Liaison Committee NGO-UNESCO

Joint programme Commission "Science and Ethics"

Cloning,
Gene Therapy,
Human behaviour,
Eugenics...

Six lectures

Booklet published on the occasion of the
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December 10, 2005

To NGO Representatives,

Madam, Sir,

On the occasion of the International Conference of NGOs, the Joint Programmatic Commission Science and Ethics (JPC-SE) is pleased to offer you the text of six conferences that were given during our plenary sessions between 2003 and 2005. The sub-committee on Bioethics organized them in order to provide us with further information on some of the controversial subjects included in UNESCO's bioethical reflexion.

The International Bioethics Committee (IBC) which plays a leading role in elaborating international legal instruments for bioethics wishes to encourage public awareness and debate on these questions. The themes of the conferences – eugenics, cloning, gene therapy, genetics and human behaviour,- were chosen with this in mind. We realize that the topics are complex, but we realize the need to grasp the available scientific data before defining our own position. We are extremely grateful to the specialists who took time to explain their work to us. We also wish to thank the Liaison Committee for its support of our plan to circulate the conferences to all the NGOs.

Three important Declarations on bioethics have been adopted by UNESCO in recent years : in 1997 the *Universal Declaration on the Human Genome and Human Rights*, in 2003 the *International Declaration on Human Genetic Data*, and this year the *Universal Declaration on Bioethics and Human Rights*. The latest Declaration contains an article inviting NGOs to participate in its circulation among the public (see : www.unesco.org/bioethics). Your participation can also include informing UNESCO directly or via the JPC-SE of any remarks and criticisms you may have concerning the implementation of the principles in countries where you are present.

Yours truly,

André Jaeglé, President of the Joint Programmatic Commission Science and Ethics

Gwen Terrenoire, leader of the Sub-committee on bioethics

Eugenics in Western countries (excepting France) before 1945

by **Rita THALMANN**[1]

January 29, 2003

Preliminary remarks

- The term *race* is still used today even though it does not have the slightest scientific justification. Keeping this in mind, the word is always to be taken here as if it were surrounded by quotation marks.
- In view of the scope of our topic the main emphasis will be put on negative eugenics insofar as it represented a quantitative and qualitative break from respect for persons that was the source of the Nazi criminal physicians' trial and the Nuremberg Code of Ethics in 1947.

Origin of Eugenics and Social Darwinism in the XIXth century

In his *Origin of Species* (1859) Charles DARWIN (1809-1882) coined a new expression, *natural selection*. For him, Nature – which he compared to a breeder – tends to preserve hereditary variations that prove advantageous in the inevitable struggle for life by allowing the individuals possessing them to survive and have more offspring than their rivals. In his view this mechanism of the natural selection of favorable variations explains to a great extent what will be called later – particularly by Herbert SPENCER (1820-1903) the *evolution of the species*. Spencer also coined the expression *survival of the fittest*, often wrongly attributed to Darwin. In this notion of natural selection the survival of individuals can generally only have an effect on the evolution of the species if it enables them to have a greater number of descendants than their rivals. But in his book DARWIN did not really insist on this aspect of his theory.

Now, for both Francis GALTON (1822-1911), a philosopher and DARWIN's cousin, who invented the term *eugenics* in 1883, and his disciple and biographer Karl PEARSON (1857-1936), a specialist in mathematics and statistics applied to biology, natural selection is progressively failing to accomplish its presumed purpose of improving the *race*, particularly in the most *civilized* human societies, since various *social* selections tend to take the place of natural selection or at least attenuate its effects. According to these thinkers it is useless to hope for a *free struggle for life* and it thus becomes necessary to undertake a kind of genetic interventionism justified by *eugenics* – this term meaning literally *good birth*. In other words man has to take over the role of breeder from Nature. The *Origin of Species* – referred to by GALTON and PEARSON – in fact represents a real break in the evolution of socio-political doctrines. By recognizing the essential role of the hereditary factor, the interests of individuals are no longer sufficient : it becomes necessary to take future generations into consideration thus transforming the notion of responsibility into a mission of improving the human species by acting on genetic inheritance.

Even though DARWIN proved bolder in his second book *The Descent of Man and Selection in Relation to Sex* (1871), he still partially accepted the Lamarckian principle of the heredity of acquired characteristics. Galton had already questioned this principle in 1865. The same is true for August WEISMANN (1834-1914), who twenty years later was one of the founders of modern genetics. According to GALTON, author in particular of *Hereditary Genius* (1869) and a synthetic article on *Eugenics : its Definition, Scope and Aims* (1904), race improvement meant educating the population to understand the long term significance of eugenics. This assumed the reproduction of its fittest members rather than those less favorably endowed. It would be criminal to let things follow their course insofar as Galton did not believe that eduation could instil aptitudes if people did not already have in their genetic inheritance. In his 1904 article he even advanced the argument that by implementing eugenics the nation would be in a better position to accomplish the vast ambitions associated with the British Empire. This theory was further developed by PEARSON, author of the first synthesis of German socialism, eugenics and nationalism.

When PEARSON argued in favour of socio-economic reforms to improve the conditions of the working class, thereby strengthening social cohesion to defend common economic, military and colonial interests, he felt that a broad eugenics programme should be included so as to prepare for future conflicts. Theories like these were widespread at the turn of the century in Western countries facing the crisis of modernity. At their core were the concept of race that was stimulated by

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developments in anthropology, an exagerated interpretation of linguistic categories and the rediscovery in 1900 of the laws of heredity that had actually first been discovered in 1866 by an Austrian monk and botanist Johannes Gregor MENDEL in 1866. For many years his work remained unknown. The result of this rediscovery was the establishment of a hierarchy of human groups that was justified by certain scientists but disputed by others, like Charles de BROCA in France or John Scott. HALDANE in England. For eugenicists a distinction should be made between positive and negative eugenics with positive eugenics aiming to improve human stock, most notably by a premarital examination and birth control, industrial hygiene and a selective natalist policy in certain cases.

The Eugenics Movement and its Development in the World

This begins in the first half of the XXth century. According to a book published in Brussels in 1929 by the International Association for the Protection of Children, there were already at that date 31 member countries, of whom 19 were in Europe, 5 in Asia, 1 in South Africa and 1 in Oceania (New Zealand).

In Great Britain : following the creation in 1885 of Karl PEARSON's Laboratory of Biometry, came the journal *Biometrika*, Galton's Eugenics Record Office in 1904, and in the years between 1907-1908 the Eugenics Education Society.

In the United States : The American Breeders Association, founded in 1903, also decided to promote the laws of heredity. Ten years later it became the American Association for Genetics and published reports and the *Journal of Heredity*. From the very beginning this association created subcommittees to study debility, madness, the heredity of mental traits, epilepsy and criminality. Along the same lines the Carnegie Institute of Washington created a Station for Experimental Evolution under the direction of Charles DAVENPORT. In 1910 this Station merged with the Eugenics Record Office of Thomas MORGAN and Irving FISHER (not to be confused with the German Eugen FISCHER) and became the Department of Genetics, with its own journals on the science of heredity.

On the international level : The Federation of Eugenic Organizations was created in 1912, the year after Galton's death, under the presidency of Major Leonard Darwin, one of Charles Darwin's ten children. The second International Eugenics Congress took place in New York in 1922, and the third in the same city in 1932. In the field of positive eugenics the member countries' action led to natalist policies based on the development of social and family law and demographic data. Research by Thomas Morgan and his group from 1910 on suggested possible convergences between genetics and human procreation stemming from new techniques of artificial fertilization.

Negative eugenics first inspired selective immigration legislation, as in the American Immigration Restriction Act of 1924, drawing heavily on research carried out by Dr. Laughlin's Commission and published between 1920 and 1930. The Commission recommended that only immigrants with mental capacities superior to those of the average American be admitted into the country. The measurement of these capacities through psychological testing led to the determination of quotas for immigrants. In addition, Margaret Sanger founded the American League for Birth Control in 1921.

Another object of legislation was the **euthanasia of incurably ill persons**. This had been adopted by the Parliament of Saxony in 1903, and by Ohio and Iowa in 1906, but was rejected elsewhere in Europe during the 1930s – with the exception of the IIIrd German Reich. Nonethess it inspired the creation of the Euthanasian Society of America which fueled debate in the United States during the Second World War.

At the same time, the United States once again took the lead in initiating **sterilization laws** as early as 1907. By the end of the Second World War some thirty American states had enacted laws on sterilization. In theory these laws made a distinction between voluntary and involuntary sterilization. The groups concerned were usually the mentally retarded, epileptics, sexual perverts and criminals of various sorts. Some states added persons suffering from syphilis and the hereditary forms of certain diseases. Castration was only allowed in Kansas and Utah. In 1927, the Supreme Court of the United States confirmed the constitutionality of the act of sterilization. 50 000 sterilizations took place between 1907 and 1948 in California alone. Sterilization was also introduced in 1929 in the Canadian province of Alberta, and the same year, in Denmark and the Swiss canton Vaud. But the German legislation in July 1933 led other Scandinavian countries and Estonia to adopt similar legal provisions. The Socialist government of Norway had published a eugenic racial programme in 1915. 60 000 persons were to be sterilized in Sweden between 1935 and 1976.

Nazi Germany

It is certain that between 1933 and 1945 Hitler's Germany experienced the most radical application of eugenics by all the judicial, medical, social and political institutions in the name of race regeneration, but the theoretical foundations had already been laid towards the end of the XIXth century by German scientists (anthropologists, geneticians, physicians, demographers and jurists). Leaving aside ideologists like Houston Stewart Chamberlain and the Bayreuth Circle, these scientists had already made the distinction between individuals of superior and inferior value. In this latter category they placed Blacks, Tziganes and antisocial persons. Psychiatrists added schizophrenics whose numbers had to be reduced or stopped by legislative measures to prevent the loss of superior family lines.

As early as 1895 the psychiatrist Adolphe JOST had published *The Right to One's Own Death*, a plea for euthanasia, and the biologist Alfred PLOETZ (1860-1940) *The Quality of Our Race and the Protection of the Weak* which set forth the main theses of racial hygiene he had already developed from 1904 on in his journal *Archives for Race and Social Biology*. The following year Ploetz founded the German eugenics organization which, unlike the others, was already called the Society for Race Hygiene. It must be admitted though that within the Society a fundamental divergence existed with Christian eugenicists like Father MUCKERMANN or Social-Democrats such as Alfred GROTJAHN, for whom science is one with universality and who considered that sterilization should be accepted voluntarily and all negative eugenic measures should remain individual. On the other hand ethno-racist (völkisch) scientists considered that these measures should be coercive and apply to whole human groups. In this line of thinking can be found people who gravitated around PLOETZ. The first was his brother-in-law Ernst RÜDIN (1874-1952), professor of psychiatry and director of the Service of Psychiatric Research on Heredity in Munich, which centre was integrated in 1924 into the renowned Kaiser Wilhelm Fondation. Other members of this circle were the anthropologist Eugen FISCHER (1874-1967), author of a dissertation on the *Bastards of Rehovot* (South Africa) in which he denounced race mixing as the cause of degeneration, and Fritz LENZ (1887-1976) a specialist in heredity. Lenz, once Fischer's student, founded a section of race hygiene at the University of Fribourg-en-Bresgau with him. In 1923, at the age of 36, he became the first holder of the Chair for race hygiene at Munich, the only one created during the Republic. Together with Fischer and Ervin BAUR, a specialist in plant genetics, LENZ published The *Fundamental Principles of the Science of Human Heredity and Racial Hygiene* in 1921. This book was reedited regularly up to 1945 and was used as a reference book by Hitler who had first read it during his detention after the failure of his putsch at Munich.

