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FERTILITY AND THE ETHICS OF EXPERIMENTS ON MAN

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The ethics of medical experimentation on man is not a matter of recent consideration. As long ago as 1880, Pasteur wrote to the Emperor of Brasil of his studies on rabies. Today we consider the problem again in the area of experiments affecting human fertility, ranking with the fundamental rules in the biology of the individual and of the species.

It is true, of course, that the position of ethics, i. e., of morals, concerning fertility involves many aspects of its problems and not only that of experimentation. It is also true that the same principles affect moral judgment both in the case of scientific experiment and in those of professional practice and individual sexual behaviour. An enumeration of these principles will thus be helpful both in exploring our main subject (the licitness of experiments on man in the field of fertility) and in the formulation of the ethical aspects of many other problems in the same field.

Ethics, as we all know, is a moral science based on a typical deductive logic, which starts

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from the principles in order to obtain the knowledge and discipline of the phenomenon. Its logic, therefore, differs from that of experimental science which proceeds in reverse, deriving from the phenomenon the laws and principles by which they are governed. The two different logical processes lead to the definition of different truths, which complement rather than oppose each other. Two truths in fact, if they are such, will never be opposed, irrespective of the method used in establishing them.

Christian ethics derive from the inherent principles of natural morals (man's individual conscience) and of Revelation (the Bible and tradition); it also derives from the corollary principles and rules established by the Church.

The most important principles affecting man's judgment and behaviour concerning human fertility and its problems are, in my opinion, the following:

I. The institutional principle of fertility as found in the first chapter of Genesis which reads: *And God created man to his own image; to the image of God he created him; male and female he created them. And God blessed them, saying: Increase and multiply, and fill the earth.*

The divine instruction to multiply is reflected in nature's de-

vices, where the multiplication of men is effected by means of a three-stage mechanism: 1) the *sexual stage* with the psychological and physical impulses of fertility; 2) the *physiological stage* of fertilization, pregnancy and birth, effecting the phenomenon at the macroscopic level; 3) the *genetic stage* effecting the phenomenon at the microscopic and biochemical level, through chromosomes and genes, making multiplication a reproduction in the world's ethymological sense (reproduction of the parental traits in the progeny).

As for *fill the earth*, population studies clearly reveal the fulfillment of the divine plan to populate the earth. The United Nations' Population Service estimates that, at the present rate, the earth's population will increase from 2,795 million in 1957 to 6,269 in the year 2000, i. e., from a density of 21 inhabitants per sq. km. to a density of 46 per sq. km.; the increase factor should vary from a minimum of 37% in Europe to a maximum of 201% in Southern and 225% in Central America.

By the device resulting from His divine instruction, God lends us part of the responsibility for the generation of man, through the fertility of the man-woman couple. Thus we can say that God associates man to His creative activity.

II. The co-production of the human being by God and man himself does not only derive from God's creation of the device of fertility of the man-woman couple; God reserves for Himself a direct act in the Creation of each individual man. It is the principle of *animation*

which is derived from Revelation and is definitely stated by the Church. Man's rational soul is not, like the body, obtained from his parents: it comes by God's direct intervention, repeated for each and every man as it was when He infused Adam with his soul. The principle of animation is very important indeed and I regret that time is too short to repeat here the deductions drawn by an eminent Italian theologian, Lanza, from the study of this principle in the case of monozygotic twins. Those wishing to do so may study this problem by reading my book *Studio dei Gemelli*.

III. A third principle, possibly affecting our problem of ethics, is the extension of a principle belonging to natural law; an extension of the right of *disposition*, according to which, and I quote, "Only the person who has the right of disposition may use it, and even so, only within the limits he has been given." Now, the full right to dispose of the human body and its functions belongs only to God, Who created it. Man is the user, not the independent owner, of his body and spirit, of his life and of all that the Creator gave him according to nature's aims. From this point of view the physician has only those powers and rights over a man's body that are explicitly or implicitly conferred upon him by man himself; but man in turn may not confer more rights than he has. Thus he may not lend the physician the right to dispose of this life, of the integrity of his body, of his organs and/or their functions if not within the natural aims established by the Creator for the

faculties of human nature. Nor could the physician be granted the right to dispose of the human body beyond the limits set by the individual (or beyond those of natural aims) by any public authority, since the latter has no direct right whatsoever to dispose of the existence or the integrity of the organs of its innocent subjects.

