 2000: 243). They also mention five obvious areas of the application of cloning –without adding refinements, such as genetic transformations (Wilmut et al., 2000). First, in the area of research, is the production of purer (genetically identical) laboratory animal strains which is believed to prove to be very helpful for experiments. Second, in the area of agriculture and other areas of domestic breeding, the aim would be the replication of elite animals. They believe that cloning of farm livestock may help to satisfy the farmers' search for 'uniformity' and 'optimum performance' of the animals. Third, in the area of animal conservation, the project will be the conservation of endangered species. With cloning it is supposed that, the species that lost much of their present variation through genetic drift can be cloned by using frozen cell cultures when the technology is ready for that. By this way, "future creatures could give birth to offspring as diverse as those of today" (Wilmut et al., 2000: 250). Fourth, in the area of human medicine, the cloning of tissues will be possible. In more concrete terms, "cloning technology could be employed to culture human tissues that could later be used for repair" (Wilmut et al., 2000: 251). Similar to the cloning process of Dolly, "cells from a person would be used to create an embryo" and then "cells from the young embryo would be cultured to provide tissue that was genetically identical to the donor" (Wilmut et al., 2000: 251)[53]. Fifth concerns the area of application which is

[53] Nonetheless, cloning of tissue for repair means to 'sacrifice' the embryo created from cells of the person. Sacrifice of an embryo, of course, leads to an ethical dispute. However, various ethical committees strive to calm this ethical anxiety by coming to an agreement on the idea that "human embryos up to fourteen days (long before they acquire any distinctive nervous tissue) have not yet acquired the status of personhood." (Wilmut et al., 2000: 251).

perhaps the most controversial one. It is the area of human reproductive clinics and its motive is to overcome infertility and to help couples who are unable to reproduce sexually, such as homosexual couples. To specify, female homosexual couples might have a clone baby by means of using one's nucleus from the body cell and the other's cytoplasm (the protoplasm of a cell excluding the nucleus) (Wilmut et al., 2000: 287). In this sense, female couples are far more independent than the male homosexual couples who need both egg donors and surrogate mother to have a clone child. Of course, interestingly, by such means "a woman could clone herself precisely if one of her nuclei was introduced into one of her enucleated oocytes." (Wilmut et al., 2000: 287). The controversial point in this fifth area of application is that the sexual reproduction which is based on heterosexual intercourse might be at the threshold of breakdown. Couples, be it homosexual or heterosexual, apparently become more independent from sexual reproduction. As a sociological consequence, this might create a tremendous pressure over the institution of family, one of the agents of socialization, so that it has to be redefined and substituted with a new set of parental relationships and moral values.

In the light of these scientific facts explained so far, I shall acknowledge that the functioning of cloning is generally misconstrued. In fact, cloning does not produce exact copies of human and animal creatures (if this problem is not overwhelmed by a more complex cloning technology in the future). To illustrate, the identical twins are in fact far better clones than Dolly and her mother[54]. However, the identical twins do not even have to look alike, nor do they behave or think in a similar manner. The reason is that, contrary to the common thinking, genes are not constant and they also mutate throughout life (Wilmut et al., 2000: 276). Though mutated genes create little difference, it is still a difference. In short, it is stated that, for the case of human cloning, people who wants 'a facsimile of the original' would surely be disappointed. After all, new person, the clone, is an individual who has to

[54] As Gould states, there are at least four additional attributes different from Dolly and her mother that identical twins share: (1) identical twins share the same cytoplasm of the egg cell; (2) identical twins share the same set of protein products in the egg necessary for the early development of embryo; and as environmental factors, (3) identical twins share the same womb and (4) they share the same time and culture (1998: 47-48).

be exposed to environmental factors, cultural values and social constructions in addition to the genetic makeup. Nonetheless, these scientific facts are not adequate to declare easily that the clone is also an individual having his/her own personal autonomy and freedom, because such declaration is insufficient for responding certain other worries and criticisms.

3.2.2. Bringing Out the Arguments Against and For Human Cloning

I think it is possible to group the arguments against and for human cloning under 'religious' and 'secular' perspectives. Note that neither includes coherent propositions or a uniform body of reasoning about human cloning. First, I will begin with the religious perspectives of theologians and religious thinkers. I shall say that the arguments are mostly Christianity-centered and largely reflecting the changing conditions in the United States. Thus, they can hardly be generalized. However, I believe, an overview of religious reactions in the US is meaningful to stress here since religious arguments have had a considerable influence on the public debate and on public policy. Also, religious communities have a distinct feature in the US that they generally have responded to the scientific advances without any delay. That is to say, the witnessing of religious communities to the genetic improvements and their contribution to the public debate happened almost at the same time. Second, I will try to picture two distinct moral arguments within the secular perspective. While delineating both religious and secular arguments, I will also refer to previously made discussions and interpretations. At the end, I will try to find an answer to the question whether there is something missing in both perspectives and in their arguments.

3.2.2.1. Human Cloning Seen from Religious Perspectives

In the article of National Bioethics Advisory Commission on 'Religious Perspectives' is explained four overlapping periods starting from the mid-1960s. I believe, a closer probe into these periods does not only allow an insight into distinguished considerations of theologians and religious thinkers on scientific prospects and ethics of human cloning, but also provide a chronological outlook to genetic improvements.

The first phase or period includes the mid-1960s and early 1970s. Between these years is said to be shaped by:

> "a context of expanded choices and control of reproduction…and the advocacy by some biologists and geneticists of cloning 'preferred' genotypes, which, in their view, would avoid overloading the human gene pool with genes that are linked to deleterious outcomes and that could place the survival of the human species at risk" (NBAC, 1998: 165).

In these initial discussions of genetic manipulation and cloning, two opposite positions became more evident within Roman Catholicism and Protestantism. On the one hand, a group of theologians supported the expansion of human freedom and control over reproduction and considered cloning as a preferable method of reproduction for the societal benefits. On the other hand, some other theologians labeled cloning as a moral boundary and a great risk to basic concepts of procreation (NBAC, 1998: 165-166). For the opponents, cloning includes three 'horizontal' (person-person) and two 'vertical' (person-God) threats. Three 'horizontal' threats were stated as: (1) clonal reproduction would require directed or managed breeding to serve the scientific ends of a controlled gene pool; (2) it would involve nontherapeutic experimentation on the unborn; (3) it would assault the meaning of parenthood by transforming 'procreation' into 'reproduction'. The other two 'vertical' threats are: (1) the cloning of humans would express the sin of pride and hubris; (2) it could be also considered as a sin of self-creation as humans aspire to become a 'man-God' (NBAC, 1998: 166).

Second period began in 1978, with the birth of the first IVF (in vitro fertilization) baby, Louise Brown, in Britain. The critical point in the second phase, according to National Bioethics Advisory Commission, was the starting of formal ecclesiastical involvement with questions of genetic manipulation (1998: 166). Meanwhile, chief discussions of the 1970s continued into the 1980s by the articulation of other disputed reproductive techniques, like artificial insemination by donor and surrogacy, to IVF. A common point in this era's critiques was that these techniques undermined the traditional notion of family and parenthood.

The passage to third phase happened with "the separation of cells in human blastomers to create multiple, genetically identical embryos" in 1993 (NBAC, 1998: 167). According to the article of Commission, the Roman Catholic Church denounced the research as 'intrinsically perverse' and Catholic moral theologians condemned this research with assaulting the norms of individuality, dignity and wholeness. Supporting their religious colleagues, many Conservative Protestant scholars expressed that this research went against the fundamental notions of personhood such as freedom, the sanctity of life, and the image of God. Yet, some other Protestant scholars believed in the potential medical benefits of human cloning and suggested a careful regulation of it (NBAC, 1998: 167).

The fourth period begins with the successful cloning of Dolly, the sheep, through somatic cell nuclear transplantation. The main concerns of this era seem not to change much than those of earlier periods. Repeatedly, the emergence of new technology led to revise the old arguments. A substantial attention is still paid on 'playing the God' critique, the violation of human dignity, and concerns about the family. Now let me briefly consider these critiques.

First of all, from a theological point of view, these recent techniques in reproductive medicine have already passed beyond the God-made moral laws. For this reason, 'playing the God' critique of theologians implies a moral forbiddance to genetic manipulation by reminding the distinctions between human beings and God, such as; "Human beings should not probe the fundamental secrets or mysteries of life, which belong to God" or "Human beings lack the authority to make certain decisions about the beginning or ending of life" (NBAC, 1998: 168-169). The second critique concerning the violation of human dignity emphasizing that cloning would jeopardize the personal and unique identity of the clone together with the one whose genome was duplicated. The argument is that violation of human dignity would also mean the violation of 'sanctity of life'. Third and the last critique is related to the violation of both 'human dignity' and 'sanctity of life', since the violation of two is believed to give rise to the demolition of barriers before treating child as an 'object of manipulation'. Manipulation includes attempts to design and control the very

identity of the child, which would also undermine the traditional notion of family and procreation (NBAC, 1998: 171).

As a result, let me gather a few remarks about this section. Recalling the arguments in the prenatal screening, I do not agree with 'playing the God' critique and theologians' line of reasoning on human cloning. Since religious perspective and discourses, to the degree discussed above, would hardly respond to how modern science and technology have flown into each other with reference to the historical, philosophical and political background. That is to say, religious discourses perceive genetic technology as a controllable phenomenon by means of religious norms and dictates. Thus, they fail to notice historical and political relation between 'techno-science' and 'power'. I think secular arguments will help us to see the picture from a wider perspective, though they are still inadequate in certain respects.

3.2.2.2. Secular Accounts of Human Cloning

It is possible to see two distinct moral arguments that are secularly formulated. These moral arguments are rather composed of considered reflections on the issue. In short, on the hand, some argue that human cloning would violate fundamental moral norms, or human rights. On the other hand, the prohibition of cloning itself is considered as the violation of such rights. Let me start with the positive arguments on cloning.

First of all, human cloning as a means of reproduction is defended because of the belief in its having the same status with other assisted reproductive technologies (such as in vitro fertilization (IVF), oocyte donation and so forth). In other words, supporters believe that human cloning is an entirely new means of reproduction and thus should be protected by the moral right to reproductive freedom (Brock, 1998: 143). Second moral argument is that supporters claim respect for individual self-determination, which means to respect "individuals' choices about whether to have a child with a condition that will place severe burdens on them, and cause severe burdens to the child itself" (Brock, 1998: 144). Consequently, pro wing thinkers claim that cloning is no more than an extension of genetic testing of fetuses or preimplantation of embryos which are done to avoid having a child with genetic

diseases or abnormalities. Third moral argument in favor of cloning follows the second one, and emphasizes "the right to raise one's children as one sees fit", which also implies "the right to determine within limits what kinds of persons one's children will become" (Brock, 1998: 144). Simply, human cloning is believed to be one of the ways to exercise these rights.