Law was another of the disciplines concerned with eugenics. In 1922 the book *The Release of the Destruction of (i.e.*Permission to destroy*) Life Devoid of Value* (Leben unwertes Leben), by a jurist Carl BINDING and a psychiatrist Alfred HOCHE was published in Leipzig, seat of the Supreme Court of the Reich (the Weimar Republic conserved the name of Reich in the 1919 Constitution). Despite some protest this idea gained ground in scientific circles of the time. In addition, the establishment of the Chair for Race Hygiene in Munich in 1923 was followed by other creations : in 1927 the Kaiser Wilhelm Foundation created the Institute of Anthropology, the Science of Heredity and Eugenics in Berlin with Eugen Fischer, Erwin Baur and Father Muckermann at its head. Despite their divergences, all three were members of the Society for Race Hygiene. It is to be noted that before 1933 this Society never had more than 1300 members. But owing to its organization as a network among scientists and the broad circulation of its research results, it influenced a greater number of people in academic, economic (notably thanks to the Krupp Foundation) and political circles.

From Eugenics to Race Hygiene during the Third Reich

The Third Reich used this influence to obtain scientific support for its biopolitics in three spheres :

- within the Reich, for expertise in the science of heredity, eugenics and race hygiene ;
- outside of the Reich, for legitimacy in international scientific congresses, journals and conferences. This international sphere later included annexed or occupied countries. This explains why Fischer came to Paris in 1942 for a conference on *The problem of race and race legislation in Germany*.
- once the war began, researchers, including the most illustrious ones, were associated with the practical implementation of race and eugenic policy within the Reich and in occupied or annexed countries, notably within the framework of the S.S. Race and Settlement Office (RuSHA).

It is evident that the purge of universities and scientific institutions, based on the law of April 7,1933, called *Law for restoring the professional civil service*, and a policy of quotas for admission to educational establishments had already excluded Jews and other persons considered politically unreliable. Scientists kept in office were treated following the degree of their loyalty to the new regime and their commitment to ethno-racial eugenics. This is why P. Muckermann lost his position at the Kaiser Wilhelm Foundation's Institute. Fischer, because he was a Catholic, was replaced as head of the Society for Race Hygiene by Rüdin who worked actively with Ploetz in the Nordic mouvement. However, after being watched over at first, Fisher was kept on as head of the Berlin Institute because of his international reputation, until he retired in 1942 ; he was even named Rector of the University of Berlin. In 1935 Otmar von VERSCHUER (1896-1969), Fischer's assistant at the Institute and a member of the Protestant church, became director of the Institute for Biology of Heredity and Race Hygiene at the University of Francfort, after giving proof of his loyalty in 1934 with a book *Hereditary Pathology* in line with the thesis of the racial specificity of the community of the people. Verschuer later took over from Fischer at the Institute of Berlin in 1942 where he was joined by Fritz Lenz.

As early as 1933 Plötz, Rüdin and Lenz participated in the Ministry of the Interior's Commission charged with elaborating legislation on compulsory sterilization, along with Himmler, a former zoology technician in charge of the S.S. and Walter Darré, agronomist and theorist of race regeneration through the peasantry, who in 1931 had become head of the Race and Settlement Office of the Nazi party. This legislation came into effect in July 1933. It was initially directed at persons affected by congenital diseases and others who were alcoholics or antisocial. What makes this legislation different from the American laws is the creation of special courts for hereditary health (composed of a judge as President, and two expert physicians as assessors ; appeals were possible before a Court but once its decision was made, it became final). According to estimates made by German historians, some 350 000 to 400 000 men and women were subjected to sterilization by force during the Third Reich.

After Munich and Berlin, other Institutes for Biology of Heredity, Race Hygiene and Eugenics were created in all the universities of the Reich, including those in annexed territories such as Austria (annexed in 1938), the city of Poznan and Alsace (annexed de facto in 1940) (University of Strasbourg). One of the first scientists to join the Nazi party was Konrad LORENZ (1903-1989) who participated in the Bureau for Race Policy. As late as 1943 Lorenz was still writing :

"Since there is no breeder to planify human beings, it is the blind results of domestication that come into effect, and these necessarily lead to the consequence that a cultured people will rush to its ruin after attaining the stage of civilization, if a scientifically based and deliberate racial policy does not prevent things from developing in this direction" [2]

Did the jury that awarded Lorenz a Nobel prize in medicine not know about his publications between 1940 and 1944 ?

However, despite support from a majority of researchers who had neither emigrated nor been expelled, scientists were unable to produce a scientific definition of a Jewish race. Hence their recourse only to jurists for the Nuremberg racial legislation (September 1935), as well as for the law On Blood and German honour which, despite the fact that their definition was extended during the war to apply to persons with non-German blood was initially only concerned with the prohibition of marriage and sexual relations between citizens with German blood and Jews, the latter defined by their adherence to the Jewish community even if they were converted to Christianity, or the adherence of at least three grandparents to the Jewish faith.

Special status was planned for first degree half-breeds (two Jewish grandparents deemed incapable of being assimilated) and second degree half-breeds (with only one Jewish grandparent) who, after examination, were found capable of being integrated through marriage with an Ayrian partner. Mixed marriages were called privileged when the husband, but not the wife, was of German blood.

Tziganes were subjected to police repression between 1933 and 1939 as antisocial (house arrest, family groupings in camps, removal to the Reich's concentration camps). In 1936, a Special Research Service was created with them in mind within the framework of the Health Service, itself a part of the Ministry of the Interior, and was entrusted to the neurologist Robert RITTER. Ritter had already written books on vagabonds and half-breed Tziganes. With a group of specialized researchers he proceeded to make an inventory of Tziganes, that involved a classification system with seven categories running from those deemed of a pure race and thus intended to be preserved,

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[2] Lorenz underlined the passage in bold type : « Psychologie und Stammesgeschichte » in Gerhard HEBERER (ed.) Die Evolution des Organismen, Iena, 1943, p. 125.

such as the Sintis, to different varieties of half-breeds – including Roms- and those graded as non-tziganes (zn) of German blood . Given the absence of a legal framework and disagreements between the Health Service experts and the Central Security Bureau, they were treated differently once the war began in accordance with contradictory instructions. Some were sent to ghettos in the East where they perished or were massacred, others were sterilized, others were sent to work camps, some of them were even incorporated into the army up to 1942-43, while others were gassed with their families. According to recent estimates, the number of victims within the Reich but especially in occupied or annexed territories in Eastern Europe is somewhere between 90 000 and 250 000.

The prospect of war gave Hitler reasons to plan to suppress lives not worth living in order to make the budget and specialized institutions available for the army. An order signed on September 1, 1939, planned to extend the medical corps' prerogatives to include giving mercy death (Gnadetod) to patients considered incurable. The man in charge of this scheme, Dr Karl BRANDT, Hitler's personal physician, set up a commission of experts under the presidency of Dr Herbert LINDEN, a psychiatrist responsible for health institutions within the Ministry of the Interior. This commission was composed of five professors of neurology, a psychiatrist, an anthropologist, a pediatrician and two hospital directors. This organization was placed under the responsibility of the Head of the Reich Chancellery and took the code name T4, sonamed after the address of its Berlin headquarters (Tiergartenstrasse 4). It comprised an administrative service, a medical work community (RAG) and a transport service (GEKRAT). Six institutes for giving death were established between the end of 1939 and January 1941, one of which was at Hartheim in annexed Austria. They were all run by physicians with nursing and technical personnel. After making an inventory of the institutions and sending forms to be filled out by the directors for all patients over five years of age – those younger would pass through hospitals and pediatric clinics – the selection was the responsibility of the medical experts who, after stamping the forms of the patients concerned, sent them on to the transport service that looked after taking the people to one of the six centres. At this early stage, notification of death – brought about by injecting scopolamine morphine and more generally by gassing - and the ashes were sent following cremation to the families who wished to recuperate them, with an indication of the disease involved chosen from a list established beforehand. Hitler, when confronted with protests from the Churches and the population over the rise of the mortality rate among family members, was led to officially stop the operation on August 24, 1941. In less than one year, according to estimates, it had led to some 70 000 men, women and children being killed.

The establishments set up for this purpose, the experience acquired and the personnel trained would be used for selecting and gassing prisoners in the Reich's concentation camps. Details of the operation carried out under the code name 14f 13 are now known thanks to letters written by participating physicians to their families. It was continued on a larger scale between the fall of 1941 and 1944 in extermination sites and concentration camps. In particular for the final solution of the Jewish question which caused the death, from a variety of causes, of some 5,2 million Jewish men, women and children in Europe, that is more than 10% of the 50 million victims of the Second World War and more than a third of the Jewish population in the world. It must be emphasized that the selection operations in the camps and the supervision of the killings were the responsibility, as with T4 and 14f 13, of physicians. After being purified between 1933 and 1935, the medical corps with half of its members members of the Nazi party or the S.S., was the professional body with the highest proportion of members won over to the politics of the regime. Each physician could nonetheless refuse to participate in the operations of selection, killing and sending to a camp. The only risk, once the war began, was that of being transferred to the army's health service or sent to the front.

For some physicians and scientists participation in the race hygiene policy held out the prospect of social promotion and also the chance to test their hypotheses on human guinea pigs. The experiments on concentration prisoners were also carried out on these grounds. According to the testimony of survivors, the correspondence of participating physicians and the 600 dossiers presented at the Nuremberg trial of the criminal physicians, the number of victims of these experiments carried out by the medical institutes of the army, the chemical and pharmaceutical industries is estimated at several thousands :

- tests involving immersion in icy water to measure resistance to extreme cold, and others at high altitude (on 500 prisoners at the Dachau camp, 150 of whom perished) by Dr Rascher and the Institute of Physiology of the University of Kiel.

- experiments at the Natzweiler-Struthof camp by anatomy professor Hirt with the assistance of three S.S. physicians (University of the Reich at Strasbourg). Hirt even had 112 prisoners from Auschwitz gassed for his collection of skeletons.

- Bacteriological and virological research, creation of abcesses and gangrene, research on antidotes to typhus and malaria in the camps at Dachau, Buchenwald and Ravensbrück.
- Sterilization by X-rays and experiments with sulfa drugs for muscle and nerve regeneration at Ravensbrück and Auschwitz.
- Dr MENGELE also continued research in Auschwitz on twins that had begun at the Kaiser Wilhelm Institute at Berlin under the direction of Professor Otmar Von Verschuer, to whom he sent anatomical specimens.

It is a particularly rare chance, the anthropologist Eugen Fischer wrote as late as March 1943, *that research that in itself is theoretical comes at a time when the general conception of the world is in tune with it and its practical results are immediately welcome as the basis of State measures*[3].

The president of the psychiatrists of the Reich, Ernst Rüdin, went even further when he published in the *Archives for Race and Social Biology* a hommage to Hitler and his regime for having *over and beyond scientific knowledge, dared take the first decisive steps towards an inspired action of race hygiene for the German people*.

Of the 22 physicians brought to trial before the American military court at Nuremberg, including a woman dermatologist acting as physician for the women's camp at Ravensbrück, 7 were condemned to death and executed at the Landsberg prison where Hitler had been detained in 1924. Among them were Dr Brandt, who organized the T4 operation, the head physician Gebhard, president of the German Red Cross, head of the Institute of Hygiene of the Waffen S.S., and the chief physician at Buchenwald. Five others were condemned to life imprisonment, 3 for a long prison term. Seven – among whom three in charge of experiments on resistance in high altitude – were acquitted and recuperated, along with other scientists, by the American military research services. Most of those responsible escaped justice by suicide, natural death, disappearance, or like Dr Mengele, by an escape network to South America. None of the expert theorists –like Professors Fischer, Lenz, Rüdin, Ritter, von Verschuer- were seriously bothered after 1945. With the exception of Fischer who was retired, they were all reinstated in the university or given a position as expert.