As we did for the individual, we must stress again that the State does not hold the right of disposition and, as a consequence, may not confer such right upon a physician for any reason or purpose. We must in fact remember the principle that in Christian ethics man does not exist for the State: the State exists for man.

The terms I used in commenting upon the principle of *disposition* are derived from three speeches devoted to this subject by Pius XII. In those speeches the Pope often quoted the horrors committed in the Nazis' concentration camps, where men were used as experimental animals. Those who wish to learn more about these experiments conducted on men may read the book by Francois Bayle, *Croix gammée contre caducée*.

IV. Since Christian ethics states that all creatures belong to their Creator and should be used according to the will of the Creator to Whom they belong, let us consider the details of God's will concerning fertility. The fundamental rule was formulated by Christ Himself and reported by Matthew (XIX, 5-6): *For this cause a man shall leave his father and mother, and cleave to his wife, and the two shall become one flesh. There-*

fore now they are no longer two, but one flesh. What therefore God has joined together, let no man put asunder.

By these words God prescribes monogamic and indissoluble marriage. The indissolubility of marriage is a legal, not a biological concept. Yet the monogamic relationship has an obvious biological implication, since it limits the area of fertility to the relationship between one man and one woman. This tends to rule out reproductive variability beyond the possible genetic combinations afforded by the monogamic union.

Within our moral logic we do not need to explain the reasons for confining fertility to the area of monogamic marriage. We only had to identify the principle. However redundant, yet, the reasons supporting this commandment are to be found within the purpose of fertility itself. This purpose is the perpetuation of life and the principle concerns therefore primarily and above all the new life being conceived. In our case the product of fertility is a man consisting of body and soul. The necessities of this life, one and twofold, material and spiritual, require a definite, balanced, adapted ecologic niche. Here the complementary action of father and mother may proceed from physical generation to the responsibilities of spiritual education which is a sort of second birth. The requirements of reproduction are the first, if certainly not only ones, to justify the confinement of sexual union to the area of monogamic marital fertility.

V. Two of the Ten commandments received by Moses con-

cern ethics as applied to experiments on fertility in the human species: the Fifth and the Sixth. They are both negative commandments: *Thou shalt not kill* and *Thou shalt not commit adultery*. The biological implication they have in the area of fertility is to protect the natural function against its denial or its distortion.

The Fifth Commandment, "Thou shalt not kill," so widely applied to all states of human life, takes on an even more peremptory significance in life's earliest stages, when it begins as a consequence of marital fertility and when, during the intra-uterine period, is only loosely protected by positive legislation. To protect life in its prenatal stages is to defend a particularly defenseless human being: defenseless both legally and biologically. Ethics stress the right to life of the unborn: from conception to birth any offense, such as criminal abortion at any stage of pregnancy, is considered as homicide, the precise moment of fetal animation being unknown or hardly definitely pinpointed.

The protection of the right of birth is so definite that ethics forbids direct abortion in all cases.

VI. I would like to mention that the Commandment, "Thou shalt not commit adultery," represents a principle of ethics in the area of fertility. Its biological implication is to keep the functions of fertility from being diverted from their natural purpose and used in various forms of infertile, intersexual or homosexual eroticism. This same prin-

ciple forbids obtaining semen through masturbation.

The ethics of experiments on man in the area of fertility is based on the synopsis of principles we have just listed. It is fitting to repeat here that the field of experiment is but one of the fields in the area of fertility and should not be confused with others, such as that of individual sexual behaviour or that of medical and surgical treatment of sterility. These and other fields also require moral norms inspired by the same principles.

But our theme concerns only experimentation. Experiment is the peculiar method of scientific research. From a technical, or logic, point of view, experiment uses inductive logic and is defined as "the systematic observation of an induced phenomenon." Experiment presupposes a hypothesis which it verifies. Verification is obtained by isolating certain factors presumed to have a causal relationship to certain effects and testing the existence of such relationship, both by induced repetition of the phenomenon—*coeteris paribus*—and by properly modified control experiments.