In addition to these three moral arguments which rely on the language of individual rights, the supporters also focus on certain individual and social benefits cloning might produce. Recall that I have already outlined five areas of application in 'Facts on Cloning'. The fifth area of application of the cloning technology was including human reproductive clinics and human cloning. Though Ian Wilmut, who cloned Dolly the sheep, is morally disinclined towards human cloning, the supporters acknowledge the possible benefits with the realization of this dream. To illustrate, "human cloning would enable the duplication of individuals of great talent, genius, character, or other exemplary qualities" (such as Einstein, Mozart and Gandhi); and, "human cloning and research on human cloning might make possible important advances in scientific knowledge" (such as about human development) (Brock, 1998: 149-151).

The opponents of human cloning who make criticisms from a secular viewpoint, however, see human cloning as a means of manufacturing humans. For this reason, they distinguish human cloning from current ARTs (Assisted Reproductive Technologies) and practices, which help the ones who are unable to reproduce through sexual intercourse. The main supporting moral argument behind their stance is that human cloning would violate moral norms or human rights. Nonetheless, Brock argues that 'violation of rights' is a confusing argument and is not very clear. Thus, he begins with reasoning what these rights would be and identifies two kinds of 'violation of rights' at the end. The first and the most common is the violation of right to have a unique identity. The second, which follows the critiques of Jonas and of Feinberg, is the violation of right to ignorance about one's future or to an open future (Brock, 1998: 151).

Brock, however, finds both of these arguments problematic. On the one hand, according to him, first argument, human cloning violates the right to have a unique

identity implies that "the relevant sense of identity would have to be genetic identity, that is, a right to a unique unrepeated genome" (Brock, 1998: 152). Nonetheless, if we recall the earlier discussions, such reasoning will seem unreliable. Given the fact that identical twins are sharing an identical genome, their rights to unique identity are not violated; because being a twin does not prevent them from having distinct and unique identities of their own. In this sense, identical genetic makeup would not predetermine the characteristics and the identity of later twin/the clone. Thus, because of genetic determinism, this criticism of being hindered from having a distinct identity does not lead to convincing results. On the other hand, the opposition made by Jonas and Feinberg seems much more powerful and convincing than the first one.

Jonas starts with arguing that the clone (later twin) knows too much about herself. To Jonas, "it will seem that her life has already been lived and played out by another, that her fate is already determined", and thus "she will lose the sense of human possibility in freely and spontaneously creating her own future and authentic self" (Brock, 1998: 153). However, it can be argued that though Jonas seems to develop strong arguments, these arguments seem to rest on the false assumption that "having the same genome as his earlier twin unduly restricts his freedom to create a different life and self than the earlier twin's" (Brock, 1998: 154). In a similar fashion, Feinberg declares a child's right to an open future. His main argument is that this right might be violated if later twin believes that future possibilities or her future life is already set for her by the choices made and the life lived by her earlier twin. However, Brock points out a central difficulty in these two appeals: the violation of a right –either to ignorance or to an open future- depends on the presumption that "the later twin is likely to *believe* that his future is already determined" (Brock, 1998: 154). Yet, Brock concludes that even if later twin will falsely believe her life has been already determined and taken from her as a result of cloning, this will not, in fact, be any violation of her rights, but perhaps the very reasons of her psychological distress.

As a result, it is commonly argued that human cloning technology would at least produce psychological distress and harm for both the earlier and the later twin.

Though some argue that cloning would diminish the later twin's sense of autonomy and freedom, this argument seems to be speculative rather than satisfying. On the other hand, opponents suggest that human cloning procedures would carry unanticipated harms and unacceptable risks to the clone, such as the failure to implant, or the failure to grow and develop an embryo which might end with death and destruction of coming being. Lastly, opponents have already posited some possible social harm. Let me mention a few of them before ending the section. First, human cloning would lessen the worth of individuals and respect for human life through reducing life to a category of 'manufactured' and a 'man-made' object. Second, commercial interests for financial gain might lead to the exploitation of human cloning. Third, governments as well as other groups might use human cloning for their immoral and exploitative purposes (Brock, 1998: 158-161).

3.3. Concluding Remarks

From the overall discussions in this chapter, it is possible to conclude that starting from the 1950s human choice and design criteria have been introduced into the construction and combination of genes, firstly in plants and animals. Then, the modern genetics has gradually achieved the capacity to reprogramme the patterns of gene expression in human beings, at least in principle, which is a radical novelty. In this chapter, rather than examining all the achievements in genetic knowledge and techniques of genetic engineering happened in these years, I confined myself with two cases of genetic advances which deeply bear upon our reproductive practices and choices, namely, prenatal screening and human cloning. So far, I have discussed different aspects of these two cases primarily focusing on the current techniques and their application areas, the risks they might bring, the societal and individual benefits and harms they might create, and the ethical concerns. Also, I think that the portrayal of the prenatal genetic screening tests and diagnosis and the prospect of human cloning have exemplified certain pivotal transformations in medicine, ethics, and politics at the beginning of the 21st century.

The first transformation, or let me call it a tendency, is the geneticization of medicine. The very examples of this tendency can be witnessed in the area of

reproductive medicine. As discussed earlier, prenatal screening tests in the 1960s – such as amniocentesis to diagnose genetic diseases in the fetus at an early stage of its development- were accompanied gradually by more sophisticated screening tests, and in 1978, by the emergence of *in vitro* fertilization (IVF), this tendency reached its peak point. Though IVF seems to signify the medicalization of infertility and thus operating as an extensive control over procreative process, the assisted reproductive technologies (ARTs) have indeed benefited from genetic inquiries into the human genome in a gradual manner. This is because human genome is said to house the complete genetic information possessed by an organism, and hence its complete discovery is believed to reveal the unknowns about human life and its formation in details. Accordingly, the growing trust in genetics has weakened the confidence in the conventional medical practices, and the utopian expectations of genetic engineering have gradually defamed the art of healing. Consequently, since genetic information becomes a more reliable source of diagnosis and the gene theoretically becomes a curable unit, genetic engineering is considered to be the most promising and prominent branch of modern technology thanks to its capacity to manipulate genes.

Another transformation occurs in the field of ethics. This resulted from the stubborn characteristics of modern science and technology which unceasingly create new tasks of investigation and challenge the objects of investigation in order to possess the knowledge about their very nature for utilitarian purposes. In simpler terms, new forms of technology (in our case, prenatal screening and cloning) seem to impose their own rationale against the ethical principles setting limits to such practices. The invading rationale of modern technology has attracted criticisms from both religious and secular wings –with arguments which look rather disorganized and fragmented and barely have the requisite qualities for a complete assessment of all the novelties. To bring the discussion into our context, on the one hand, some claim that cloning technology in general (and human cloning in particular) is no more than an extension of pre-cloning genetic advances, such as genetic testing of fetuses or preimplantation of embryos. Furthermore, the pro-wing in both religious and secular perspectives consider human cloning as a protection of individual rights and believe

in its medical benefits. On the other hand, some secular criticisms see human cloning as a means of manufacturing humans and as the violation of individual rights and moral norms; thus, they distinguish it from the current ARTs. In addition to that, reactionary religious accounts conceive the latest technological advances, i.e. cloning, as godlike powers the application of which may lead to the violation of human dignity and sanctity of life. To sum up, two tendencies come out of secular and religious arguments, be it against, or for genetic manipulations. First, the prospect of human cloning, and indeed the cloning technology in general, is considered as an extension of pre-cloning genetic technologies. Second, cloning technology is regarded as an individual and distinct case which should be elaborated separately from other assisted reproductive technologies. To my point of view, the first tendency which assumes continuity –between reproductive technologies of the 1980s and cloning technology of the 1990s- is much more helpful in understanding the geneticization of medicine, though this assumption lacks the sufficient clarity and requires a critical interpretation. I think that this continuity thesis exhibits the challenging character of modern technology which permanently seeks new horizons, rather than producing a better health policy and widespread health service. Besides, genetic manipulation and intervention –i.e. the prospect of human cloning and gene therapy- might be regarded as a significant milestone in the long process of 'control and manipulation of human life', which includes phases such as prenatal screening, IVF and cloning of Dolly. To put it differently, genetic manipulation is no more than "the culmination of a materialistic way of thinking about nature that started some four hundred years ago with Bacon, Descartes and Galileo" (Verhoog, 1993: 93). Accordingly, one may argue that each successive phase on the path towards 'control and manipulation of life' appears to be the result of a self-feeding necessity in which man himself plays the least role. This self-feeding necessity seems to be analogous with what Heidegger calls 'the essence of technology' which is enframing, and what Bernasconi calls 'the technological control' which desires in a blind manner to evolve into the successive phase –no matter what it is. I believe that in the light of these observations –the assumption of continuity and the challenging character of modern technology- the transformation in ethics can be better explicated. From the

mid twentieth century, the adventure of modern genetics has carved the very roots of traditional ethics piecemeal in favor of a new ethics –which, for the time being has brought no obvious and clear response to the new challenges of the latest scientific and technological advances.

Third transformation concerns the politics. This is because the geneticization of medicine and the emergence of new dilemmas stemmed from technological improvements have close proximity with the body politics. In other words, aforementioned transformations in medicine and ethics are also subject to the power relations. Therefore, as the current social relations and our conceptualizations of human life are frequently exposed to the sanctions of a more geneticized knowledge and geneticized medicine, the question whether we are at the edge of a more determinable and normalized society has gained a considerable relevancy. To specify, no doubt, one day human cloning will be achieved and declared in the front pages of newspapers with great enthusiasm and as well as with deep anxiety. However, cloning of human beings should be removed from the agenda of traditional ethics and transmitted into a new agenda in which genetic technology and power relations are considered as intertwined. This is because the dimension of power relations is relatively obscure in the ethical arguments examined so far in this chapter. In other words, the depiction of ethical and technological transformations is incomplete as far as the political transformations are not taken into account. Recall that secular and religious criticisms directed to prenatal screening and genetic inquiries into human biology are mostly based on the opposition to 'the standards of normalcy' which thought to be rather discriminative, repressive and exploitative. However, such criticisms do not sound explanatory. Instead, an analysis of power relations in the age of geneticized medicine requires the examination of actual reasons of what makes pregnant women *voluntarily* come under the genetic umbrella and what kind of power relations make human cloning a *desirable* project.

For these reasons given above, a more complete picture of genetic control and manipulation in the current context can be drawn only with reference to the transformations in medicine, ethics and politics all together. In the fourth chapter, I will bring these transformations under the light of Jonas's critical assessments of

genetic technology, Heidegger's philosophical remarks on the premises of modern technology and Foucault's original remarks that tie medicine and power. To what extent the views of these three figures are relevant to recent achievements in genetics will be my major concern.