It can be added that the Japanese experiments on Chinese prisoners, under the direction of Dr. Shiro, and those carried out by Unit 731 beginning in 1944 were not punished either. But the fact remains that in the wake of the concept of crime against humanity, that came out of the International Trial at Nuremberg, the trial of the Nazi criminal physicians produced in 1947 the *Ethical Code of Nuremberg* that was to become the basis of laws and ethics committees created in the 1980s.

The idea of pseudoscience is not appropriate for this period of eugenic practice. At the very most the term distortion could apply since eugenics was practised by scientists and institutes most of whom had international recognition.

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[3] Eugen Fischer, « Erbe als Schicksal », in Deutsche Allgemeine Zeitung 28.3.1943.

Eugenics in France before 1945

By **Gwen** **TERRENOIRE**[1]

March 24, 2003

Preliminary remarks

Eugenics before 1945 became an object of research in the last third of the 20th century when historians of science began studying the American and British movements. From their studies they derived a number of hypotheses that provided a theoretical framework for exploring other national movements. This may be one of the reasons why the French example, which in many respects did not fit into this framework, took longer to be recognized as a genuine eugenic movement. A few studies were published in the early 1980s [2]. But despite the quality of this research, public knowledge of the French movement still remains limited today. Many people think eugenics was a foreign phenomenon that did not touch France, which is far from true, as this paper will show.

Concerning the French movement, it was probably the political scientists who first provided the entry point in the 1970s when they "rediscovered" Alexis Carrel. This was the decade when the extreme right political party rose to prominence, and Carrel whose career spanned the first half of the XXth century was claimed to be one of its sources of inspiration. Then other researchers began to explore the topic of eugenics in its historical manifestations. Since the mid 1990s important contributions have been made to our understanding of the relationship between eugenic ideas and medicine, psychiatry and social hygiene, but we are probably still far from having a complete picture of the movement with all its ramifications[3]. In this article we will attempt to review the knowledge available at the present time [4].

Even if there are still many topics awaiting exploration, there is a general agreement that the battle against degeneration[5] in the early 20th century interested French elites just as much as it interested elites in other countries. And yet, French eugenics did not produce a unified unchanging message on biological regeneration ; in fact the ideas presented as belonging to eugenic thinking varied, depending on the circumstances and the moment they were expressed. Most French eugenicists adhered to the Neolamarckian theory of heredity that gives preeminence to the heredity of acquired traits (meaning that when an individual's physical condition is improved through interventions on his environment, his descendants will also be healthier) rather than the Mendelian theory of the heredity of stable genetic traits that cannot be modified by the environment. The Neolamarckien approach was compatible with medical action, whereas the Mendelian approach inspired animal or plant breeders in their efforts to select superior strains to improve productivity.

The choice of dates

An argument could be advanced for starting our review of French eugenics with the year 1886, since that was when the English word "eugenics", coined by Francis Galton in 1883, was introduced as "eugénique" into the French language by the racist anthropologist Vacher de Lapouge. The closing date could be 1950 which is the publication date of an important work by the French demographer Jean Sutter, *L'Eugénique, problèmes, méthodes, résultats*. Note that this final date comes well after the end of the Second World War, at a time when the word

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[2] See in the bibliography J.Leonard, 1983, 1985 ; M.Lafont, 1981 ; A.Béjin, 1982.

[3] It is most regrettable that W.H.Schneider's book has not been translated into French , for it is the only one so far to have explored the themes of quantity and quality in all the institutions established in France for their promotion in the first half of the XXth century..

[4] The bibliography at the end provides a list of the documents referred to in this paper.

[5] « Dégénérescence » : either degeneracy (moral) or degeneration (physical or mental) according to Robert/Collins. Schneider (see note 2) uses the term degeneration, but it is obvious that for eugenicists moral decline, degeneracy, was usually linked to physical or mental degeneration.

eugenics had acquired a purely negative connotation elsewhere. For this paper the presentation will be limited to the period between **1913**, date of the creation of the Société française d'eugénique (SFE), and **1942**, when the Vichy Parliament passed a law on maternal and infant protection. Among other innovations this law established the premarital medical examination in a eugenic perspective : "*for the physical and moral preservation of the race*"[6].

How was "eugenics" translated into French ?

In the early XXth century the French had difficulty finding a single word to cover all the various meanings of Galton's "eugenics". Several terms were suggested in the late XIXth –early XXth century (Taguieff, 1991). For Vacher de Lapouge eugénique was synonymous with elite, or good heredity, while eugénisme, introduced in 1887-8, was the opposite of degeneration ("*Eugénisme is the smiling side of heredity, while degeneration is heredity's curse*") . But many other suggestions were made : "*good birth", "conscious procreation", "puericulture", "human selection", "hominiculture",* even *"eugennetics*". The establishment of the Société française d'eugénique in 1913 brought the term eugénique official recognition[7], and the other suggestions faded away. But, as this paper will show, throughout the period under examination the term eugénique was associated with a great number of different interpretations.

If we look at French eugenic documents it is clear that definitions were usually quite vague : for example, " race improvement", or "social progress by improving the biological quality of the population", and each author gave his own understanding of what this meant. The term race could refer to a population supposedly homogeneous in its biological and moral characteristics, or the French population, the social body, or even the nation as a whole, without any suggestion of selection. There was thus no unified system of ideas, in spite of the consensus that biological regeneration was imperative and that it would have to be achieved by acting in the field of procreation.

Degeneration and eugenics

According to a widely held belief, it was urgent to *regenerate* the population because it was in a dangerous state of degeneration. This notion was very popular among French elites in the XIXth century and was used to characterize unwelcome changes observed in a wide variety of areas : culture, politics and religion as well as the physical and moral state of the population. Near the end of the century the biological/moral interpretation was fuelled by a number of specific factors, one of the most important being a feeling that the country had become vulnerable in the geopolitical arena because of its declining birthrate (this had begun earlier in France than in other European countries). The size of the population and its quality thus became a most important political consideration in an era of intense competition between countries, - military, political and economic. This perception of national decline was aggravated by the trauma caused by the 1870 military defeat in the French-Prussian war, political instability and a growing awareness of the high rates of infantile and neonatal mortality resulting from the socalled *social curses* (alcoholism, syphilis and tuberculosis) that bred in the new slums acompanying urbanization and industrialization.

These preoccupations with decline and degeneration were expressed publicly by members of a medical profession that had produced prominent political leaders. These physicians believed in the ideals of the Third Republic (equality, non discrimination, the civilizing mission of education as the best means to reform public morals). They were also the objective allies of the powerful Catholic Church in emphasizing the value of the family and procreation.

The aim of reform was approached in several different ways : measures to stimulate the birth rate aimed at increasing the size of the population (The very powerful Alliance nationale pour l'accroissement de la population française, which later became Alliance nationale contre la dépopulation, was established in 1896) ; legislative action attempted to improve the biological quality of newborns through a series of laws voted in the years 1910-1920 on such topics as women's working conditions and maternity leave ; public hygiene (preventive medicine) and social hygiene saw the creation of several institutions (Société française de tempérance, 1872 ;

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[6] It is of more than anecdotal interest that the ordonnance of November 2, 1945 confirms this institution but drops the eugenic reference.

[7] Today the term eugénisme is used to define the movement of ideas during this historical period. It is also often used when modern developments in the biomedical sciences are analysed.

Ligue contre la tuberculose, 1891 ; Société française pour la prophylaxie sanitaire et morale (venereal diseases), 1901 ; Alliance d'hygiène sociale, 1904).

To sum up these introductory remarks, eugenics was considered by the elites as a positive reaction to the degeneration of individuals and modern civilization, and took its place in a vast reform movement. All these programmes were characterized by the fact that they turned to Science to identify the problems and contribute to their solutions, within a general context of growing State interference in areas that until then had depended on individual initiatives. Physicians and scientists were called to counsel the political authorities. The specific characteristic of eugenics was to call upon the life sciences (Mendelism in the USA and Neolamarckism in France) to explain social problems and justify ways to solve them.

The specific medico-scientific background for eugenics was characterized by a variety of approaches that at times were in contradiction. As said earlier, the Neolamarckian perspective was generally adopted by the medical community but Mendelism was not entirely absent. Physicians were aware of Mendelian genetics but gave it a relatively minor place in their way of looking at heredity, and only a few used it to explain the pathologies they studied and justify the preventive measures they advocated. At the same time there was a racist ideology based on the study of races, and represented by the term anthroposociology with its reference to Gobineau and his *Essai sur l'inégalité des races* (1854). Ideas like these would later inspire selectionnist eugenicists like Vacher de Lapouge (*Sélections sociales*, 1896), Charles Richet (*La sélection humaine*, written in 1913 and published in 1919) and later on Alexis Carrel (*L'Homme cet inconnu*, 1935).

French Eugenicists and the International Eugenics Movement

French eugenicists were active participants in the international movement that began to organize in the early years of the XXth century. This movement was based on national societies that met for three congresses. The first one took place in London in 1912 with nine societies present. The second was held in New York in 1921 with sixteen, while the third, in New York in 1932, listed thirty national societies among the participants. But there was a striking contrast between the 700+ persons present in 1912 and scarcely 100 twenty years later. Between the Congresses an International Federation of Eugenics Organizations organized annual meetings to stimulate communication between the various national bodies.

The French participated in all the international congresses. In 1912, even before the SFE was created, their delegation was second in number only to the British. The French should have organized the second Congress in 1915 but war cancelled this project. The Federation meetings took place in Paris between 1913 and 1926. The last point worth mentioning here is that French eugenicists collaborated in the creation of a little known Fédération latine de sociétés eugéniques in 1935 and hosted its unique Congress in Paris in 1937.

The Société française d'eugénique (SFE)

The French eugenics society was set up in December 1912, following the London Congress. It was the only eugenic institution created in France and had a scientific journal *Eugénique*. The SFE brought together all those interested in the improvement of the human condition in an elite type of professional society. The list of the first members reads like a Who's Who : a future President of the Republic, Paul Doumer, professors from the Medical School in Paris, members of the National Academy of Medicine and the Academy of Sciences, the director of the French Statistics, Lucien March, the director of the Museum of Natural History, Edmond Perrier, professors from the Collège de France, the Minister of Labour, Henri Chéron, psychiatrists …Unlike other national societies the medical community dominated the membership, with physicians representing more than half of the founding members.

In the first number of its journal, the SFE gave the following definition of its aims : *research and application of knowledge useful for the reproduction, preservation and improvement of the race, and study of subjects concerning heredity and selection in their application to the human race and subjects relating to the influence of the economic state, of legislation and morals on the value of successive generations and their physical, intellectual and moral capacities (Eugénique*, 1913, 1-4, p. 46). This definition is close to the one proposed by Galton, founder of the eugenics movement : *the study of the agencies under social control that may improve or impair the racial qualities of future generations, either physically or mentally*.

Unlike other national societies, such as the British or American ones, the SFE did not plan at first to engage in the popularization of essential eugenic ideas. In these countries popular education was thought to be the indispensable complement of scientific research. Insufficient funding prevented the SFE from carrying out some of its initial projects, in particular the creation of a laboratory for eugenic research or a programme of genealogical studies of residents of hospitals, prisons or psychiatric asylums.