Experiment is therefore a procedure of research aimed at the knowledge of phenomena.

We are greatly indebted to the organizers of the Fourth World Congress of Fertility and Sterility for having focused attention on this problem, because biological research is gaining ground by leaps and bounds and seems now ready to bring experimentation into the sacred enclosure of fertility.

In 1931 Aldous Huxley wrote his famous book, *Brave New World*, in which he foresaw for

the Seventh Century after Ford the development *in vitro* of biologically superior ova, fertilized by biologically superior spermatozoa, intended to produce men of the ruling classes. Other biologically inferior ova would undergo a twinning process whereby one fertilized ovum would produce 96 identical zygotes: through proper conditioning the latter would develop into sub-human creatures capable of non-skilled work.

This is absolute scientific phantasy, but it is highly significant that four years ago Huxley wrote a new book, *Brave New World Revisited*, in which he states that the nightmare he had foreseen for the Seventh Century after Ford is rapidly closing in on us.

Cytogenetics has recently made such progress in the study of human caryology that all important clinical laboratories are undertaking researches on human chromosomes in their metaphase. The step separating the experimental study of the reproduction of somatic cells from the study of amphimixis is technically short, and we know that it has been taken several times in recent years. We cannot pass judgment on these experiments because moral judgment must consider subjective circumstances, such as information and intention, which I do not know. I only wish to mention these experiments, from the original ones of M. K. Menkin and J. Rock, through those of L. B. Shettles and others, to the recent ones of D. Petrucci, in order to support my statement: that modern laboratory techniques are increasingly capable of ef-

fecting fertilization *in vitro* and even of following it up by the gradual states of human embryogenesis.

In my opinion the fact that these experiments, while so far not totally isolated, but still rare, is not due to technical difficulties, but rather to an intangible moral barrier in front of which the voice of conscience has alerted the individual scientist's initiative. "All those who are capable of the truth," wrote Dostoevskij, "all felt in their conscience what is good and what is not."

The message that appears before the mind of many researchers, as if sent over a mysterious teletype, could be the same that Moses received at the burning bush: "This is a sacred place."

For utter clarity let us find this message in the words addressed by Pope Pius XII to the members of the First International Congress of Histopathology of the Nervous System, convened in Rome ten years ago:

Scientific knowledge has its own value in the domain of medical science no less than in other scientific domains, such as, for example, physics, chemistry, cosmology and psychology. It is a value which must certainly not be minimized, a value existing quite independently of the usefulness or use of the acquired knowledge. Moreover, knowledge as such and the full understanding of any truth raise no moral objection. By virtue of this principle, research and the acquisition of truth for arriving at new, wider and deeper knowledge and understanding of the same truth are in themselves in accordance with the moral order.

But this does not mean that all methods, or any single method, arrived at by scientific and technical research offers every moral guarantee. Nor, moreover, does it mean that every method becomes licit be-

cause it increases and deepens our knowledge. Sometimes it happens that a method cannot be used without injuring the rights of others or without violating some moral rule of absolute value. In such a case, although one rightly envisages and pursues the increase of knowledge, morally the method is not admissible. Why not? Because science is not the highest value, that to which all other orders of values—or in the same order of value, all particular values—should be subordinated. Science itself, therefore, as well as its research and acquisitions, must be inserted in the order of values. Here there are well defined limits which even medical science cannot transgress without violating higher moral rules.

Let us note in respect of the words of the Pope that the position between scientific *experiment* (such as that to which the Papal message refers) and straightforward scientific *observation* differs, in so far that the latter does not entail the causing of the phenomenon and thus frees the researcher from many moral responsibilities for a phenomenon which he then only observes, describes and studies.

A real *experiment* in the field of human fertility can reveal many relevant and diverse aspects of biological and moral facts. Some experiments have already been carried out, others are being considered for some time in the future, others are being tried now.

The experiments made possible by currently available techniques but involving many and serious moral problems are primarily those found in the field of human experimental embryology: the possibility of providing human gametes does exist through surgical and non-surgical means, and research does not face any too extreme problems in repeating on fer-

tized human ova what Hans Spemann did on eggs of tritons and other species, with many followers in the field, among whom I would especially mention Otto Mangold, who died very recently.