CHAPTER 4
REFLECTIONS ON GENETICS: REASSESSING THE RELEVANCE OF JONAS, HEIDEGGER AND FOUCAULT

4.1. Introduction

The argument that there is a continuity in terms of technological mentality between the former genetic techniques of prenatal tests and the current more sophisticated cloning technology provides the necessary ground to examine the genetic science and technology from a comprehensive view. Despite the fact that the knowledge of genetic science, together with its techniques, has reached to undreamed levels in terms of propagation and applicability, the technological mentality has succeeded in preserving its metaphysical premises derived from scientific and technological revolutions. The mechanistic/technological world view and its materialistic way of dealing with outside reality have created a world of objects that is to be manipulated for human interests. Body as a field of scientific knowledge and a space for technological intervention has already been considered an object of investigation in modern medicine; but only with the rise of modern genetics, the organic structure of body has begun to reveal its concealed secrets to human knowledge thoroughly. Moreover, modern genetics opened new doors for medical treatment by discovering the unit of heredity, DNA, and its role in transmission of many fatal genetic diseases. However, for the introduction of genetic knowledge into the medical treatment more densely, it was declared that we should know much more about the human genome and how to engineer the ordering of human genes. Therefore, in today's context, our attention is mostly channeled towards genetic studies and the extreme benefits genetic engineering might bring (i.e. immortality and absolute healthiness).

From the crawling times of reproductive genetics to the prospect of human cloning, genetic engineering of human has always been a dream –which generally refers to the actualization of manipulating genes, usually outside the organism's normal reproductive process. Each discovery and technological improvement in genetics was meant to contribute to the realization of the fantasy of human

engineering. Therefore, I prefer to start with a discussion of 'genetic engineering'. Though, in the general course of genetic advances, genetic engineering of humans seems to be more of a futuristic option and remained at the level of speculations – when compared to those of prenatal tests and other current genetic technologies- engineering of human which is a merger of human genetics, molecular biology, biotechnology and engineering has attracted a considerable attention of many social scientists and philosophers. Hans Jonas is one of the philosophers who took genetic engineering into account seriously –as well as prenatal screening tests and human cloning- observing them, and problematized them ethically. Nonetheless, contrary to Jonas' direct attention, Heidegger and Foucault seem to have been relatively disinterested in such cases. I believe that focusing on the general characteristics of genetic engineering might help to evaluate philosophical remarks made by Heidegger and Foucault in integrity with those of Jonas. In this way, the relevance or irrelevance of these thinkers to recent advances will be discussed in a comparative manner.

Two main lines of argument constitute the content of this chapter. First, starting with the criticisms of Jonas, the ethical transformations and radical changes in the nature of human action will be elaborated in the context of the advent of modern technology. Criticizing modern technology inevitably leads to a discussion of *techné* and an analysis of its new form in the modern technological world. Briefly, I will present the changing conceptualization of *techné* and its recent penetration into the realm of human beings. Remaining loyal to Jonas's way of reasoning, I will argue that *homo faber* (Man the Maker or Man the Toolmaker) is now turning upon himself, and the best signs of this are the scientific and technological efforts towards 'human-made humans' and the arduous attempts of accomplishing genetically engineered human species. Then, explicating the discussions on 'the challenges to the traditional ethics', 'the novel human actions' and 'altering *techné'*, I will portray the general features of genetic engineering and indicate its distinctive aspects departing from the conventional meaning of 'engineering'. Though this first line of argument will be relying heavily on Jonas, his analysis will be completed by recalling Heideggerian reflections on modern science and technology. I hope that

such reading will show the philosophical proximity between Jonas and Heidegger more apparent, as well as their relative weakness in problematizing the question of power in relation to modern technology. Second, the critical reflections of both philosophers –particularly on the technological mentality- will be accompanied by an analysis of the transformations in medicine and bio-power. Following the claims of Foucault on the organization of medicine and different historical phases in the spatialization of disease (in the 18th and 19th centuries), I will try to reach an evaluation concerning where to locate genetics in relation to medicine, and what changes genetic advances have brought (and might bring) in today's medical context and power relations.

As aforementioned, this chapter begins with an examination of genetic engineering, rather than a reassessment of the cases (prenatal screening and cloning) presented in the third chapter. This has two reasons. First, except for Jonas, other thinkers have involved in neither of these discussions. Thus, taking prenatal care and cloning into account individually will not explicate the major philosophical disputes or proximities better. Second, examining genetic engineering –which is as philosophically striking as two other cases- makes methodologically easier to reveal Jonas' ethical and philosophical remarks for a comparison with Heideggerian reflections on modern technology.

4.2. Ethico-Philosophical Reflections on Genetic Engineering

Three topics will be analyzed here. First is the insufficiency of traditional ethics in responding to the rapid improvements of threatening technological powers which have drastically transformed the very nature of human action. Accordingly, I will discuss four traditional characteristics that have been eliminated from the nature of human action with the advent of modern technology with reference to the reconceptualization of *techné*. Second, the significance of these qualitative transformations for today's context will be indicated through portraying the most obvious eight differences between genetic engineering and conventional engineering. Lastly, I will try to figure the philosophical proximities between Heidegger's and

Jonas's reflections on modern technology and evaluate their relevance to the current technologies in genetics.

4.2.1. Changes in the Nature of Human Action: The Issue of Techné and Ethics

We are already acquainted with the critical arguments in second chapter that modern technology have brought new ethical dilemmas that man should care and be responsible for. The emphasis on the idea of responsibility is also one of aspects of Jonas's criticisms which aim to highlight the new tasks of ethics against the overwhelming potential of modern technology. Basically, Jonas reflects on the 'qualitatively novel nature of certain of our actions' which has been molded by the profound effects of modern technology. To put it differently, certain developments of technology and hence our improved technological powers have changed the very nature of human action. Therefore, this new scope of human action calls for a change in ethics as well (Jonas, 1974: 3). This is because the standards and canons of traditional ethics have no relevance any more with the threatening capacity of new technological powers. Then the reasons behind this irrelevancy of former ethics are to be indicated and what differs between the preceding and current nature of human action needs to be discussed.

Jonas outlines four prominent traditional aspects that have been eliminated from the scope of human action by the modern technological changes. Let me briefly explain these bygones. First, the whole realm of *techné* (with the exception of medicine) was once ethically neutral, meaning that there arouse "no question of permanent injury to the integrity of its object" (1974: 6). Therefore, human action on non-human things did not establish 'a sphere of authentic ethical significance'. In other words, the realm of non-human things was *not* included by the former ethics. Second, as seen in the first aspect, all traditional ethics was indeed 'anthropocentric'. This means that former ethics constituted itself as a sphere of direct dealings of man with man. Third, Jonas believes that "the entity 'man' and his basic condition was considered constant in essence and not itself an object of reshaping *techné*" (1974: 7). The very condition of human action and man himself were thought to be proceeding without interruption, and remaining outside the objective of *techné*. Four,

there was a closer proximity between the human action and its consequences: "the good and evil about which action had to care lay close to the act, either in praxis itself or in its immediate reach, and were not a matter of remote planning" (Jonas, 1974: 7). What Jonas derives from this proximity is that the effective range of action was small; the time-span of foresight, goal setting and accountability was short; and the control of the circumstances was limited. In brief, former ethics was chiefly concerned with the 'here' and 'now', the relationships between men, and the short-run consequences of men's actions. Perhaps one of the major philosophers of Enlightenment, Immanuel Kant, can well illustrate what is argued here. Kantian ethics had nothing to do with scientific knowledge or long-term calculations of moral actions. It was a knowledge of 'here' and 'now' which "is entirely non-theoretical" (Jonas, 1974: 8). Since the good or the bad of the action is decided within the short-term context, "the short arm of human power did not call for a long-arm of predictive knowledge" (Jonas, 1974: 8). Therefore, the quality of moral action and its consequences were visible to the wielders and witnesses: 'the complete locus of human action and power was always the *present*'.

Modern technology, however, has introduced certain qualitatively novel actions into our lives in such a way that traditional ethics can not even deal with it or provide any sufficient responses. This is because, contrary to the anthropocentric nature of human action in old ethics, modern technology has brought an entirely new order in which both human and non-human beings together are affected by human action. The sphere of human action (and, accordingly the ethical responsibility) has included the world of things since these novel human actions have achieved to intervene and transform the very nature of non-human beings. Besides, the most evident characteristics of former ethics –'nearness' and 'contemporaneity' of human action- are swept away with the rise of modern technology, and hence man inevitably finds himself in a contingent ethical situation where the consequences of his action for the first time reach to the far future as to include next generations and the future of earth, environment, species etc. This is something radically new for the modern man and thus his former experiences are powerless in order to call for help (Jonas, 1974:95). In other words, Jonas draws a picture of modern world in which the

'predictive knowledge' falls behind the 'technical knowledge' which sustains our power to act: "no previous ethics had to consider the global condition of human life and far-off future, even existence, of the race" (Jonas, 1974:10). For certain, the discovery of science of ecology exemplifies how far global impacts of novel human actions have reached in the modern world. This indicates our altering role in the larger scheme of things as well, and our growing power over the human and non-human beings is believed to necessitate a new ethics which should develop novel arguments with respect to the radical transformations in *techné*.

According to Jonas, the most obvious transformation in the understanding of *techné* happened with the rise of modern technology. In his own words;

> "[T]echné was a measured tribute to necessity, not the road to mankind's chosen goal –a means with a finite measure of adequacy to well-defined proximate ends. Now, *techné* in the form of modern technology has turned into an infinite forward-thrust of the race, its most significant enterprise, in whose permanent, self-transcending advance to ever greater things the vocation of man tends to be seen, and whose success of maximal control over things and himself appears as the consummation of his destiny" (1974: 11).

New understanding of *techné* as 'an infinite forward-thrust of the human race', and as a never-ending vocation into a fantasy of maximal control over non-human and human beings appears to be an inherent characteristic of modern technology in both Jonas' and Heidegger's works. As a result, this infinite expansion of technological control over the artificial environment continuously reinforces the inventive action of man and its management, together with the drive of further advance (Jonas, 1974:11). Therefore, the entry of new understanding and applications of *techné* into the realm of human beings, i.e. our efforts for having control over evolution, is not actually a surprise. Engineering of human body and making alterations in the design of man himself do not seem absurdities in the changing course of *techné*. In this sense, the field of genetics and the possibilities it offers do not appear as if they are the excessivenesses of modern technology, but the very thrust of it. In more particular, genetic engineering also brought practically and theoretically certain serious departures from the vision of conventional engineering. I think that an examination of these departures might clarify the transformations in

techné examined so far, and indicate the significance of these qualitative changes for the modern man and his future.