The Activities of the SFE

From an organizational viewpoint, the SFE's activities can be divided into two periods. The first ran from 1913 to 1926 during which the society was independent, holding meetings once a month and these were presented regularly in the journal. The second period went from 1926 to 1941. Financial difficulties led to a drop in membership and the SFE merged with the French branch of the International Anthropological Institute which already had a eugenics committee of its own. The journal *Eugénique* was discontinued, and from then on articles on eugenic subjects were published in the *Revue anthropologique*. Even though the members of the Society continued their activities, the Society itself was no longer in a position to organize debates. It is known that a meeting took place in December 1941 during which the Nazi anthropologist Eugen Fischer presented a paper on *race problems and racial legislation in Germany* but it is not quite clear that the Society still existed officially. In the wake of the military defeat and the new political context that resulted, the School of Anthropology shut down, the *Revue anthropologique* fell into the hands of a raciologist Georges Montandon, and a new series of organizations (Institut d'anthroposociologie, Union française pour la défense de la race) and new publications (*Ethnie française*) were created.

If the focus is on the ideas on eugenics rather than its institutional aspects, it would be more correct to speak of three periods, not two. The first one, from 1913 to 1920, was the shortest but also the most active one, dominated by a medically inspired positive eugenics which aimed at encouraging both the quality and the quantity of the population. This approach brought it the approval of the Alliance nationale pour l'accroissement de la population française and Catholic authorities. The leader during this period was Adolphe Pinard, renowned obstetrician and one of the first vice-presidents of the Society. But at the same time far more radical opinions were tolerated. The best example here is Charles Richet who was vice-president after 1919 and who in his book *Sélection humaine* advocated the prohibition of marriage for the weak, the poor, and persons suffering from heredity diseases or belonging to different races (called race blending at the time).

Fourteen meetings took place before May 1914. They were taken up with presentations of research results on topics such as the dysgenic effects of alcoholism, the inheritance of psychological traits, the laws of Mendel, the activity of other eugenic societies. Those active in the Society shied away from organizing a campaign to achieve eugenic objectives by law.

The second period, from 1920 to 1926, was marked by the passage of legislation aimed at increasing the birthrate by prohibiting contraception and abortion. The Society supported these measures but argued that concern over quantity should not lead to forgetting ways of guaranteeing the quality of infants. In another area the Society initiated a more open approach by organizing a series of public conferences on the effects of the war from a eugenical viewpoint. These conferences were later published in book form[8]. The Society also reformulated its objectives in order to emphasize the notion of puericulture : *carry out research aimed at showing the conditions necessary for individuals and couples to have beautiful children in good health*. In spite of this narrow focus, more repressive ideas such as the control of immigration on the basis of biological criteria or a compulsory prenuptial examination began to circulate.

The third period, from 1926 to 1941, was one of a great diversity of points of view. The ideas contained in positive, medical eugenics gained widespread approval outside of the ranks of the SFE[9]. Before the publication of the papal encyclical *Casti Connubi* in 1930 Catholics supported this kind of eugenics and welcomed the opportunity to reflect on individual responsibility in procreation. But in 1931 the Holy Office published a decree that declared the theory of

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[8] E. Apert (dir.), *Eugénique et sélection*, F.Alcan, 1922.

[9] During this period the ideas of positive eugenics were adopted in other places : the League for Mental Hygiene, the Association of Sexologic Studies, the League for Human Rights, the Communist Party.

eugenics, positive or negative, to be false and condemned it. It condemned the means proposed to *improve the human race that neglect natural laws, both divine or ecclesiastical, concerning marriage and the rights of individuals*. However at the same time attempts were occasionally made to elaborate a Catholic form of eugenics that emphasized the sanctification of marriage and the duties of married couples.

The SFE was also host to contradictory debates over negative measures. The earlier discussion of a premarital medical examination continued with several draft bills being elaborated. Pinard, who had become a member of Parliament in 1926 (at the age of 82 !), presented the first bill to the National Assembly. A eugenic aim,- to prohibit marriage among *inapt* persons,- was approved by a number of eugenicists but the majority only wanted to make the population aware of the importance for couples and future parents of being in good health. Several bills were proposed but none was approved by the whole of the SFE, with the result that no legislative action was successful despite the fact that the idea was generally very popular.

The SFE also became one of the places for a discussion of birth control, sterilization and immigration restriction. These subjects brought about a change in its public image that resulted in a loss of popularity among certain sectors of the population. Some Catholic physicians, initially allies, changed their position for fear of being sanctioned, and of course institutional Catholicism was highly critical after 1930.

In spite of this trend towards more repressive approaches, positive medical eugenics came back with the organization of the Latin eugenics congress in Paris in 1937. This congress has not yet been studied in detail but it seems that it was convened to react against Germanic and Anglo-Saxon trends that had dominated the 1932 International Congress. There the major theme had been the sterilization of the inapt. The participants in the Latin congress adopted a point of view opposed to eugenicists who favored purely Mendelian explanations for social pathologies. *We do not claim to be the directors of people or lawmakers*… said one, while another proclaimed : *our purpose is to cry out a warning against premature passion proposing measures that need to be examined scientifically before being implemented, so as to avoid horrible setbacks*. Improving the biological quality of the population remained a legitimate goal for these physicians and scientists but to attain it they favoured more modest measures coming from medicine, hygiene and universal education. The Latin Federation disappeared after this unique congress.

Eugenic discourses

The SFE was not the only place where eugenic ideas circulated. Beyond it, beyond the medical world, these ideas were discussed in other disciplines and among persons not always close to the SFE. In this section these interpretations are presented with an indication of the persons or groups attracted to them. It is worth mentioning that several of them were already firmly established before the turn of the century.

Medical eugenics

To begin this review of ideas, we return to the interpretation proposed by the SFE in its early years, eugenics as the equivalent of puericulture. It is a most important discourse, favouring quality **and** quantity but it is often mistakenly considered to be the only one proposed by French eugenicists. The emblematic personality here is Adolphe Pinard (1844-1934) mentioned earlier. Pinard was already a well known and respected obstetrician in the 1880s. He was responsible for reviving the concept of puericulture that had been defined in 1865 with the following meaning : *the science of raising one's children hygienically and physiologically*. Pinard added a eugenical aim. For him puericulture became no longer concerned only with the preservation of the human species but also with its improvement. Puériculture before procreation was *the art of raising children which takes into consideration all the influences, including the biological quality of the parents, that come into play to determine the quality of the child*. In fact, when Pinard talked of the improvement of the human species he had in mind not the long term but the immediate future, that is the children whose parents learn to avoid behaviour that risks spoiling the quality of their *product*. But this medical action proclaimed a social objective of selection and perfection that belonged to the eugenic ideology. Thus, *In acting in this way […] we will manage to reduce the number of social failures, the cripples, the idiots, the degenerate […]. The future of the race is to a great extent dependent on puericulture* *before procreation* [10]. Pinard felt that the hereditary quality of the population could be improved by intervening in the sanitary and social environment, notably by :

- informing all couples of the importance of their physical and moral condition when they procreated ;
- taking legal mesures to protect maternity : maternity leave, free medical assistance for needy pregnant women ; a maternity home in the departments for unmarried mothers and homeless pregnant women ;
- and various other forms of assistance for mothers [11].
- The puericulteurs' ideas was influential because, in spite of their acceptance of eugenic aims, their programmes were based on the values of their profession and the democratic and universalist tradition of the Third Republic :
- respect for all living human beings, whatever its quality (all have the right to live) ;
- the desire to have all the population benefit from their propositions, with no wish to select certain groups to whom specific measures, mainly negative such as the prohibition of marriage, would be applied ;
- defense of individual freedom to marry and have a family ;
- confidence in the pedagogical action of medicine to inform couples of the conditions necessary for having healthy children[12].

Their values were in complete opposition to other discourses based on selection and elimination which were also present at the turn of the century but became more visible in the 1930s.

Racist eugenics

It was noted earlier that racist ideas were present throughout the first half of the XXth century. Several personalities, many of whom came from anthropology, played a leading role in spreading them. The *racist thinking of anthropologists* [13] with its eugenic implications is associated with Georges Vacher de Lapouge (1854-1936). Its main themes were the inequality of races and individuals, the priority given to race over the individual, the rejection of representative democracy. Individuals with superior heredity ought to be favoured, and this implied that the State interfere in the private life of citizens in matters relating to marriage and procreation. Lapouge wrote : *Every man is related to all men and to all human beings. There is thus no such thing as human rights … The very idea of rights is a fiction. There are only forces*.

Ideas like these circulated within nationalist and anti-Semitic circles that emerged at the end of the XIXth cenury around the Dreyfus affair. But Lapouge was not held in high esteem by his fellow anthropologists and sociologists and he was felt to be pro-German at a time when France felt vulnerable. And yet, his ideas appealed to certain prominent eugenicists, notably the first Vice-president of the SFE, Charles Richet (1850-1935) [14]. Richet, an eminent physiologist and recipient of the Nobel Medicine Prize in 1913, wrote : *After eliminating the inferior races, which is the first step in the path to selection, comes the elimination of abnormal individuals. I fully realize that when I propose this suppression of abnormals, I will offend the sentimentality of our times. I will be accused of being a monster, because I prefer healthy children rather than sickly children and I see no social reason for preserving sickly children…* .

In the thirties the economic crisis and the rise of unemployment led René Martial (1873-1955), whose speciality was public health in the industrial setting, to elaborate a series of propositions aimed at selecting *good* immigrants on the basis of their capacity to become assimilated[15]. In his view, this capacity depended on the proximity of their *biochemical blood index* (in other

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[10] « De la conservation et de l'amélioration de l'espèce », Bulletin médical 1899, n° 13, p. 141.

[11] Voir Schneider, 1990.

[12] Voir Carol, 1995.

[13] Taguieff, 1991, coined this expression.

[14] Schneider, I990.

[15] At the beginning of his career, in the after war years, Martial was an inspector of the sanitary living conditions of the numerous foreign groups that had immigrated to France in search of employment, mainly in the mines of the North, and he made an important contribution to improving their situation.

words, their blood group) to the average index of the French : *we must have as many Os as possible and no Bs, since the Bs belong exclusively to the Asians, and no ABs either because this is the sign of Asian race blending ; on the other hand the As (Alpine race) can be admitted along with the Os* [16]. Alexis Carrel also followed this line of thinking. The blood groups are inherited following Mendelian rules, and Martial was one of the few eugenicists who used the Mendelian approach scientifically ; Richet, Carrel and Lapouge were more at home with the vague notion of degeneration that flourished in the XIXth century.

Limiting quantity to have quality

Another discourse that existed before the creation of the SFE is Neomalthusianism (birth control), aimed at improving the biological quality of infants by voluntarily limiting their number. In France it was proposed to the working class as a way of improving their living conditions. The major spokesman was a high school teacher and Socialist named Paul Robin (1837-1912)[17]. Robin had been exiled because of his opposition to the Second Empire ; as a Socialist and member of the International, he was considered a political extremist. He founded the League for Human Regeneration in 1896, the same year the powerful natalist organization was founded, the Alliance nationale pour l'accroissement de la population française . It is no surprise that the League and the Alliance became enemies immediately.