Between experimental embryology on animals and on humans, ethics erect an invisible wall separating the licit from the illicit world.

The moral judgment on fertilization and embryogenesis *in vitro* as concerns the human species:

1. require an illicit use of human ova of which not even the woman from whom they come may dispose in such manner;
 2. require the use of spermatozoa that are normally obtained by illicit means and then illicitly used;
 3. effect artificial fertilization in a manner outside natural sexual intercourse;
 4. in the most likely hypothesis, produce the onset of human life thus realized outside the marital status, i.e. outside the area of legitimate fertility in the human species;
 5. provide the development of the embryo in improper site and circumstances, against the rules of Providence and the requirements of human nature;
 6. place the life thus artificially produced in such environmental conditions as to render it today certainly doomed; thus defying the Fifth Commandment: "Thou shalt not kill."
- We can thus easily understand why the Church, having condemned artificial insemination, should condemn even more fertilization and embryogenesis *in vitro* as an experiment that, however, technically possible to-

day in its first stages, is nevertheless utterly illicit.

Other experiments may be licit or illicit, depending on various circumstances: *quoad modum and quoad finem*. We may consider the example of anti-ovulatory substances. If they are used without the woman's consent, the experiment is illicit because it deprives the individual of a somatic right derived from the Fifth Commandment, "Thou shalt not kill." The sterilization of men and women suggested to Himmler in 1941 belonged to this type.

If the woman consents to her own temporary infertility, the problem concerns the woman's (or the researcher's) purpose. If it tends to make sexual intercourse (marital or extramarital) infertile, the use of anti-ovulatory substances is illicit. If instead the woman was administered anti-ovulatory substances for licit purposes, then the corresponding experimental researches would also be licit. If for instance these substances were administered, according to recent practice, for therapeutic reasons, to treat sterility by the so-called "rebound therapy," then the purpose is totally reversed. In this case the use of temporary oral contraceptives, intended for rebound fertility, is justified by the physician's aim to assist human persons in their natural functions (the same principle justifies, in other fields, surgical mutilations).

Since our practical discussion should be based on examples, I would like to mention another field in which experiments can be carried out, according to ethical principles, even in some

areas pertaining to the process of fertilization. This field is the study of twins, which Human Genetics explore daily in order to obtain those experimental results that Experimental Genetics obtains on animals and plants.

Like experimental embryology, Experimental Genetics is illicit, even if possible, in the human species. Therefore Human, Medical, and Clinical Genetics must have recourse to the observation of spontaneous phenomena (genealogical method), to the statistical analysis of hereditary phenomena in populations, or to the study of twins, which is a complete method in itself. The twin method, in fact, includes both proof and counterproof of the genetic phenomenon being considered, wherever it is applied to both categories of twins: monozygotic and dizygotic. In a recent paper written with G. Brenci I have explained the methodology of this type of genetic analysis.

In Rome's Mendel Institute we have applied the twin method to a study of the fertile period of monozygotic and dizygotic twins through an analysis of individual menarche and calameniogram (i. e. the time-cycle variations of the menstrual flow). Another study considered ovulation in its thermal variations, while a survey of the so-called premenstrual syndrome is now in progress.

Experiments on twins find their crucial and most revealing point in the twofold comparison, intrageminal and intergeminal: experimental findings are compared between cotwins of the same pair and, respectively, between monozygotic and dizygotic twin pairs. The experimental

conditions are thus provided by Nature itself; human intelligence must recognize these experimental conditions, read through them and interpret the results.

Yet I realize that the many examples and classifications I just mentioned may confuse the total picture of biologic phenomena involving men, such as only ethics may supply.

The moral viewpoint is a religious view, solemn, balanced and optimistic, of human phenomena.

Its solemnity derives from the reflection that man's life is linked to the *causa causarum*, the will of our Creator, and is, therefore, sacred. We can repeat this same principle using some words written by Rostand: "As there are unsurpassable limits of radioactivity, there are limits in the spiritual order, unsurpassable limits unless we want to throw the human animal into chaos and disorder."

Balance, or harmony, is a human character, reflecting the inter-dependence of phenomena affecting men in mutual relationship through space and time.

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