4.2.2. The Distinctive Features of Genetic Engineering

Jonas determines the most obvious eight differences between genetic engineering and conventional engineering in his article of 'Biological Engineering – A Preview' (1974: 141-167). Though he uses biological engineering interchangeable with genetic engineering, I prefer using 'genetic engineering' instead of 'biological engineering' for its emphasis on 'genetics'. Jonas believes that genetic engineering gives rise to a radical challenge to the conventional meaning of engineering which "means the designing and constructing of complex material artifacts for human use" (1974: 142). Therefore, conventional engineering implies a process of designing of existing designs –of what has been already created. Also, conventional engineering has only one direction: from man (the subject) to the nature (the object of technological mastery). Since the object of conventional engineering has been lifeless materials (dead matter, i.e. metals and wood), the division between man and nature was also clear cut. Jonas sees a radical departure from this clear division – between human and non-human, which signifies a break of metaphysical importance as well. Let me explain these differences in order to grasp the very nature of genetic engineering and this metaphysical break.

First, genetic engineering appears to be a partial making and design alteration rather than total making and designing (Jonas, 1974: 143). Contrary to conventional engineering which is, from the first step to the last, inventive and productive, genetic engineering depends on design alterations of a pregiven structure –such as human biology, and plant or animal structures. In other words, there is a constant and pregiven form of human body which restricts the praxis of genetic engineering to making alterations only.

Second, genetic engineering implies a shift from passive materials to active biological systems. Therefore, "the modifier is a co-agent with the self-acting material…into whose self-activity he inserts the new fractional determinants" (Jonas, 1974: 143). This is a kind of power of determination over living organisms by

intervention only, not by *building* –till the time we dare to create human-made chimeras as in the mythological stories.

Third, since there is no 'unknowns' in the conventional engineering, the engineer can accurately predict the outcomes and properties of his product. Nevertheless, there arises the question of 'predictability' in genetic engineering. Each redesigning and modification in genetic engineering, due to the multiplicity of unknowns, is in fact no more than an 'experiment'; and hence outcome lies beyond the purview of the experimenter himself because of this immense number of unknowns (Jonas, 1974: 143).

Fourth, to Jonas, this also destroys the traditional relation between the mere experiment and real action. What Jonas means is that experiments are indeed 'non-committal' and carried out with substitute models that the experimenter can alter, test and retest it, before the final model is decided and produced. However, genetic engineers deal with the original itself –the real thing in its fullest sense, the living creatures. Thus, as Jonas states, there remains no comfortable separation between 'mere experiment' and 'definitive action'. Since a final approved model through numerous experiments is not applicable, conducting genetic experiments means to work on the actual lives of individuals and populations by means of trial-error methods. Genetic engineering has only one physical space, human body, for both its experiments and definitive actions –that is why, each genetic experiment on the human body is indeed an irrevocable definitive action at the same time.

Fifth, there are usually unintended consequences of experiments and of the finished product in conventional engineering. Despite the accurate calculations and well-defined blueprints, there is always a risk of error. In such cases, however, the product can be recalled to the factory for correction of faults. Nonetheless, it is not the case in genetic engineering. As Jonas states, 'what is done is done' and its deeds are irreversible (1974: 144).

Sixth, another significant difference from 'dead-matter engineering' is that genetic engineering has indirect and prolonging effects. This is to say that the production in genetic engineering is indirect since the new determinant introduced into the genetic structure might show its first effects only in the next generation, and

then these effects might be carried to the other generations by means of DNAs. Therefore, Jonas regards 'making' in genetic engineering as 'launching', which means "setting adrift in the stream of becoming which carries along the maker himself" (1974: 144).

Seventh, for the reasons given above, Jonas also questions the issue of power which is intimately allied to technology. Recalling the Baconian optimistic formula which assumes an increase in power over nature, as well as, over men in accordance with an increase in scientific and technological knowledge, Jonas comments satirically on the degree the cumulative power of human kind has increased:

> "Now man's impending control over his own evolution is hailed as the final triumph of this power –'nature' now significantly including man himself, reclaiming him as it were from his splendid isolation. But of whom is this a power over what and whom? Plainly, of the living over posterity; more correctly, of *present men over future men*, who are the defenseless objects of antecedent choices by the planners of today. The obverse of their power is the later servitude of the living to the dead." [Emphasis added] (19974: 145).

That is why such a power over future appears to be blind once it is exercised. Controlling the power over evolution appears to be no longer in the hands of power holder or any professional authority, and hence power as such brings two novel and critical questions with it: " what *right* anyone has to so predetermine future men; and hypothetically granting the right, what wisdom he has that entitles him to exercise it" (1974: 145).

Lastly, Jonas differentiates genetic engineering from conventional engineering in terms of its goals. On the one hand, it is possible to define the goals of conventional engineering within the confines of utility which means 'for the use of man'. On the other hand, though the utilitarian goals are still applicable in genetic engineering of plants and animals, this hardly explains the case of man's engineering of himself. Then, the question arises: what are the aims of genetic engineering of man? The answer Jonas gives is as follows:

> "Surely not to create man –he is already there. To create better men? But what is the standard of better? Better adapted men? But better adapted to what? Supermen? But how do we know what is 'super'? We stumble into

> ultimate questions as soon as we propose to tamper with the making of man. They all converge into one: in what image?" (1974: 146).

Perhaps this last difference between two kinds of engineering concerning the goals denotes the most significant one. After a series of questions, Jonas ends with the most critical one: in what image man does want himself to be. Such question cannot be answered easily by reference to cultural paradigms of Enlightenment, or in reference to certain particular historical experiences of humankind. This is a completely new question which is far beyond the imagination of surgical operations dealing with the physical body and its aesthetics. As Jonas states, what we will probably face in the future is 'launching' a new determinant into the human body. Of course, this 'new determinant' is a vague expression and defenseless to open-ended futuristic speculations. However, with what kind of image genetic engineering would intervene into the human body (whether to heal a genetic disease or to correct and control human body) is a key question. Since launching a new determinant is not merely a technical question, it is also connected with the ethico-philosophical matter of determining 'coming-to-be'. In this sense, I think that selective abortion and genetic modification signify the similar kinds of interventions Jonas had in mind, because each is a different ways of determining 'coming-to-be'. Recall that disabled people brought certain reservations against the selective abortion of fetuses decided in accordance with the outcomes of prenatal screening tests since they consider selective abortion as the violation of rights of people with disabilities. However, hypothetically, selective abortion is thought to be a woman's right and a medical option for pregnant women who think that her baby would be unhealthy in the future according to the cultural paradigms of health and the standards of normalcy. Therefore, except for the diagnosis of certain serious genetic diseases from which the baby might suffer after birth, that which guides women's decisions is indeed the cultural image of healthiness produced and disseminated by medical discourses. These discourses are in turn have serious influences on genetic counseling which is strongly influential on the decisions of pregnant women about whether or not to terminate pregnancy. One should note that the cultural image of healthiness is not constant. To follow Jonas's terms, I think we may argue that 'the image of better

man' –or the image of 'healthier' man- is in a perpetual change in direct proportion to the technological developments in medical science and in genetic technology. Accordingly, 'the image of better man' is not an approachable ideal since there is not a steady ahistorical form (of betterness, or healthiness) waiting there to be realized by human race. Rather, from a genealogical point of view, this image is continuously reconfigured according to the current cultural paradigms of health together with the technological opportunities and imagination modern genetics might offer. One should agree with Jonas and Heidegger in their emphasis that the functions of cultural paradigm, the question of modern technology and the understanding of beings are all allied to the question of power, yet the attention they pay to the problem of power seem to be relatively weak, and to a certain extent, incapable of evaluating the 'positive' character of current power relations which has been underlined by Foucault. Now let me summarize their contributions on ethico-philosophical assessments of genetics together with a demonstration that the issue of power remains undeveloped in their criticism.

4.2.3. Interpreting Heidegger's and Jonas' Arguments: A Synthesis and Evaluation

Though Heidegger does not point to genetic engineering or cloning technology as specifically as does Jonas in his criticisms of the technological mentality, the philosophical proximity between their arguments is obvious. This proximity is important not only for clarifying what they argue likewise on modern technology, but also it gives us an opportunity to evaluate the relevance of their philosophical reflections with today's technological and political context concerning the control of life.

First of all, I have considered genetic engineering as more of a futuristic goal which we are able to imagine in accordance with the already gathered genetic knowledge at hand. Relying on the continuity principle of technological mentality enables us to predict that there will be further advances that go beyond genetic screening tests and cloning of human. Recall that this tendency of continuity was conceptualized as 'infinite forward-thrust' by Jonas and as 'constant activity by

Heidegger. Even though what Heidegger had actually in mind was to characterize the essence of science, and modern physics in specific, when he uses the phrase 'constant activity', I think that his conceptualization is directly applicable to life sciences and genetic research as well. Broadly speaking, Heidegger states that modern science as research is more than an amalgamation of results, and its methodology permanently utilizes the results to direct itself towards a new set of questions and unknowns. In this way, it establishes new procedures. Nevertheless, as aforementioned in the second chapter, the establishment of new procedures necessitates a concurrent process of 'institutionalization' in order to secure and legitimize the scientific progress and the process of gathering knowledge. I believe that starting from the 1950s, modern genetics has methodologically established new procedures for obtaining further knowledge about the 'concealed treasure' kept in the human DNA. Moreover, genetic research as a constant activity, passing from different stages, is now reaching to a point where human cloning and genetic engineering of human are no more utopias but very possibilities, at least in theory. Yet, even though genetic research continuously strives to possess the genetic knowledge of a projected region of human genome in a mathematical exactness, experimental method remains as a barrier before its calculations. This is because there are no substitute models for living organisms, but also and more importantly, experiments on humans is an ethically disputed issue. Therefore, the experimental method which is one of the pillars of modern scientific research and a significant constitutive of its metaphysical progress now stands paradoxically as an ethical obstacle which retards the development of genetic engineering of human. Then, for the time being, the further institutionalization of genetic research into human body as a 'constant activity' is hindered.

Another crucial point both Jonas and Heidegger make concerns the position of modern man in modern age. They argue that man has transformed himself into the sole representative, as the only referential core of all other beings. Such an anthropocentric interpretation of Being, in Heideggerian terms, has led to the role of man as the norm-giving subject. For Heidegger, this metaphysical transformation in the meaning and position of Man was a radical break, i.e. with the Greek morality

and the humanisms of Middle Age and Renaissance, since modern man ceases to open himself to what is present, and instead, he begins to neutralize everything in relation to himself. What followed was the objectification of beings that stand before man's scientific gaze. Indeed, only in this process of objectification of all beings, man could find himself a position as the 'subject'. Same process made man the guide of all other beings as well. Concomitant with gaining the status of subject man is loosing something; Heidegger and Jonas criticize such a metaphysical transformation and modern man as his closing himself to Being. Moreover, they believe that man should abandon his guiding role of agency and rather have the role of 'stewardship' that protects the integrity of beings instead of manipulating the very nature of them for utilitarian purposes. For this reason, I think that genetic breakthroughs with novel capacities to manipulate genes and to launch new determinants into hereditary patterns of human beings must represent all the fears and anxieties that Jonas and Heidegger share.