Robin's League carried out intensive propaganda in the direction of the working class, encouraging workers to limit their procreation without the assistance of the medical profession. But the League's advocates were accused of *pornography* and thrown into prison. The 1920 law prohibiting contraceptional information and abortive measures meant temporary defeat for this attempt to obtain newborns of quality by limiting their number. The economic situation in the 1930s prompted the return of the topic of birth control, this time as a repressive measure, for the lower classes and the mentally deficient. Led by Just Sicard de Plauzoles (1872-1968), the proponents of these ideas called for the revocation of the repressive 1920 laws. Sicard de Plauzoles came from a family of distinguished physicians, was president of the Société française pour la prophylaxie sanitaire et morale, the major spokesman for institutional social hygiene and a member of the SFE. He criticized the official policy encouraging an increase in the birthrate for all classes, since he felt that the lower classes should not be allowed to have as many children as the upper. These arguments were supported by Edouard Toulouse (1865-1947), a well-known psychiatrist in the interwar years and specialist in mental illness. He too agreed that mentally deficient persons should not be allowed to procreate. Toulouse was the driving force behind the Association d'études sexologiques that he created in 1931. Another group in favour of these ideas was the Ligue des Droits de l'Homme and, of course, most members of the social elite.

State control of marriage and sterilization for quality births

This discourse, taboo in the SFE in its early years, reappeared in the 1930s. The historian Schneider described this as a *turning point* in institutional eugenics in France. Even though these ideas never became an official policy of the organization, the very fact that the SFE discussed negative dispositions represents a most significant evolution of the ideas the medical elite considered morally and politically acceptable. The campaign for a prenuptial examination has already been mentioned ; concerning sterilization, Richet had proposed it in 1919 for abnormals in order to preserve society, but this idea was at odds with immediate post-war preoccupations and was not taken up by many.

Ten years later the topic reappeared when the sterilization laws of other countries were examined in the SFE. Several medical theses described them, suggesting that the French medical community was aware of them. The earliest ones were of American and Swiss origin ; these were not criticized for wishing to eliminate social dregs and socially dangerous individuals. Awareness of the Nazi legislation in the 1930s was immediate ; it struck observers as no different from the other better known laws, except for the number of people concerned which some found quite amazing. Many French eugenicists thought that sterilization could be used to prevent the inapt from procreating but they were usually highly critical of compulsory or punitive dispositions they found contrary to the moral law and the values of French civilization.

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[16] La Race française, 1934,quoted by Taguieff, 1994.

[17] Drouard, 1992.

On the other hand, the idea of socalled therapeutic sterilization motivated by the accumulation of defects and poverty was often accepted, notably by pediatricians like G.Schreiber and physicians working in the field of mental illness such as Edouard Toulouse, founder of the mental hygiene movement already mentioned in this review, and his Association d'études sexologiques. At times the therapeutic argument took on economic overtones familiar to hard line eugenicists, sterilization aimed to *reduce the number of abnormals whose care costs the collectivity several billions of francs* . The mental hygiene specialists suggested that eugenic dispensaries be authorized to carry out the sterilization *if justified for medical reasons, at the request of the persons concerned or for serious reasons relating to public order (hereditary defects, criminal or sexual impulses)* [18]. Alexis Carrel was also a partisan of sterilization for similar reasons.

The biocratic State

Alexis Carrel (1873-1944) must be given a special place in this review because of the tremendous success of his book *L'Homme cet inconnu* that instantly brought him public recognition throughout the world.

Carrel was born into a bourgeois family in a Lyon suburb. After passing his doctorate in medicine in 1900 he worked on techniques for suturing blood vessels prior to organ transplantation. He failed the surgeon's specialist examination and went to the United States where he quickly obtained a position at the Rockefeller Institute. He kept this job until retiring in 1938, but he often spent time in France. Carrel perfected a method of culturing tissues outside of the body and received the Nobel Prize for Medicine in 1912 for his earlier work. The Nobel award made him a celebrity and conferred on him a new social role, that of expert scientist for the Society of Nations. Other scientists such as Einstein, Huxley and Haldane were also invited to advise the international organization. The book he wrote in 1935 near the end of his professional life, *L'Homme cet inconnu*, can be read as a contribution to a lively ongoing debate over the future of society in which biologists and physicians were especially active. In the 1930s Carrel worked on several plans for a new kind of research institute that would study *human problems* ; he also joined an extremist right-wing political party in France. In 1941 Pétain signed a decree creating the Fondation française pour l'étude des problèmes humains and Carrel was named director. The foundation was a pluridisciplinary centre employing around 300 researchers (mainly statisticians, psychologists, physicians) from the summer of 1942 to the end of the autumn of 1944. Its budget was almost as important as that granted to the CNRS, created just before the war. After the liberation of Paris, Carrel was suspended by the Minister of Health ; he died in November 1944, thus avoiding an inevitable purge, but the Foundation itself was purged, only to reappear shortly later as the Institut national d'études démographiques (INED).

Carrel's interest in eugenics went back to his early years in the USA. In 1912 he participated in the work of a group of American eugenicists who sought to establish ways to improve the genetic inheritance of the American nation. One of their recommendations was to segregate about ten per cent of the population to prevent it from procreating, with the most dangerous elements being sterilized. The ideas he expressed in his book were grounded in all the obsessions justifying the most extreme eugenic policies in the early years of the XXth century. It was immediately translated into several languages, proving that these obsessions were widely shared : depopulation, race degeneration, the abdication of the elite, the failure of democracy (because it gave the vote to the weak), the need to control heredity, eradicate degeneration, select the best elements of the population, a view of medicine as the supreme science of mankind, government by the biological elite … Carrel's ideas on human selection, aristocratic and non-aristocratic heredity, the euthanasia of criminels were *considered not only acceptable but noteworthy by the great majority of scientists, intellectuals, politicians and journalists, with the only objections coming from left-wing Catholics and Communists* [19].

In his book Carrel gave voice to a feeling, commonplace among the elite of the time, that society was going through a moral and social crisis. He was not alone in calling for a revolution in all fields. But the originality of his approach was to describe a *biopolitical* plan that would organize society in conformity with the *reality* of human nature that only biology could understand. The key word for him was degeneration : biological (the decline of the white races),

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[18] Wojciechowski, 1997 ; Simmonot, 1999.

[19] Muchielli, 1997, quotes A.Drouard who studied the newspaper reviews of the book.

physiological (prevalence of disease), sexual (birth control), political (mediocrity of the political class in democratic regimes), moral (search for a life of leisure, loss of the value of discipline) and cultural (he saw in the radio one of the lowest forms of culture).

It is surprising that the term eugenics was seldom used in this book, but selective eugenics inspired all his thinking, particularly when he developed his ideas on a deliberate policy for encouraging procreation among the elite and sterilizing the insane and mentally deficient ; the need to sacrifice individuals in the interest of future quality (*Those who are afflicted with too heavy an ancestral burden are morally obliged to abstain from marriage*) ; the preventive task of education (*with appropiate education young people could be made to understand the misfortunes they risk if they marry into families with syphilis, cancer* …). Biology contains the explanation and justification for the existence of the social classes, that an individual cannot escape : *Today's proletarians of today owe their situation to hereditary defects in their body and mind… each person must occupy his natural place*.

Carrel expresses more clearly than other eugenicists the dream of a State governed by eugenics, what Muchielli calls a *biocratic utopia*, where public policy is inspired by the scientific elite, with medicine prevailing over all other disciplines. He believed that his *scientific* approach would enable social and moral problems to be solved, and with this aim he recommended not only measures relating to hygiene and the protection of childhood but also the elimination, occasionally directly by euthanasia, more often indirectly by the sterilization of thousands of individuals judged to be dangerous for the future of the human race and an obstacle to the success of socalled biologically superior people. In this perspective criminals would not be punished for their acts but because their abnormality made them socially dangerous. Modern critics of Carrel are not in agreement over the source of his frequently quoted idea of *euthanasic institutions equipped with appropriate gas* (was he referring to the contemporary American death penalty or prefiguring the Nazi gas chambers ?), but it is evident that for him the standard for including or excluding individuals in his new society was the biologically *normal* man.

Judging by the success of these ideas in the 1930s and the interest expressed by other eugenicists for sterilization and immigration restriction based on biological criteria, a great part of French eugenics in this period was very close to its Anglo-Saxon and German counterparts. And yet, unlike other countries, these ideas did not result in a single new law before the 1940 defeat brought about a change in the political regime.

Post-script

After the demise of the SFE in 1941, the problematic of race regeneration inspired Vichy politics in three areas :

- racist policy as theorized by the anthropologist G.Montandon, and René Martial ;
- family law (including the 1942 law concerning infantile and maternal health (including the premarital exam)
- the pluridisciplinary research programme to *preserve and improve the French population* in Alexis Carrel's Fondation Française pour l'Etude des Problèmes Humains.

The end of the Second World War did not lead to an immediate rejection of the eugenic ideal in French medical and scientific circles. In 1950 the term still had a positive connotation in Jean Sutter's book, revealing that there was probably not the same appreciation of the need to mark a break between pre- and post-war ideas, as in the United States and Germany. More recently historians of genetics have pointed out the continuity between the ideas of eugenic pediatricians like Raymond Turpin in the 1930s and the discipline of medical genetics that began in the 1950s. Finally it must be remembered that Carrel's reputation continued to be excellent in certain circles, in particular among physicians and Catholics.

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Eugenics today

By **Michel Morange**

JUNE 22, 2004

The speaker introduced himself by indicating that he trained both as a biologist and as a philosopher and historian of science. He heads a research group in biology at the Ecole Nationale Supérieure, Paris.

Introductory remarks

The conference begins with a rapid reminder of historical elements : the term eugenics was coined by an Englishman, Francis Galton ; numerous eugenics societies were established early in the twentieth century ; legislative measures inspired by eugenics were adopted as early as 1907 in the American state of Indiana. After the Second World War medical genetics and genetic counseling replaced what is often called the historical period of eugenics.

The term eugenics is commonly used today with three distinct meanings : 1) the preservation of the human genetic heritage by preventing genetic defects from being reproduced (by controlling the marriage of persons affected by abnormalities (cf. China, Singapore) ; 2) eugenics is the equivalent of euthanasia, as in the example of genocide (cf. contemporary German usage) ; 3) any programme involving the manipulation of genes or any health policy based on knowledge of genes, for example prenatal diagnosis.

Jean Gayon has made a distinction between eugenic ideas (some of which are of ancient origin, cf. Plato) and the eugenic ideology. The latter is linked to a given social and scientific context. Its intention is to apply to the human species methods of artificial selection already used in animals breeding to replace natural selection that has been made ineffectual by medical progress. In this line of thinking it is felt that procreation control is necessary to avoid the deterioration of the genetic heritage of mankind.

Present-day practices, with a distinction between eugenics and ethics

A comparison can be made between practices in the 1930s and those observed today.

The 1930s

In Germany judges decided on sterilisation requests after receiving the opinion of geneticists and physicians and their ruling was followed by application. Family trees were drawn for persons interned in mental institutions (Goddard in the United States, for one) to prove the hereditary transmission of defects. Certain groups' right to procreate was controlled ; predictions were made on the future biological quality of a child before his birth.

Today

A search can be made to see if a specific gene (but not all) is affected, meaning that the person is carrier of the associated anomaly. Diagnostics are made before birth (prenatal and preimplantation diagnosis) and can lead to termination of the pregnancy to prevent the birth of an affected child. We know that the link between a given anomaly and a particular disease (that is, the question of genetic determinism) is variable depending on the disease : it is perfect for Huntington's chorea (the prediction is sure to come true) but in other cases the presence of a genetic anomaly only gives a probability that the person will be affected. Hence the practical problem of giving information to couples following a diagnostic result.

A diagnosis can also be performed at the neonatal stage, that is, at birth : the example here is phenylcytonuria (PKU) for which a special diet will prevent the mental deficiency associated with the anomaly. France is entertaining the idea of carrying out the same sort of diagnosis for cystic fibrosis.