Third, both philosophers deny any conception of technology as something neutral (together with utilitarian justification of technology) which makes us blind to the essence of technology. In more concrete terms, they reject any 'instrumental' and 'anthropological' conceptualization of technology. This is to say technology should not be taken as a mere means to an end in the pursuit of human interests. Instead of such Baconian/utilitarian optimism, they develop more of a phenomenological interpretation of technology. Accordingly, what they figure is a kind of technological mentality behind this 'infinite forward-thrust' which stemmed from the *epistemological* changes with the rise of modern science as research and the *ontological* break with the past which refers to the emergence of modern man as the sole representative of his worldly existence and other earthly beings.

What they simply mean by technological mentality is the novel metaphysics of human conduct by which everything becomes an object in front of us, and thus everything can be manipulated in the sense of challenging-forth for the purposes of utility. For instance, there is no significant difference between storing energy from Rhine river and storing embryos from a couple in the name of technological mentality since both (the flow of Rhine river and the reproductive process) are

deemed two equivalent processes to be challenged-forth and stacked away for future use. Broadly speaking, technological mentality penetrates into the natural course of life (of all beings), and transforms their natural becoming according to an anthropocentric project in the pursuit of human interests. Here, what Jonas and Heidegger find vital is that the driving force of technological mentality which is composed of 'constant activity/infinite forward-thrust' and 'challenging-forth' never comes to an end. For this reason, from their point of view, any technological advance driven by this technological mentality –such as the prospect of human cloning, gene therapy and genetic modifications- do not appear to be an end in themselves but only another means to other 'means' which are not prescribed yet.

Fourth, though this process of objectification of every being makes them loose their ends and become a means in the service of ordering, it is not an entirely human-driven process. Heidegger believes that even though man himself drives technology forward and has a role in ordering of beings (as standing-reserves for future use), man does not have a complete control over the process. This is mostly because man finds himself in an already unconcealed realm, or let me call it a predetermined sociability, which shapes the newcomers in the way it desires. The constitution of 'predetermined sociability', already unconcealed social relationships, goes back to the times scientific revolution had drastic effects on the metaphysical thinking and material life. Recalling Jonas's arguments presented in the second chapter of my thesis, one should distinguish the initial inspiration and the cognitive intentions of revolutionaries such as Copernicus, Galileo and Descartes from the world of later protagonists who have entered into a ready-made world of innovations. This is to say that subsequent generations have witnessed unconsciously an erosion of the revolutionary character of scientific movement, though they have moved forward the scientific inquiry. Then, this new scientific 'orthodoxy' which is devoid of initial inspirations and cognitive intentions has become more of a goal-oriented and utilitarian activity with the articulation of technological revolution in the 19th century. Especially with the burst of innovations due to the industrial revolution and the expansion of capitalist market economy, successive generations found themselves more subjected to the self-propelling motivation of capitalist economy

and technological mentality. This all-encompassing transformation was so powerful and massive that it established itself as if human conduct were beyond human control. This is why I think technological mentality –which drives man to challenge-forth both the nature and man- seems to administer life as if there is a technological agency that has its own consciousness other than that of man, and which operates beyond man's rational authority. Furthermore, this technological agency/mentality driven forward by the 'will to technicity'[55] has the capacity to design and build a future world by manipulating the nature of non-human beings and man himself. At this juncture, genetic engineering appears to have the leading role in the technologically-driven future. Therefore, the long arm of technological mentality not only prepares the conditions of a predetermined present but also drifts us to a predetermined future which is now defenseless against the present manipulations of life. On the one hand, this corresponds to what Jonas calls 'the power of the living over posterity, of present men over future men'. On the other hand, since technological mentality is inclined to set upon man to order what is present as a standing-reserve for future use; our relation with future is characterized by 'enframing' in Heideggerian terms. I think that the field of genetics –with the capability of cloning and storing embryos for transplanting the necessary tissue entirely adoptable to the donor, and some visible and some potential power to control future generations, i.e., by introducing new determinants into human genome- fits very well to a new technological world picture in which the technological mentality now sets upon man to order himself as a standing-reserve as well. Simply, the technological outlook and the reason behind man's becoming a standing-reserve can be best understood by reference to Krell's short introductory passage to 'The Question Concerning Technology': "the technological framework is inherently expansionist and can reveal only by reduction. Its attempt to enclose all beings in a particular claim –utter availability and sheer manipulability- Heidegger calls 'enframing', *Ge-stell*." (Heidegger, 1972b: 285).

Despite these four points of proximity between Jonas's and Heidegger's ethico-philosophical arguments that help us to understand the core of genetic

[55] See also; Kroker, Arthur. "Hyper-Heidegger." In: http://www.ctheory.net/articles.aspx?id=348

technology, genetic engineering and recent genetic advances, in their works two issues remain relatively undeveloped and obscure: the relation between politics and technology, and the relation between medicine and genetics. I believe that merely portraying the contours of technological mentality remains insufficient and somehow misleading without a concomitant attempt to grasp the political conditions that breed technological advances. For this reason, the significant role of technological improvements in sustaining of power relations should also be delineated. In this sense, Jonas' point of view which sees genetic engineering as a politically repressive tool in the hand of state power is quite a naïve one –though it is not completely wrong. Jonas seems to be worried and uneasy about the potential consequences of human engineering, since he believes, genetic engineering has the capacity to contribute to increasing social manageability at the price of individual autonomy. For this reason, he sees genetic engineering as the key factor that might give rise to a passage from 'the dignity of personal selfhood' to 'programmed behavior systems'. Although his concerns sound right in terms of genetic control of future men and increasing social manageability, such developments are not happening at the price of individual autonomy. Rather, as I will argue in the following section mostly devoted to Foucault's works, modern forms of power tend to fortify the idea of individual autonomy and the freedom of individual choice including the right to determine one's own future.

About the second point of insufficiency in Jonas and Heidegger, I want to defend that the relation between medicine and genetics can be better formulated from Foucauldian perspective. Unless genetics is founded on the legitimate ground of medicine, which always welcomes technological advances, there is little chance for its rapid growth and its penetration into health concerns. In other words, genetic science has found a convenient room in medical science, because medicine is always an exceptional field of study in which any technological improvement tend to articulate into the medical practices and treatments as immediately as it consolidates and contributes to the art of healing. Nevertheless, articulation of modern genetics into the medicine has expanded the traditional boundaries of medicine as well. As a consequence, whereas medicine has become more geneticized, the art of healing has

involved genetic technology. Now let me focus on these two topics, as the cases of transformations in medicine and power relations that arise with the articulation of genetics.

4.3. Bio-politics of Geneticized Medicine: A Foucauldian Comment

For a clear comprehension of the interaction between medicine and genetics, and of the geneticization of medicine in general, the 'medical experience' which includes different configurations of disease is to be explained first. Only with an examination of the birth of the clinical medicine, it becomes possible to indicate certain aspects of its changing structure and to assess the novelties of geneticized medicine. Also, I believe that an initial discussion on the archeology of medical perception is also helpful in understanding the role of medicine in the bio-political management of population and in the subjectification of individuals. Therefore, I will start my discussion with considering one of the most famous books Foucault had written in 1963, *The Birth of the Clinic*. After delineating three different spatializations of disease –which have already been outlined by Foucault- which led to the formation of modern medicine in the early nineteenth century, I will develop the thesis that the fourth spatialization of disease begins to occur with the incorporation of genetics into medicine. My proposal to differentiate the 'fourth spatialization of disease' does not only refer to the on-going discussions concerning 'geneticization thesis', but also invites us to think of the bio-political intentions of re-configuring illnesses on the basis of genetics. Therefore, portraying of the fourth spatialization of disease implies that a new regime of bio-power has been taking shape for last few decades. That is to say, the transformations in the medical experience also refer to a reconfiguration of the three elements of bio-power: knowledge, power and subjectivity. I believe drawing the main properties of the fourth spatialization will make the significance of 'bio-power' as an analytic concept more apparent.

4.3.1 Archeology of Medical Experience: Doctor, Patient and Disease

In 'The Birth of the Clinic: An Archeology of Medical Perception', Foucault examines the social practices "which enable human beings to treat themselves as objects in the purest sense" (Dreyfus and Rabinow, 1982: 15).His attention to the 'archeology of medical perception' is in fact an attempt to draw the role of 'space, language and death' in the birth of anatomo-clinical medicine and the reconfiguration of illness, which pioneers the emergence of modern medical practices. To Foucault, only with the incorporation of death (the corpse, on which medical experiments are conducted) into medical thought, a medicine as a science of the individual have become possible (Foucault, 1973: 197). Furthermore, the birth of the clinic[56] required both a systematic distanciation from the language of former medicine and its fantasies, and the constitution of a new qualitatively acute language which grounds itself on 'a world of constant visibility' (Foucault, 1973: x). More precisely, the birth of a 'positive medicine' was only possible with the acquisition of 'positive knowledge'. This inevitably necessitated a 'positive gaze' of the doctor as well. In short, 'positive medicine' or anatomo-clinical medicine has brought three important transformations with it. First, the spatial configuration of doctor-patient relation was reorganized. Second, the language verbalizing the relation between doctor's gaze and ill bodies has changed. Third, "language has turned into a rational discourse" (Foucault, 1973: xi). These transformations at the level of 'spatialization' and 'verbalization' beginning from the last years of the 18th century indicate the birth of modern medicine. Now let me explicate what Foucault argues in 'The Birth of the Clinic' concerning this transformation.

Starting from the 19th century, Foucault sees a qualitative change in doctors' descriptions of the 'visible' and the 'expressible' (1973: xii). Eye as a metaphor, the careful gaze of the doctor, has gained importance since doctor's gaze has a critical role in gathering empirical knowledge. Though at the end of the eighteenth century the power of the eye in the sense of its capability to bring a truth to light was limited, eye became 'the source of clarity' after the nineteenth century (Foucault, 1973: xiii).

[56] As to the translator's note, Foucault means both 'clinical medicine' and 'teaching hospital' by the French word, *la clinique*

More importantly, despite its all passivity, the gaze "dedicates it to the endless task of absorbing experience in its entirety and of mastering it" (Foucault, 1973: xiv). This made possible to organize a rational language of the individual in his 'irreducible quality'. Nonetheless, transformation of individual subject into an object of rational discourse was not indeed carried through the abandonment of old systems and theories, but through a formal organization of medical practices in depth (Foucault, 1973: xiv). Accordingly, the clinical experience and the clinical gaze attained a new culture of the 'perceptible' and 'statable' through realizing the following four aspects of reorganizations: 'a new distribution of the discrete elements of corporal space', 'a reorganization of the elements that make up the pathological phenomenon', 'a definition of the linear series of morbid events', 'a welding of the disease onto organism' (Foucault, 1973: xviii)[57]. As a result of these transformations, it is stated that it became possible to approach the patient, the object of their experience, "with purity of an unprejudiced gaze" (Foucault, 1973:195). Understanding illness was re-evaluated, and the rules and practices for fighting with illness were reorganized. Since the illness became expressible, the truth inside it has emerged into the light of language. What has changed was, in fact, the 'forms of visibility': the invisible in the illness –the abyss beneath illness- has become visible through 'a syntactical organization of disease' (1973: 195). By this way, medical practices and the medical gaze could be verbalized by a rational discourse. In addition to the re-definition of illness, and of the status of the doctor and his role in the network of medical power, the position of the patient was to be reassessed:

> "For clinical experience to become possible as a field, a new definition of status of the patient in society, and the establishment of a certain relationship between public assistance and medical experience, between help and knowledge, became necessary; the patient has to be enveloped in a collective homogeneous space" (Foucault, 1973: 196).

[57] Concurrently, the dialogue between doctor and patient begins to exhibit certain significant changes. The former, relatively unqualified, question of 'What is the matter with you?' was replaced by into 'Where does it hurt?' a question in which the power of the doctor's gaze and the operations of the clinic are clearly recognized (Foucault, 1973: xviii).

On the one hand, for the 'positive knowledge' of the illness and the clinical experience to become possible, a 'positive medical gaze' and a 'rational language of disease' were required. On the other hand, these structural transformations in the medical experience were accompanied by social reorganizations of the patient's status and spatial reorganization of medical care. Therefore, the birth of the clinic – and the anatomo-clinical method in which space, language and death are articulated- constitutes historically a new medicine in terms of its medical methods and its spatialization of the pathological. I believe that the passage from 'classificatory medicine' (the preceding medicine), to the 'anatomo-clinical medicine' tells us much about how modern medicine could establish itself by reconceptualizing three elements in a new discourse: the doctor's gaze, the silent body of the patient and the spatial configuration of disease. Now, I would like to focus particularly on three types of 'spatialization of disease' as demarcated in *The Birth of the Clinic*. I think that an analysis of these three spatializations might provide an opportunity to draw a 'fourth' one, of which properties have certain points of proximity with the 'geneticization thesis'[58] frequently referred in the current Science and Technology Studies and philosophical debates. Now let me explicate three different spaces of disease.

In the primary configuration of disease, it is identified historically and according to the medicine of species by the doctor of the 18th century. The knowledge of disease rests on attentive observation, and the classificatory gaze of the doctor perceives through analogies and resemblances which are believed to determine the essence of diseases. In other words, in the primary spatialization, the difference between diseases can be outlined only through surface divisions. Thus, classificatory gaze "can not see symptoms or episodes" (Foucault, 1973: 6). It only finds formal similarities, yet, when these similarities become dense, diseases are invisible to classificatory gaze: "There is no fundamental difference between an

[58] This thesis suggests that there is now a new tendency which thinks of and explains the most of our experience in terms of genetics. It implies a process in which psychological, behavioral and pathological variations and distinctions between individuals are made on the basis of genetic language. Thus, geneticization thesis, as I will discuss largely in the last section, connotes that we are embedded in a genetics-driven process which has significant impacts on the medicine, culture and society.

apoplexy that suddenly suspends motility, and the chronic, evolutive forms that gradually invade the whole motor system" (Foucault, 1973: 7). Also, in the primary spatialization of disease, doctor believes that an exact knowledge of the disease is needed for the success of the cure. For this reason, in classificatory medicine;

> "[T]he doctor's gaze is directed initially not towards that concrete body, that visible whole, that positive plenitude that faces him –the patient- but towards intervals in nature, lacunae, distances, in which there appear, like negatives, 'the signs that differentiate one disease from another, the true from the false, the legitimate from the bastard, the malign from the benign" (Foucault, 1973:8).

Therefore, Foucault states that classificatory gaze let the disease 'win the struggle and fulfill its true nature' in order to reach the truth about the disease, and that is why; this kind of gaze is *retreating* (Foucault, 1973: 9).

In the secondary spatialization of disease, however, there occurs a qualitative shift in the doctor's gaze. Interestingly, the patient as a negative element during the doctor's attempt of possessing truth of the disease now turns into a positive element. In other words, within the doctor-patient relationship, patient acquires a positive status in the sense that "patient is the rediscovered portrait of the disease, he is the disease itself" (Foucault, 1973: 15). As a result, contrary to the primary spatialization in which 'medicine of species located the disease in an area of homologies' and 'the individual could receive no positive status';

> "[I]n secondary spatialization, on the other hand, it required an acute perception of the individual, freed from collective medical structures, free of any group gaze and of hospital experience itself. Doctor and patient are caught in an ever-greater proximity, bound together, the doctor by an ever-more attentive, more insistent, more penetrating gaze, the patient all the silent, irreplaceable qualities that, in him, betray…the clearly ordered forms of the disease" (Foucault, 1973: 15-16).

The relation between the more attentive gaze and the silent body in the secondary spatialization, however, would be replaced by the tertiary (third in rank) spatialization of illness which operates with the terms of densities and functioning of medical gaze. One of the most distinctive characteristics of this third spatialization is

that "a disease is circumscribed, medically invested, isolated, divided up into closed, privileged regions, or distributed throughout cure centers, arranged in the most favorable way" (Foucault, 1973: 16). Thus, the tertiary spatialization brings into a new set of medical arrangements and forms of social relationships –including 'mechanisms of exclusion', 'forms of assistance' and 'medical reactions to death and poverty' for the protection of the *social*. New medical practices and institutional organizations, in this sense, differ themselves from the primary and secondary spatializations in terms of 'genesis, structure and law'. Combating with the illnesses and maintaining the health of the social now become a task for the nation. At this point, Foucault argues that the medicine of spaces in which a disease is left to itself as to show its true nature disappears, and the anatomo-clinical medicine, and with it a new form of institutional spatialization of disease, emerges (Foucault, 1973: 18). In sum, since the early nineteenth century, according to the normalization theory of Foucault, the theory of medicine has actively molded the social order by polarizing 'health' and 'illness', classifying diseases, and confining disease into isolated regions, such as hospitals and asylums. This is why 'theory of medicine, the social body and human body are closely interconnected' (Ten Have, 2003: 535). In line with this interconnectedness, each medical practice is in fact a form of medical and a discursive power in the Foucauldian sense, which governs both the individual and the social body. Thus, medical discourses and medical practices do not only function at the level of population in order to rationalize and order the social body, but they also function at the individual level as part of the technologies of the self that gradually invert human beings into *subjects* (Mehta and Poudrier, 2004: 19). Consequently, an archeology of medical perception indicates that the tertiary spatialization of disease has always been a national concern and a governmental focus; and more importantly, such an archeology implies that the bipolar technologies of bio-power (anatomo-politics and bio-politics) serve to assess the complete process of clinical experience.

4.3.2. Fourth Spatialization of Disease: Disease along a Genetic Axis

I think the emergence of the fourth spatialization of disease, in which the illness or abnormality begins to be identified in terms of genetics, has its principal

roots in the mid-1970s, because, since the mid-1970s, 'the objectives, problematizations, normative orientation and practices of genetic advice giving' has passed to a new trajectory (Novas and Rose, 2000: 494). Though the identification of genetic risks goes back to the 1950s –the times modern genetics triggered the idea of preventive genetics and positive eugenics supposing that heredity risks should be taken into account in the familial decisions of child bearing; it was the 1970s when genetic risks were widely specified through new techniques of genetic tests and prenatal diagnosis, and the identification of risks were mostly attached to the ideals of 'maximization of life chances' and 'improving the quality of life' (Novas and Rose, 2000: 494). Therefore, the fourth spatialization of disease first comes into practice with the genetic orientation of the subjects to act responsibly with reference to the heredity risks. This is because the aetiological explanations (study of the causes of diseases) reconfigured disease along a genetic axis. In the second half of the 20th century, there appeared two aetiological models: on the one hand, 'gene model', till the 1990s, studied single genes and their effects on the formation of diseases (one gene-one trait model); on the other hand, after 1990s, 'genomic model' analyzed the functions and interactions of all the genes in the genome rather than focusing on single genes (Oliver, 2004). Even though genomics' broader perspective has suggested a more complex picture, genetic reductionism and genetic determinism has changed little. Reconfiguration of diseases along a genetic axis has become the leading medical understanding due to the fact that the causes of many diseases are believed to be found in the genome. In this sense, the fourth spatialization I suggest to add to the Foucauldian account of medicine marks pivotal transformations in terms of configuration of disease: disease is now described and rationalized at the molecular level, and accordingly, new medical gaze concentrates on the causes rather than the consequences of diseases. It is the disease configured at the micro level by the optics of molecular genetics and medically explained by rational genetic discourses that basically characterizes the fourth spatialization.

Many authors discuss these recent and profound transformations in medicine –the growing geneticization of health and illness, or the emergence of a new medicine which deals with the submicroscopic causes of diseases- by employing the

'geneticization thesis' introduced by Abby Lippman into the literature in the 1990s (Lippman, 1991; Lippman, 2000). Although the content of most of these arguments is to a great extent identical with what I mean by 'fourth spatialization of disease', there are also slight divergences which are critical. Now let me outline the general characteristics of what I call 'fourth spatialization of disease', and demarcate the points of divergence between 'fourth spatialization' and the 'geneticization thesis'.

First of all, as mentioned above, the advent of genetic diagnostic tests informing us about the genetic risks paved the way for the rise of the person who is 'genetically at risk'. Inevitably, this knowledge created new ethical responsibilities as well. Locating the pathological on a hereditary basis made the illness no more an individual matter, but a matter of family: a matter of past and future (Novas and Rose, 2000: 487). Thus, genetic forms of thought have charged the man with the ethical responsibility of his offspring as well. Consequently, identification of 'genetic risk' became a dominant factor in life affairs –in genetic consultations and medical care, in the molding of personhood, and for the responsible human action. Novas and Rose argue that the emergence of the person 'genetically at risk'[59] is just one aspect of the entire transformations in the vision of life. Thus, it is now life itself that has been reconceptualized through a new molecular optics:

> "Life is now imagined, investigated, explained, and intervened upon at a molecular level –in terms of the molecular structure of bodily components, the molecular processes of life functions, and the molecular properties of pharmaceutical products…As the body becomes the subject of a molecular gaze, life is recast as a series of processes that can be accounted for and potentially reengineered at the molecular level." (2000: 487).