There are two reasons for asking for a prenatal diagnosis : either the family history (antecedents suggest that a hereditary transmission is involved) or there is already an affected child in the family. This type of diagnosis is not systématic.

What are the ethical questions raised by prenatal diagnosis ? Prenatal diagnosis must not be blamed for everything, since the vast majority of anomalies are discovered by ultrasound (for example, Down's syndrome). Is prenatal diagnosis a eugenic practice ? Two answers can be given, both yes and no. No, because there is no longer the idea of preventing the genetic heritage from deteriorating ; decisions are not made by the public sector (in other words, they are not political decisions) but belong to the private sphere. It can also be shown that present-day practices in fact increase the rate of genetic anomalies in the population, since in the case of recessive disorders (both parents are carriers but not affected) prenatal diagnosis does not pinpoint the carrier children who will never be affected. However if they procreate later on with another carrier they run the risk of being more numerous in the same situation as their parents. Yes, because some questions still remain : the idea of bad genes and the idea that certain diseases should be eradicated, for example Down's syndrome, ideas like these smacking of eugenics are still common in society. See in this respect the offer of prenatal diagnosis for women aged 37 and older, they can have an early ultrasound, then a blood control, then a prenatal diagnosis. Further, ideas and practices like these raise ethical questions because they suggest that affected persons have less value than others. For example cleft palate is generally refused despite the fact that it can be rectified with good results. Another problem, early diagnosis of certain diseases, for example Huntington's chorea, that manifest later in life, pose difficult questions. Chorea is a very serious disease, but it is likely that less severe handicaps will be diagnosed at the prenatal stage. Where should the cutoff be placed ?

Future prospects

This is a difficult exercise but it must not be neglected. One day humans will probably be cloned. This will be done to satisfy individual whims, and will not be dangerous for democratic countries but it could be used by a tyrant. An individual's genome will probably be modified once and for all to mend it. Knowledge available at present concerning animals shows that the success rate is low (about 1%), because you have to work on two generations to eliminate the mutation involved definitively. With human beings it would be socially inacceptable. But if the techniques are more reliable, would it be a *reasonable* programme ? The answer is no for recessive genes, that are the majority. The answer is also no for dominant genes because we already have prenatal diagnosis followed by termination and this is effective. Some people might refuse prenatal diagnosis for religious reasons but this will not be the general tendency.

New diagnostic techniques will appear for the embryo and the parents. It might be possible to detect all mutated genes (many of which remain within the limits of normal variation) in both parents and then prevent the birth of children having genes carrying a risk of disease. Is this a fanciful idea ? Today yes, but in a few years it will be possible. But even if a technique is available it will not necessarily be used. On the other hand, many mutations are related to a probability and the information is of no practical value. There will probably not be a systematic policy except for a few rare diseases.

There will be few changes in the next 40 years.

Does the ideology of eugenics represent a danger today ? It can first be observed that the idea of deterioration is not predominant. We should combat the temptation to interpret problems as biological that can be dealt with by cultural or social measures. The example here is AIDS. At first people feared it would be impossible to check its progression. We know now that salvation comes from medicine or changes in behaviour. We also know that 1% of the population has a natural resistance to the virus. Is this good or bad news ?

Is scientism a danger ? J.Rostand, considered a great humanist, thought at one time in his career that the whole population should benefit from new knowledge and that to refuse it would be the sign of prejudices of religious origin. Near the end of his life he realized that this attitude was potentially dangerous and that great caution should be exercised in such matters.

DISCUSSION

The discussion following the presentation opposed **two visions of eugenics today**. Several participants presented an extensive definition of eugenics, linking it with the theme of risks, or dangers associated with certain biomedical practices in human reproduction and the corresponding changes in behaviour they encouraged. For example, for some participants, progress in the detection of anomalies before birth encourages parents to aim for a *perfect* baby, with the result that they will demand an abortion for reasons that physicians will consider futile ; likewise artificial insemination could be used to select genes responsible for exceptional characteristics. Others fear that persons suffering from disease will be the object of social stigmatisation (as happened with AIDS). Another example here might be when parents fear being discriminated if they decide not to interrupt a pregnancy when the coming child will be an economic burden to the community. These participants are preoccupied with the current phenomenon of placing too much emphasis on biological criteria (as in genetic data bases, or the idea of a personal genetic card), and the influence of ideologies of exclusion based on genetic criteria, which illustrate the present-day tendency to consider that *genetics explains everything*. Others feel that researchers involved in manipulating the human genome or in elaborating new antenatal diagnostic techniques might go beyond what is acceptable. The same criticism was voiced concerning overhasty political decisions in the health sector that may be made before their scientific justification is determined.

A more restrictive definition of eugenics was presented by other participants. Professor Morange stated that the desire to have a perfet child is a normal fantasy that is unrelated to eugenics. On another topic, the generalization of genetic tests in the workplace is not new. Employers already use biological criteria to select future employees. This is absurb, genetic tests should not be considered responsible for abuses in this area. Positive eugenics is an old idea, Plato had a eugenic program. Today there are sperm banks that recruit donors among Nobel Prize winners. On the relation between eugenics and economics, Professor Morange reognized that the rise of eugenics in the 1930s was indeed linked to the years of crisis following World War I, and the same thing happened more recently in France during the period of high rates of unemployment. But it is difficult to see if these discourses represent a real threat today. Scientism can be seen as flourishing when market mechanisms predominate, as is the case today when science is called upon to justify social programs that policymakers present as inevitable. On the other hand, the dysgenic effect of genetic tests has often been emphasized. It is also true that when medicine proposes new diagnostic tests it puts pressure on couples to accept them, since *where there is an offer there is a demand*.

One participant suggested that the term heritage should not be used when referring to the human genome because of its unfortunate financial connotation. Unfortunately this term was accepted by Unesco itself when working on the Universal declaration on the human genome and the rights of man. At the time Unesco wanted to erect a barrier to the commercial use of human genetic data.

Scientific responsibility. Recent newspaper reports of the successful cloning by Korean researchers of a human embryo up to the 100-cell stage prompted one participant to ask whether it would be feasible to impose a blackout on this sort of publications, as Einstein had proposed concerning nuclear fission. However, even if this precedent could have been justified in the context of war, it is generally felt to have serious disadvantages, since it prevents scientists from discussing research findings with their colleagues, and this is one of the important ways progress can be made. The recent discussion on blocking publications on biological warfare following September 2001, shows that the idea could probably not work.

Cloning

By **Jean-Paul RENARD**

October 21, 2003

Dr. Renard introduces himself : he is the director of a research group at the National Institute for Agronomical Research (INRA) that studies the reproduction of mammals. He prepared his doctorate under the direction of the late Charles Thibault. He worked ten years at the Pasteur Institute and was a member of the Comité consultatif national d'éthique (CCNE) from 1983 to 1991. His particular field of interest is the beginning of embryonic development up to the moment the foetus is attached to the uterus. His team is composed of 15 researchers, assisted by more than 80 technicians who look after the animals. He works on animal models : mice, rabbits, sheep, goats, rats, that is, on non primate mammals.

Preliminary remarks

1) Dr Renard's research theme is at the centre of the questions treated in biology : what is it that makes a single cell able to produce a complex organism, in this case a mammal ? Many biologists have worked on flies that provide a simpler model giving rise to simpler concepts. For his part, he approaches the same questions but with mammals. This is basic research, the search for knowledge. However, one of the characteristics of his work, as with all the work done at INRA, is a close association between basic and applied research.

2) This field raises problems because mammals are close to man. The present conference will not be limited to scientific questions, he will try to treat his subject by exploring different approaches as proposed by biology, medicine, ethics and morals. His own opinion is that biologists must take society's point of view into consideration.

This field of research touches on permanent questions, such as the status of the embryo (this was the first topic addressed by the CCNE in 1984), on which science intersects with medicine, ethics and law. Today scientific knowledge disturbs our conception of the embryo with the result that our point of view is changing. Society questions these new representations and is afraid that it will to further than it should. Knowledge can only progress if it is placed in a social context, this means that we must know if new research will call into question our idea of what constitutes living substances. There is no way out of this question if we do not ask ; *might it not be our idea of the embryo that is evolving ?*

Reproductive cloning

The technique consists in taking the nucleus of an adult cell and putting it in another cell, the ovum. It avoids the stage called fertilization, when the egg merges with the spermatozoon. These cells (egg and spermatozoon) each have n chromosomes and exist from the very beginning of the embryonic life of a male or female. Meiosis is the stage of cellular division preceding the formation of the gametes and is characterized by the reduction of the number of chromosomes and the combination of genes from the father and the mother. With meiosis the nuclii come together (genetic recombination) and the number of chromosomes doubles from n to 2n. But surrounding this is a cell, the egg. When cloning is done, the nucleus of this egg is removed and all that is left is the cytoplasm (a sort of envelope). Another nucleus is injected and we know that a new egg will be produced and develop after being transferred to a female uterus. This has been done with cows, mice, goats and rats. The oldest cows are 5 years of age, other mammals are 2 ½ years old. Their development is normal, they are fertile and thus can reproduce. The Dolly experiment showed that the technique was feasible, earlier trials had failed to produce a frog from a cell of an adult frog.

This scientific progress demonstrated that the dogma of the irreversibility of cell differentiation (that is, the idea that it is impossible to go backwards) was no longer valid. This is a very important lesson : cells are amazingly plastic. This progress stimulated research to find out which cells can differentiate and this is what led to the interest in stem cells[1]. These stem cells can be found not only in blood and marrow but also in the brain.

Another lesson : if a nucleus is put into an ovum, there is still the ovum's envelope (cytoplasm) that plays a very important role because it can reshape the nucleus. This also shows that the gametes (sexual cells) are unequal : the spermatozoon no longer counts ! On the other hand, the egg and its cytoplasm is very important.

It is a mistake to think that every time a nucleus is transferred there will be an animal. Success rates are about 2%. This means that it takes 200 rebuilt embryos to have one that will be viable. But the embryo can be observed to begin developing : 2 cells, then 4, then 8 and so on. The problems begin afterwards.

60% of the cells reach the blastocyst stage, where the embryo is distinct from the placenta. Afterwards, it is more complicated. At certain moments there is a high rate of embryo mortality. This seems due to the deregulation of the dialogue between embryo and uterus. Even if the embryo displays an enormous adaptibility, this does have limits. Abnormalities occur during the whole gestation period, including after birth. In cows these abnormalities appear early on and then at birth with the calves affected by diseases (diabetes, cardiovascular diseases).

In reprductive cloning it isn't the beginning that is difficult but the development. What are the practical applications ? At present, none. It is only a research theme.

The adult cell is interesting because it can be manipulated. Animals with the same genomes can be compared during the period the cell that will provide the nucleus is cultured. This opens the way to transgenesis in animals, but not in plants.

Reproductive cloning is of no use for humans. I do not see what it could be used for. Using animals we can study diabetes, cardiopathies, certain immunological deficiencies. There is no reason to say that this research will lead to a catastrophe.

What is his personal opinion ? *Yes, it is true that we tinker (as nature does), and that we do not control everything. We will not do transgenesis with genes coming from anywhere, we will not work in a haphazard way*.

What is needed is clear thinking and openness in debates.

Cloning with a therapeutic aim

The term *therapeutic cloning* is a misnomer. It is cloning with a therapeutic **aim**. The technique is the same as for reproductive cloning, only the embryo is not transferred to a female recipient. The fact that the embryo begins to differentiate is taken advantage of to culture it so that its cells remain undifferentiated. Transplantation is not part of the programme.