As life with all its components becomes observable, expressible, and manipulable at the molecular level, human body and disease entirely turn into objects of new medicine. This new geneticized medicine not only strives to eliminate the

[59] To Novas and Rose, "the birth of individual 'genetically at risk' has to be understood as one dimension of a wider mutation in personhood" that they call 'somatic individuality' (2000: 487). This term refers to new and direct relations established between body and self with the rise of recent developments in the life sciences, biomedicine and biotechnology. They argue that these recent developments are "associated with a general 'somaticization' of personhood' in an array of practices and styles of thought, from techniques of bodily modification to the rise of corporealism in social and feminist theory and philosophy" (2000: 491).

causes of diseases "through therapeutic interventions that interrupt the processes leading from a gene to the symptoms" and to develop preventive strategies "to identify the predisposition to develop diseases", but also will make it possible to "design babies –free of defects, healthy, and of preferred sex, color and qualities" (Ten Have, 2003: 534). Thus, the new molecular gaze has nothing to do with the symptoms of disease, and with the question 'Where does it hurt?' It seeks to reveal the genetic causes of illnesses and to detect any risks much before the symptoms come forth. In this sense, molecular gaze is conceptually a broader term than the medical gaze of tertiary spatialization outlined by Foucault, yet this new gaze is at the same time genetically reductionist and determinist in terms of aetiological explanations.

The second characteristic of the fourth spatialization signs the institutional and the market aspects of molecular gaze at the submicroscopic level: the problematization of illness at the molecular level makes the issue of health and human body something reproducible and manipulable, and something can be re-engineered in *laboratories*. For instance, biotechnologies have long promised to alter the human body and to engineer new body materials in laboratories. By means of popular science magazines and the media, we are more accustomed to the mechanistic vocabulary of stem cell technology: 'replacing failing parts', 'neo-organs', 'off-the-shelf organs', 'prefabricated spare parts' which suggest that body is an entirely repairable entity (Ten Have, 2003: 534). Also, the ideal of repairable human body together with the rise of the person genetically at risk constitute a new commercial niche for the market economy, in which healthy individual is theoretically turned into a patient and hence a consumer of new medical products. In this sense, individuals who consider themselves healthy are left in an uncertain state in terms of health since they are told that they might be 'asymptomatically ill'. In other words, transforming healthy persons into persons genetically at risk creates new consumers of the commercial biotech products. In sum, one the one hand, the illness is spatialized at the molecular level and increasingly problematized as a laboratory work; on the other hand, this molecular gaze gives new opportunities to colonize the life in the name of health and to commercialize it for the sake of market

ideology[60]. Then what I call fourth spatialization is in line with the positive aspect of power in Foucauldian sense, because it invests life and enables individuals to act responsibly in the name of health.

The third characteristic of fourth spatialization concerns the status of individuals in a new context of disease reconfigured along a genetic axis. This means to consider both persons genetically at risk (asymptomatically ill) and ill patients. Besides, one should also examine to what degree the processes of identity formation are influenced by the geneticization of medicine. Above all, I do not think that the assertions of 'geneticization thesis' which see patient individuals as passive and isolate bodies reflect the current modes of subjectivity. Rather, patients and persons genetically at risk are inclined to take more active roles in the contemporary medical experience. Therefore, the geneticization of medicine does not lead to isolate and passive forms of selfhood, but to a more 'liberal' medicine in which patient gaze is also prudent and active just like doctor' gaze. I think, an overall comparison of the 'geneticization thesis' with what I propose by 'fourth spatialization of disease' could have been clarified my objections better. Yet, I shall solely explicate the thesis that 'patients are active agents' in the contemporary medical experience which is critical in understanding the new bio-political rationality.

In the early 1990s, Lippman used the term 'geneticization' as a new tendency which makes distinctions between people "on the basis of what one believes are genetic differences to view most disorders, behaviours and physiological variations as determined (wholly or in part) by genes" (Lippman, 2000:33). As a term geneticization was employed to indicate new ways of thinking and doing. More specifically, it meant a particular way of "applying genetic technologies to diagnose, treat and categorize conditions previously identified in other ways" (Lippman, 2000:33). Therefore, geneticization connotes a process in the Western culture that has profound influences on the medicine, culture and society:

[60] Lippman states that "industry is encouraged (even subsidized with public funds) to develop, market, and sell us choices in the form of new drugs, new technologies and new programs" (2000:33). According to Lippman, this is a market-driven approach to health, which not only names the health risks, but also furnishes ways to manage them.

> "The concept of 'geneticization' aims to describe the interlocking and imperceptible mechanisms of interaction between medicine, genetics, society and culture. Western culture is, supposedly, deeply involved in a process of geneticization. This process implies a redefinition of individuals in terms of DNA codes, a new language to describe and interpret human life and behaviour in a genomic vocabulary of codes, blueprints, traits, dispositions, genetic mapping, and a gene-technological approach to disease, health and body" (Ten Have, 2003: 535)

Geneticization thesis suggests that we are increasingly interpreted by a gene-technological approach, through which we are embedded in a vocabulary of genetics and a plethora of genetic and genomic explanations. This is a process which is believed to be more than a redefinition of 'health and disease' with reference to genetics. Geneticization indeed serves to enable whole-scale socio-cultural transformations. For this reason, Lippman criticizes ELSI (Ethical, Legal and Social Issues) projects, which defend the standardization of ethical principles and the maintenance of better medical regulations, of being insufficient and irrelevant, and of promising no more than a managerial approach (Lippman, 2000: 36). Instead, Lippman proposes to develop "new imaginative ways to assess geneticization, fresh metaphors for speaking and writing" (Lippman, 2000: 36). Nonetheless, as a close look at the relevant literature might show 'geneticization' is not a compromised concept in terms of its definition and its scope of analysis. There are social scientists and philosophers who wish to conceive of geneticization in a more productive way (Hedgecoe, 2001), those who wish to employ the term mostly with its philosophical connotations (Ten Have, 2003), and who criticize 'geneticization' argument for its misleading emphasis on the individualizing aspect of genetic identities, and on the passivity of patients (Novas and Rose, 2000). I believe that the criticisms of Novas and Rose against the geneticization thesis have a peculiar strength in discussing the active status of patients and new forms of individuality –which can also be regarded as the last characteristic of what I call 'fourth spatialization of disease'.

Starting from the second half of twentieth century, patients take more active roles in the game of medicine and in the network of medical power relations. This is explicit in incorporating the patients and their voice increasingly into the diagnostic process. Novas and Rose argue that, in contemporary medical genetics which

fabricates persons genetically at risk, patients are to become 'skilled, prudent, and active, an ally of the doctor, a proto-professional" (2000: 489). Moreover, both the ill patients and 'asymptomatically ill' patients together with their families are now more enthusiastic in demanding "control over the practices linked to their own health" and to seek "multiple forms of expert and non-expert advice in devicing their life strategies" (Novas and Rose, 2000:489). In this sense, the assumption of geneticization thesis that new genetic identities are formed with 'the reduction of the human subject to a mere expression of their genetic complement' is redundant and misleading, according to Novas and Rose (2000, 489-490). The geneticization theses that geneticization is an individualizing tactic due to the genetic approach which blurs the communal aspects of genetic problems, and that geneticization "represents a threat to doctrines such as equal opportunities, as well as to ideas of free will, intentionality and responsibility" are criticized by Novas and Rose (2000:489). Novas and Rose suggest that the new medical genetics does not isolate individuals or represent a threat to these doctrines, but rather current medical practices strengthen the ideals of autonomy, individuality and responsibility, and the familial and communal bonds through locating individuals in a matrix of networks (2000:490). For instance, the genetic illness is not only an individual matter, but a matter of 'family' as well, i.e. the genetic mapping of previous generations for the detection of heredity causes of an illness together with the identification of heredity risks are important for both the patient and the relatives. Therefore, Novas and Rose argue that genetic identity is not individualized; rather, it is revealed and established 'within a web of genetic connectedness' (2000: 490). Simply, the new forms of individuality are in fact intertwined with the novel networks of interaction. On the one hand, persons genetically at risk engage themselves with the genetic knowledge as "interested and avid consumers, aware of the range of knowledge products on the market, and demanding that their chance is constantly expanded" (Novas and Rose, 2000: 506). Hence, patient individuals do not have a passive role in the development of new treatments; they rather actively work for the development of bio-medicine. On the other hand, the subject genetically at risk is surrounded by an ethical responsibility of his or her family, potential and actual spouses, children and

grandchildren in terms of risk and inheritance (Novas and Rose 2000, 490). On the basis of these arguments, they claim:

> "Rather than seeing these practices of genetic objectification in isolation, we suggest that they interact with, and become allied to, contemporary norms of selfhood that stress autonomy, self-actualization, prudence, responsibility and choice" (Novas and Rose, 2000: 502)

I believe that their arguments on the active role of the persons genetically at risk in the development of bio-medicine and medical treatments, and their analysis of the emergence of new forms of subjectivity along with a novel matrix of networks are very persuasive and are in line with what I suggest by the 'fourth spatialization of disease'. In addition to this, thanks to power of their arguments, the relevance of bio-power to contemporary debates on genetic advances is once again certified. Now let me focus on this aspect.

Recall that the management of collective life and health became a key objective of the nation states across the 20th century, and the social body and the individual body were turned to be the targets of a new form of power which claim the right to 'life'. The new political struggle was over the life, over one's body and over the satisfaction of one's needs and desires (Rabinow and Rose, 2003: 2). The repressive tools of political authorities, even though they were not totally removed, left the ground to more legitimate and desirable political technologies. The older political project of sustaining the subjection of individuals to the state authority was replaced by the constitution of bipolar technologies of bio-power (anatomo-politics and bio-politics) for the protection of the social and individual body on the basis of health. Employing Deleuzian terms, Rabinow and Rose define these two poles of bio-power as 'molar' and 'molecular'. Molar pole implies "the emphases and relations on ways of thinking and acting at the level of population groups and collectivities"; whereas, molecular pole is "the individualization of bio-political strategies" (Rabinow and Rose, 2003: 10). Bio-power is simply a new configuration of 'knowledge' and 'truth', 'power', and 'subjectivity' on the basis of life and health. In more concrete terms, Rabinow and Rose suggest that:

> "[T]he concept of bio-power seeks to individuate strategies and configurations that combine a form of truth discourse about living being; an array of authorities considered competent to speak that truth; strategies for intervention upon collective existence in the name of life and health; and modes of subjectification in which individuals can be brought to work on themselves, under certain forms of authority, in relation to truth discourses, by means of practices of the self, in the name of individual or collective life or health." (2003: 9)

To illustrate the case of reproduction, Rabinow and Rose argue (2003:14-19) that sexuality, once a great technology of selfhood, is now disengaged to a degree from the practices of reproduction. Reproduction is instead objectified through a series of forms of 'knowledge', 'technologies' and 'political strategies'[61]. As I have also argued in the third chapter, and as they also state, reproduction has become problematized as an object of medicine since infertility has been identified as a remediable medical practice. The problematization of infertility through medical discourses as a legitimate site of intervention has brought new technologies such as IVF (*in vitro* fertilization), artificial insemination, cloning and etc. I completely agree with the suggestion that reproduction has been conceptualized as a problem space, "in which an array of connections appear between the individual and the collective, the technological and the political, the legal and the ethical", and hence it is a *bio-political space* par excellence (Rabinow and Rose, 2003: 15).

Just like reproduction, the genomics medicine exemplifies a bio-political space in which a series of individual and collective problems operate on the basis of the division between the normal and the pathological (2003:15). Many academic studies have shown that molar and molecular poles of bio-power extend;

> "[F]rom the management of collective health by means of pure water, to annual health check-ups and insurance, through the preventive medicine that operates in large domains between collectivities and individuals, to the field

[61] Rabinow and Rose see triple movements concerning the reproduction starting from the 1970s: "the question of reproduction gets problematized, both nationally and supra-nationally, because of its economic, ecological and political consequences –over population, limits to growth etc. A new politics of abortion emerges, taking different forms in different national contexts. And, in the West at least, a related by different issue of 'reproductive choice' begins to take shape, when a small number of couples in the West, and some doctors, strove to define infertility as a potentially remediable medical condition and consequently the site of legitimate interventions." (2003: 14-15).

> of clinical interventions onto the body of the sick person in the name of health" (Rabinow and Rose, 2003: 19).

Medical action upon the collective health, throughout these years, has increased the quality of life and longevity of individual lives. Bipolar technologies of bio-power have reorganized the regime of health which has profound effects on the individual and collective life all together. Accordingly, with the advent of a new medicine, genomics medicine, there arises the question whether a new regime of bio-power will take shape (Rabinow and Rose, 2003: 19). To certain extent, with the opening of fourth space, we witness decisive changes in the medical experience. Yet, it is too early to reach the conclusion that bio-power will "pass a qualitative new configuration of knowledge, power and subjectivity" (Rabinow and Rose, 2003: 20). However, it would not be an exaggeration to say that we are at the edge of a historical turning point that human kind has never seen before. This is because the genomic research seeks to identify the central processes in the causation of illnesses in order to intervene for therapeutic reasons. We do not know yet whether or not the identification of the pathological will be realized in the purpose of intervention, but we know that the absolute knowledge of the pathological means an absolute power over life. For the time being, when we notice the investments of national governments, of pharmaceutical and biotech companies, and of patients groups in the field of genomics, it is obvious that "a modified bio-political rationality in relation to health is taking shape, in which knowledge, power and subjectivity are entering into new configurations, some visible, some potential" (Rabinow and Rose, 2003: 209).

CHAPTER 5
CONCLUSION

The possibility of controlling and manipulating the corporeal world was made more apparent by the pioneers of scientific revolution, and increasingly actualized through modern scientific progress brought by consecutive technological innovations. At the beginning of new century we are now witnessing a different phase of scientific and technological revolution which is in continuum with the original project of controlling and manipulating. This is the phase of molecular biology characterized by a new set of technical tools, on which genetics grounds its principles. Yet this phase also contains the seeds of radical alterations. We experience that human body and human life are now manipulable objects under the molecular optics of genetics almost in a mechanistic way similar to modern physics. Despite the technological powers it might hold over living organisms through engineering their natural occurrences, genetics lacks the exactness that modern physics and traditional engineering have. As I have argued, neither 'gene model' nor 'genomic model' in the 1990s provides exact explanations for the causes of genetic diseases within the rationalized language of genetics, nor does genetic engineering has a complete control over its object, human body. Yet, the lack of exactness does not constitute a barrier for the establishment of genetic field. Rather, life sciences in general, genetics in specific, have overcome the issue of exactitude by installing a highly ambiguous concept of 'risk'. By this, genetics as a scientific endeavor implies that inexactness–the inaccuracy in genetic knowledge and the possible errors in its applications- in terms of diagnosis does not cause a scientific 'weakness', or 'impotence'. On the contrary, only by setting up the terms 'risk' and 'possibility' in life sciences, human life becomes a readable and interpretable reality under the lenses of genetics. All the genetic risks and possibilities in human life brought to light by molecular gaze are rationalized and classified so that they can be treated in the same way the dead-matter has been treated. This novelty has another aspect: biotech companies have realized that engineering human body (i.e. through stem cell technology and gene therapy) is as profitable as engineering dead-matter. Thus,

market-oriented approach has recognized the importance of the knowledge of genetic risks and the establishment of genetic technology, and invested huge amounts of money into gene technology for its capacity to open a new market of advanced diagnostic tests and genetic treatments for high prices.

On the one hand, genetics has collected the knowledge of molecular risks that might occur anytime in one's life or in his/her successive generations, and established novel therapeutic devices to avoid from these genetic 'fallacies'. Since these risks are verbalized and rationalized within the discourse of genetics, the knowledge concerning the risks turn into a political source of the management of life in the name of health. Accordingly, the techniques for measuring genetic risks, such as prenatal screening tests have gained the status of the most significant tool of bio-politics. These high-tech tests have included genetic monitoring, genetic testing, and foetal diagnosis in maternity care and such advances in biomedicine have presented novel rationales for control. In other words, in liberal Western political culture, new techniques of biomedicine seem to imply a 'post-disciplinary' mode of power (Helén, 2004). There are no longer severely corrective and punitive state interventions, but an invisible administration of life (bio-power) through genetic monitoring of risks, genetic counseling, and dispersed disciplining discourses in the name of health. I believe that this might imply a new bio-political rationality, a new regime of bio-power, which moulds the living conditions and the reproductive processes by managing the uncertainties inherent in them. This is why the concept of risk becomes fundamental to the rationale of control. The essential novelty in this administrative technology is that all the invisible uncertainties now become conceivable as risks, and potentialities. The uncertainties in our body and in our lives turn into interpretable data; the control over our bodies and lives expands gradually (Helén, 2004). In this sense, the surveillance over life has gained a much wider scope and a more complex structure with the advent of new genetics after the 1950s. Contemporary surveillance has passed beyond monitoring techniques of the early years of child development in the 20th century, which focused on 'wide provision of antenatal care', 'birth notification', 'baby clinics', 'infant welfare clinics', 'health visiting' and 'nursery schools' (Armstrong, 2002: 113). In fact, the political

technologies of today redesign their monitoring techniques for the surveillance of 'coming-to-be'. What I mean is that technological advances especially in molecular genetics has attributed an inter-generational dimension, in addition to its intra-generational logic, to the practices of normalization outlined by Foucault and enframing conceptualized by Heidegger. This is because molecular genetics has not only identified the persons genetically at risk, but expect them to act responsibly for the successive generations as well as for his or her family and relatives.

On the other hand, besides the management of genetic risks, I have argued that reproductive genetics has established new possibilities for the treatment of infertility. As a matter of fact, only when infertility is seen as medically problematized –and hence as something remediable-, it becomes possible to intervene into the reproductive process through artificial insemination and *in vitro* fertilization. Indeed, it is the problematization of infertility in this way which made the prospect of human cloning more indispensable as a medical investment, and presented genetic engineering as more desirable for its capacity to modify human's bodily existence and to design the realm of coming-to-be. This technologically driven forward-thrust also implies a predetermined sociability in which the social relations of production and consumption are ordered to provide the perpetuation of technological development. Such a self-propelling technological mentality is now more equipped to enframe coming-to-be by employing genetic technologies, and to normalize individuals at the molecular level by administrating the genetic language of possibilities and risks.

The key point is perhaps to understand the geneticization process by which medical practices and discourses have been altered. This process, as I have argued, seems to result in the 'fourth spatialization of disease' which has introduced new ways of genetic thinking and doing into the already existing medical experience. I call this articulation 'fourth spatialization of disease' which is intentionally employed to emphasize the role of genomics medicine, geneticized medicine, in the reconfiguration of 'knowledge', 'power' and 'subjectivity'. I have tried to explicate these reorganizations of medical experience by focusing on three agents: doctor, patient and disease. The transformations that occur show us that the alliance of

power and knowledge (power-knowledge) is productive and creative in the sense that new political technologies continuously seek to prevent the resistance and the unwillingness of many to participate in these newly established procedures. The aim of preventing resistance appears to be accomplished by the withdrawal of visible power and the transfer of responsibility for surveillance over patients to the patients themselves (Armstrong, 2002). In more specific, flexibility of new form of power and its positive property to produce effects at the level of desire and at the level of knowledge have paved the way for new forms of subjectivity. In fourth spatialization of disease, in opposition to the geneticization thesis of Lippman, I have argued that new forms of selfhood are not subject to individualizing and isolating genetic discourses. Rather, ill patients and asymptomatically ill patients (persons genetically at risk) are enrolled into a new matrix of relations, a new type of interconnectedness, in which patients are actively taking roles in the process of their treatment and even investing money for the establishment of more convenient medical treatments. Thus, the geneticized medicine gives rise to a new perception of interconnection rather than individualizing goals.

In these circumstances, and in the light of critical arguments, I have argued that power withdraws itself gradually from its apparently active involvement and disciplining, becoming more invisible and yet being more forceful in the administration of life. The target of bio-politics is not only the existing populations of a country now, but also the would-be new-comers of genetic combinations. That is to say, instead of employing repressive disciplinary apparatus, power comes to diffuse itself in the relations of knowledge for the surveillance and disciplining of bodies. Therefore, the genetic knowledge, which determines the criteria of truth constituting the genetic discourses in the name of health, can be considered as a new political technology with its role in disciplining the individual and social body through normalization. This is to say that "disciplines are no longer the prerogative of certain institutions…Disciplines become ubiquitous and liberated…they are placed at the service of the good, the good for all, of all socially useful production" (Ewald, 1992: 169-170). For this reason, the control and manipulation of life by means of genetics is rather represented as to be convenient with the premises of

liberalism with the points of meeting such as self-actualization and individual autonomy. Therefore, to conclude, I believe that neither any conservative enmity towards technological advances nor any moral antagonism depending on the belief that geneticization ruins the idea of autonomy provide a necessary set of explanatory approaches. Instead, for an analysis of the politics of genetics, the concept of bio-power and its set of analytical tools allow for a more critical assessment, albeit the fact that even this concept might remain somehow inadequate for grasping the ethical and political problems we will face in the future.

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