Cloning like this has been demonstrated in a mouse with a mutated gene that is the source of a disease ; an unmutated gene was cultured and replaced the mutated one in the diseased tissue. This reinjection implies modifying the subject's genome. This raises the following question : will the embryo have the same genome as the donor animal ? Is the reprogrammation complete or not ? Is it the same thing as the tissue ? And if not, why ? Other questions : do the differences come from the cells, from the environment ? What will the long term effects of the transplantation be ?

Reproductive cloning and cloning for therapeutic purposes raise the same questions : what will the long term disturbances be ? This interests the specialists of in vitro fertilization. But the questions do not concern only the scientific party. Scientists must be open to what other disciplines have to say. We do not know where we stand with regard to filiation. Psychoanalysis says that when you have identical beings you have death. And scientists answer : cloned animals are not identical.

Concluding questions

Should this research be authorized or not ? The scientist cannot give the whole answer. When new possibilities are demonstrated, can the consequences be estimated ? Is it a matter of

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[1] Stem cells are able to differentiate into a variable number of functional cells. Embryonic stem cells can differentiate and produce all the cells of an organism. In adults most tissues possess stem cells that enable differentiated cells making them up to be renewed. For example, all the blood cells derive from the same type of stem cells present in bone marrow.

questioning *natural* principles ? (what does *natural* mean ?). When organisms are created artificially what will the consequences be for those existing naturally ? These questions are also important for animals.

Human intervention leads to new possibilities, but this is also true for nanotechnologies. On these subjects science must dialogue with society. Today's speaker thinks that at present it's a dialogue between parties who are deaf to each other. In France we tend to rigidify the debate, to prohibit without being clear about the justification of such a prohibition.

Human beings possess a collective intelligence that enables them to act on their environment. Today this action concerns us. What could the conditions for dialogue be ? We must refuse decisions to prohibit. The issue of modifying man genetically will inevitably arise. Isn't it too early to tackle the question of aims ? These questions cannot be settled today. They have to be reformulated.

DISCUSSION

Research freedom. Several questions are raised by the participants : should we take risks ? Can researchers be stopped ? Can risks be calculated, or even limited ? Dr. Renard thinks that the question should be *how can we ascertain risks, and with what instruments ?* Furthermore he feels that scientists must anticipate the questions that the public will ask, this is part of their responsability as scientists.

The science-society debate. Does the public really understand the risks of cloning ? How can we avoid being unduly impressed by media coverage that exagerates either the negative or the positive side of scientific breakthroughs ? It is not surprising that ethics seems to come into play too late, after research has been carried out, and is only there to block progress. Wouldn't it be possible to have ethics play its role before new knowledge has been found ? The earlier debate on nuclear energy suggests that a democratic debate on controversial subjects such as cloning is almost impossible to organize. And yet, this precedent may not be appropriate here, when it occurred the important decisions had already been taken. The problem with cloning in this respect is that the questions have come long before any practical application has been attempted, and at present we have no idea whether stem cells will be fruitful or not. However, people will no longer accept being kept in the dark. What makes the debate difficult is that everybody is interested only in results. It is essential that we work on a common language to talk about these things.

Controlling biology. There are two mechanisms for controlling science, ethical controls and political controls. In most countries ethical controls have been reinforced in the last few years for researchers and physicians. Major research institutes have created ethics committees. As for political controls, France is a good example of a country that has decided to procede by law, the 1994 bioethics law is presently being revised, and the new law may introduce a moratorium of five years for cloning research.

The history of gene therapy
and the future of medicine and bioethics

by Professor **Pascal NOUVEL**[1]

December 14, 2004

History

The history of gene therapy began fifty years ago, but the first successful application took place in 2000 at the Necker Hospital in Paris, under the direction of Professor Alain Fischer. In the early 1950s, sickle cell disease was described by James Neel as a genetic disease (monogenic, i.e. depending on a single gene), even though the gene involved had not yet been identified. The purpose of gene therapy is to eliminate a disease by substituting a healthy gene for the defective one, (this is called gene therapy in vivo). However, at the time nobody knew how to go about this, it was a mere theoretical possibility that biologists thought would be the future of medicine. Physicians were less enthusiastic because the horizon was far away in the future.

With bacteria a virus (or phage) has the capacity to inject its genetic material into a given bacteria's nucleus. If this could also work for eucaryotic cells (that is, cells with a nucleus and chromosomes), it would be possible to put a gene into a diseased cell. At the end of the 60s gene transfer became possible with viruses serving as vectors for bacteria. But no viruses as vectors for eucaryotic cells were known, and nobody knew how to modify the DNA of a virus, that is manipulate it for therapeutic purposes. The author of a book entitled Genes, dreams and realities even declared that biology had gone as far as it could.

In the early 70s two very important discoveries were made : first, viruses capable of inserting their genetic material into a cell. These are called retroviruses and are composed of ribonucleic acid (RNA) that is transformed into desoxyribonucleic acid (DNA) after entering the cell, and this DNA becomes integrated in the target cell's DNA. At the same time restriction enzymes were discovered. These protect certain bacteria from viral infection by cutting the phage's DNA at particular sites : needed genes are obtained by cutting the DNA at specific sites. All the elements necessary for doing gene therapy were thus available.

However the procedure seemed complicated. Six obstacles were described in 1972 :

- the vast number of target cells to be modified ;
- the cells are compacted in organs, making it difficult to reach them ;
- penetrating the cells by crossing the cytoplasmic membrane ;
- penetrating the membrane of the nucleus ;
- the entrance of a foreign gene into one of the 23 chromosomes of the genome ;
- the integration site of the foreign gene in such a way that it takes the place of the defective gene.

In the 1980s Martin Cline carried out an experimental gene therapy in a foreign country. The conditions of these trials were dubious and there was no improvement for the patients. The scientist's desire to do something spectacular (he received extensive media coverage) led the American authorities to enact a set of very stringent rules for gene therapy and Cline was forced to abandon all his activites.

The next trials took place ten years later, in 1990, when French Anderson, the 'father' of gene therapy, carried out a therapy with an approved protocol on a little girl affected by a severe

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[1] Professor Nouvel Pascal Nouvel's initial training was in molecular biology and genetics, but he is also engaged in studying the history of science from a philosophical viewpoint. He is the co-author, with Claude DEBRU, of Le possible et les biotechnologies, PUF, 2003.

haematological defect. The result was not conclusive owing to the drastic rules imposed by the committee in charge of approving the protocol. This committee demanded that treatment be directed at the blood cells (that are renewed every three months) and not the marrow's stem cells. An improvement was noted but it did not last.

In 2000 Alain Fischer's group at Necker Hospital in Paris carried out the first successful trial on two *bubble babies* (so-called because owing to a lack of immune defenses resulting from a monogenic disease they had to live in a sterile room). The protocol was very similar to the previous one, except that the marrow was treated so as to receive the missing gene. After five or six weeks the presence of mature lymphocytes in the blood was perceived and the children were rid of their defect... and the disease. Seven other bubble children were treated. But after a certain time, two of them developped a form of leukemia involving the anarchical expansion of immune cells because the retrovirus had been inserted at a site that was close to an oncogene (a sort of gene that can induce cancer) that the manipulation had activated. The estimated risk had been one per thousand, but this estimate was wrong because the place where the retrovirus was activated was probably stimulated by its proximity to the oncogene. This shows the importance of the sixth obstacle, involving the insertion site.

More recently in 2002, Rudolph Jaenisch, a German scientist working in the USA carried out experiments on a mouse with a major immunodeficience due to another gene. Animal models are very frequently used, and if target pathologies do not exist (in animals) they can be created.

Second generation gene therapy involves three stages :

- culturing embryonic cells ;
- homologous recombination with specific replacement of genes ;
- cloning (it must be noted that the sheep Dolly died a few months ago at the age of six).

Thus, for sick mice, the following steps are taken ;

- a few skin cells are removed and then cultured ; the nucleii are removed ;
- the nucleii are placed in oocytes (cloning technique) and the embryonic cells are cultured ;
- homologous recombination to replace a defective gene by a healthy one ;
- the cells multiply : and hematopoïetic stem cells can be reinjected into the mouse ; it works and the result is a success.

The future

Human cloning is prohibited in France because there is no proof that cloning is necessary for therapy. But the condemnation of cloning on the grounds that it inevitably leads to reproductive cloning cannot be justified ethically. Basic (or fundamental) research should not be stopped. Francis Bacon in his work Novum Organum (1620) called this search for understanding nature *luminous science.*

DISCUSSION

Therapeutic cloning. Two problems are mentioned. The first concerns the large numbers of ova (and thus women donors) needed. Couldn't adult stem cells be used in their place, for example in research like Jaenisch's, thus avoiding this ethical preoccupation ? Unfortunately, adult stem cells are not as vigorous as embryonic stem cells and they replicate more slowly. As a result they do not produce the large numbers required for selecting suitable cells for homologous recombination. Theoretically it would be possible to use them, but in fact they are not at all useful. Furthermore, if large numbers of ova are needed for reproductive cloning (some 300 for Dolly), therapeutic cloning is easier since the embryo is cultured at a very early stage of its development. A second problem concerns the name of the technique *therapeutic* cloning. Isn't it dangerous with regard to the public to talk of therapeutic cloning when it is really scientific cloning ? The latter is limited to in vitro interventions. Its objective is not to obtain all the sorts of cells in an organism but only one or two cell lines, and this is much easier. But at the same time it is true that when human material is used for scientific research it has a different status than other material.

Animal research. Cloned animals have more frequent health problems than normal animals. Ian Wilmut (Dolly's *father*) and R.Jaenisch say that human beings should not be cloned because of the high unpredictable risk of failure and abnormalities. However, animal models could be created for human diseases. It must be remembered that basic biological research progressed because of initial research on animals, such as mice and flies.

Scientific responsibility. Two problems are discussed. How can we stop researchers from unethical conduct ? How can research be presented to the public without raising false hopes ? Professor Nouvel mentions the Jesse Gelsinger affair. This young American died in 1999 four days after a gene therapy trial targeting a hepatic disease. His death was due to an allergy-type reaction to the virus. The inquiry that looked into this affair revealed that the physicians had embellished the results and not indicated that two monkeys had been killed by the virus. Further, the director of the institute where the research was carried out was the owner of a private laboratory that would have made a fortune if the result had been positive. This situation was a consequence of the Bayh-Dole Act (name given to the Patent and Trademark Law Amendements Act, passed in 1980), which authorizes universities to hold patent rights, thus opening the door to collusion between academic researchers and private interests. Before that date this was prohibited[2]. In the United States federal funds are no longer granted to researchers and thus they have to look to private companies. The European Commission tends to approve the American model. In France the prevailing model could be called *entrepreneurial romanticism*, as illustrated by the annual Telethon operation.

National scientific policy. It is known that the American President is personally opposed to cloning and that research on cloning is prohibited when an American scientist receives public funding. But with private funding Americans can do whatever they like, including cloning. We know that this sort of research is also carried out in France and Great-Britain. There is thus no international consensus on these questions, even in Europe.

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2 On February 1, 2005, two months after this conference, the National Institutes of Health, the federal organ financing academic researchers, decided de prohibit its employees from being paid as consultants for pharmaceutical and biotechnological companies. They will not be allowed to hold stocks in these companies eiher. This prohibition will also apply to research institutions receiving NIH grants. NIH was moved to act in order to preserve the public's confidence. Other limits have been set up so that the public will be able to learn what royalties NIH researchers receive when they assist companies in developing experimental treatments.

Genetics and human behaviour

by **Pierre-Henri GOUYON**
Director of the research group *Ecology, Systematics and Evolution*
CNRS, France

May 9, 2005

Our **Joint Programmatic Commission Science and Ethics** invited Dr Gouyon to address the following topics :

What theories and observations support the idea that human behavior is determined, or even controlled by genetic factors ? Why did many scientists object to sociobiology when Wilson's work was introduced ? In particular with regards to the question of a genetic determination of moral attitudes ? What are the facts today relating to this debate that has accompanied the science of genetics throughout its history ?

The beginning of genetics

The concept of heredity has fascinated thinkers over the centuries. Aristotle himself proposed a theory to explain it, as did many others in later years. Two phenomena have always seemed particularly intriguing : why do human beings produce only human beings, dogs only dogs, etc. ? and why isn't each new being just a carbon copy of its procreators ? Before the XIXth century people also wondered if the male or the female played the dominant role in procreation. For the anthropologist Françoise HERITIER, this question has always been linked to the problem of power in male-female relationships. Her explanation is that men have always been afraid that women might decide to produce only women, and this is why they have set up various social systems that enable them to dominate women.

By the early XIXth century there was agreement that both parents are needed for procreation and that this occurs by a blending of something from each member of the couple. Each one gives a part of what he has received from his own ancestors, this part being both physical and the result of the person's experience. Some thought also that if one member of the couple had lost a leg, the offspring would likely be born without a leg too. This theory is called the theory of acquired traits.

The basic question in the latter part of the XIXth century became : how can the phenomena of simultaneous ressemblance and variation be explained ? Two new sciences developed in response, embryology concerned with the heredity of the type (resemblances) and genetics at the beginning of the XXth century with the heredity of variations linked with genes.

Early contributors to genetics

The first was the German **Weissmann** who in 1880, after carrying out many experiments on mice (cutting off their tail to see if the offspring would be born without a tail), concluded that the theory of acquired traits could not be proved. Despite his condemnation French biologists remained attached to this theory for a long time as it had been defended by **Lamarck**. It was Weissmann who made the distinction between germinal and somatic cell lines. To be correct, nobody *reproduces* himself, even though the term reproduction suggests this. What we pass on we have received from our ancestors. As individuals, we add nothing. This idea seemed scandalous.

A second shock occurred in 1900 when the findings of the Austrian botanist **Mendel** were rediscovered. Mendel had shown as early as 1865 that when reproduction occurred (he worked on green peas) each individual passed on to his offspring only half of his genetic inheritance. The consequences of this discovery were immense, since it meant that from one generation to the next genetic information is constantly being lost, even though each individual receives new information through mutations. Dr. Gouyon described this fact with the vivid expression *heredity is amnesic* !

The Englishman Francis **Galton**, **Darwin**'s cousin, who did excellent research on the size of plants, started studying the heredity of genius in the 1860s. He found that on average the offspring of geniuses were less intelligent than their parents. The terme *regression* described this phenomenon of a *return to the mean*, and Galton was unhappy over this, since it suggested that Darwin's theory would not work. Galton, and his disciple Karl **Pierson** were the ones who decided to apply mathematical methods to the study of heredity. Galton is also responsible for inventing the word *eugenics*.

In 1900 the theory of the heredity of continuous traits developped and integrated the new science of genetics after Mendel's work had been rediscovered. The Dane **Johannsen** invented the word *gene* which replaced Darwin's *pangenes* or *gemmules*. He also made the distinction between the genotype, comprising the hereditary traits received from the parents, and the phenotype, that is the expression of the genotype of a given subject in a given environment. To understand the concept of heredity, it must always be remembered that a given phenotype results from the interaction between the genotype and the environment.

The science of genetics developped after 1900, mainly in the United States, England, and the Nordic countries ; Latin countries were less enthusiastic. Genetics when combined with Darwinism gives an explanation of the evolution of man, and thus leads to eugenics. But it must be noted that all the geneticists in the 1930s were eugenicists (one of them was Julian **Huxley**, brother to Aldous, the author of *The Best of All Possible Worlds*, Julian became the first General Director of UNESCO). Eugenics as a system of laws on sterilization mainly affected the countries where genetics was developed, but it must be noted that no eugenical laws were passed in the United Kingdom. Few French biologists shared the views of their American colleagues. As for Nazi Germany, we know what happened there. Russia remained wary of genetics for a long time.

When the ravages caused by eugenics in the Third Reich were revealed after World War II, it created an enormous shock that is still with us. France didn't understand at all, since most French biologists remained Lamarckian (just think of Zola's *Germinal*). But the few who did understand were criticized.

Next came the **Lyssenko** affair. Genetics was declared incompatible with the Soviet Revolution ; Mendelism and Morganism were reactionary ! Russian geneticists like **Vavilov** were sent to the goulag and disappeared. In France Marcel **Prenant**, a Communist geneticist, was forced to renounce. In the mid-XXth century in France it could be said that partisans of the environment were left-wing and partisans of genes right-wing.

Heredity and genetics today

Geneticists work only on the heredity of variations, they have nothing to say about things where there is no variation, such as the number of legs in humans. There isn't a gene that determines whether an individual will have one or two legs, it's a matter of accident. As for complex traits such as I.Q. or height, they are determined by genes **and** the environment. In these matters we should say *each individual is totally (100%) determined by his genes* ***and*** *by his environment*. What proportion of the height of an individual can be explained by hereditary factors ? To answer this question, a geneticist will begin by observing the variation in a group of individuals' height and then will determine the proportion that is due to genetic variations. The same method will apply to the calculation of the heritability of I.Q. If the group being considered changes, so will the result. The term *heritability* means the part of total variation that can be explained by genes in a given environment.

Nowadays, as a result of the sequencing of the genome (the Human Genome Project) and the technique of *quantitative trait locus*, geneticists are able to locate genes that intervene in complex traits. Geneticists working on homosexuality usually talk of **the** homosexuality gene, but this does not mean that homosexuality is determined by one gene. Despite this, James

Watson, co-discoverer of the double helix (1956), did not hesitate to state that one day we would be able to prevent homosexuals from being born !

Sociobiology

This science is founded on the fundamental notion that all life forms, including the human race, do not invent anything. The human race has received genetic information from the fish (through evolution), but information from their environment as well. This is what we call culture. The purpose of biological evolution is to preserve genetic information by encouraging behaviour that ensures its preservation, as when animals protect their young and not the older members of the group in situations of danger. In the 1970s the discovery was made that in certain races an individual is closer to his sister than to his daughter (in other words, he shares more genes with his sister than with his daughter). **Hamilton** discovered that certain cells sacrifice themselves in order to preserve the genetic information. But this discovery was not recognized. Instead it was **E.O.Wilson**, known for his work on animal societies (bees, ants) who became famous. His work, *Sociobiology*, is almost totally devoted to these societies, but in a final chapter he applied the same ideas to human societies, and this shocked many people. No animal society can exist without a family structure. A couple is required to enable genes to be transmitted. Many thinkers found it difficult to accept the idea that humans are animals and very close to primates.

Wilson was criticized by his radical (i.e. marxist) American colleagues, mainly Stephen J.**Gould** (who died recently) and Richard **Lewontin**. It is to be noted that all three work(ed) at Harvard University (USA). Their dispute spread to the rest of the community of biologists. For our speaker, the greatest sociobiologist of the XXth century is **John M. Smith**. But, even though Wilson went to extremes, it is perfectly legitimate to study human societies with his hypotheses.

In France, the discipline of sociobiology is called *behavioural ecology*. What can it be expected to contribute ? Probably interesting findings for plants, but less for human beings, because the subject is more complicated. One researcher in France, working on the heritability of I.Q. in the 1990s ran into difficulties. He had shown a certain heritability of I.Q. among adopted children who had been born following an artificial insemination. He was criticized for constituting his sample by referring to a sperm bank to identify the children who had been conceived with sperm from the same donor. This event took place before the French bioethics laws were passed (1994) ; these laws prohibit sperm banks (CECOS) from giving any information to third parties concerning people involved as donors or recipients of sperm. In the early 1990s this was just considered to be good practice by the great majority of sperm conservation centres.

Subjects under discussion today

Two are mentioned. The first, how can the public's understanding of genetics be improved ? As an example, it is established that with an average I.Q. set at 100, 80% of individuals will have an I.Q. ranging from 80 to 120. When this information was interpreted by the mass media, one French newspaper gave the following headline *I.Q. is determined by the environment* whereas another stated *I.Q. is determined by genes* ! The speaker thinks that the principles of genetics should be taught much earlier in the classroom. This would enable people to avoid being deceived by certain falsehoods.

Are there some subjects for which research should be prohibited ? The only way to do this would be to have an international consensus, but no such consensus exists. If French researchers (or German or British etc.) decide not to carry out certain projects, others will do so. We must make the distinction between science, the search for knowledge, that should remain free, and technology (in other words, applications) that might be prohibited. But it would be a grave error if we deprived ourselves of knowledge. The best illustration of this danger is Lyssenko, the Soviet agricultural technician whose theories were approved by the political leaders and resulted in the destruction of Soviet agriculture.

DISCUSSION

Sociobiology. One of the participants drew attention to the troubling connection between sociobiology and extreme right-wing ideas in France in the 1970s. The same sort of connection could be found between sociobiology and the ethology of Konrad Lorenz. Lorenz, a German scientist, was a fervent partisan of Nazism in the 1930s. At the beginning of the XXth century Weissmann worked in a university alongside racist colleagues.

The relationship of technology and knowledge. Today many people are concerned about the intrusion of competition in the world of research through pressure to be the first to publish results. However, it can observed that this competition concerns new technologies more than new knowledge. The distinction between techniques and knowledge is an important one. New techniques should be debated in society, and in some cases their introduction should be controlled. Many countries realize the importance of establishing mechanisms to foster frequent contacts between scientists and associations representing of civil society.

The social responsibility of scientists. James Watson’s remark on the prevention of homosexualty is a good example of scientific irresponsibility ! How can scientists exercise their social responsibility ? For one thing, by disseminating knowledge about their research. Good vulgarization is an excellent way to combat popular falsehoods and misconceptions. As for physicians and medical researchers, they need to be reminded of their ethical obligations. An oath like the Hippocratic oath might be useful for researchers. Professionals such as genetic counselors should also reflect on the words they use to explain the concept of risk to the families who consult them.

Human, humanity. Some contemporary philosophers think that man is essentially a social being who needs an environment, education to become human in the full sense of the term. But from a strictly biological viewpoint, each individual is the result of both genetics and environment. Both factors are necessary.

Should research be forbidden on certain subjects ? One participant suggests that this is perhaps not the best question. It might be better to ask *why is this project being undertaken ?* Again, what is the motive behind basic research ? The speaker says that for him there is a basic human need to know and understand the world we live in. Another difficult question is ***should*** *we always do what we* ***can*** *do* ? The example of the **Unesco** Declaration on human genetic data shows that all the problems have not yet been solved, there remains a lot of work to be done.

Genetics and human freedom. When we consider what is known now about the role of genetic factors in the formation of human beings, one participant wonders what room is left for individual freedom. In what sense do we say that research is free ? Does it mean that scientific researchers are free to do anything they want ? The speaker suggests that freedom entails responsibility, even though humans are under certain constraints. An illustration can be given by the link that some establish between the sexual chromosomes and violent behaviour. Even if men with two Y chromosomes are statistically more prone to violence and agressive behaviour than men with only one, it is the social environment that creates conditions for adopting criminal behaviour. Penal justice will sometimes take this into account with the notion of *extenuating circumstances*.

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