

WORKING GROUP

ON

THE DETERMINATION OF BRAIN DEATH
AND ITS RELATIONSHIP
TO HUMAN DEATH

10-14 December 1989

EDITED BY

R. J. WHITE

H. ANGSTWURM and I. CARRASCO DE PAULA



PONTIFICIA ACADEMIA SCIENTIARUM

MCMXCII

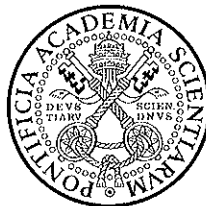


Casina Pio IV, situated in the Vatican Gardens,
Seat of the Pontifical Academy of Sciences

WORKING GROUP
ON
THE DETERMINATION OF BRAIN DEATH
AND ITS RELATIONSHIP
TO HUMAN DEATH

10-14 December 1989

EDITED BY
R. J. WHITE
H. ANGSTWURM and I. CARRASCO DE PAULA



PONTIFICIA ACADEMIA SCIENTIARUM

—
MCMXCII

The opinions expressed with absolute freedom during the presentation of the papers and in the subsequent discussions by the participants in the Plenary Session, although published by the Academy, represent only the points of view of the participants and not those of the Academy.

Editorial committee for the preparation of the Proceedings:

GIOVANNI BATTISTA MARINI-BETTÒLO

RENATO DARDOZZI

AMBROGIO M. PIAZZONI

ISBN 88-7761-048-4

© Copyright 1992

PONTIFICIA ACADEMIA SCIENTIARUM

VATICAN CITY

PREFACE

The Pontifical Academy of Sciences, in pursuing its mandated aim of promoting the progress of the mathematical, physical and natural sciences, employs various approaches to this end. Thus, in the words of its 1976 Statutes, it

“organizes meetings to promote the progress of science and the solution of important scientific problems...” and “promotes scientific investigations and researches which can contribute, in the appropriate quarters, to the exploration of moral, social and spiritual problems.”

The interdisciplinary Working Group which met at the Seat of the Academy in the Vatican Gardens in December 1989 was of a nature to further both these aims. In this it differed from a previous Working Group organized by the Academy in October 1983, “The Artificial Prolongation of Life and the Determination of the Exact Moment of Death,” where participating experts were mainly drawn from the scientific community alone.

In the 1989 meeting, the context was enlarged to include representatives from the fields of philosophy and theology, as well as a legal expert. This interdisciplinary formula, with its possibilities for fruitful exchange, is one which the Pontifical Academy of Sciences is applying with increasing frequency in the conferences which it organizes.

At its inception, this meeting was convoked to consider:

- whether “cerebral death”, being the suppression of an essential function of the human person, is a sufficient indication of actual death;
- whether there are other experimental “signs” which might be included, along with “cerebral death”, as valid and sure indications of “actual death”;
- the present experimental situation: norms involved when “cerebral death” is considered to be, in practice, a valid criterion; the need for prompt action in order to avoid possible abuses.

In the course of the Working Group deliberations, there emerged a nearly unanimous agreement that the Definition of Death arrived at in the earlier meeting of 1985 was valid and acceptable. (The Proceedings and Conclusions of the 1985

Working Group have been published by the Academy as No. 60 of its *Scripta Varia* series). It should be noted, however, that in publishing the *Proceedings* of the present *Working Group*, the Editors have excluded from the title any mention of the concept of the "moment" of death. As they explain below, in the *Foreword*, the "state" of brain death can be clearly ascertained, whereas the determination of the exact moment when it occurs may be more problematic.

The papers presented by the scientific participants in the *Working Group* will be found in the first part of the volume, followed by the *Conclusions* which they formulated at the end of the conference. Then follow the papers of the participants from other disciplines. These philosophical, theological and legal experts, while not formulating *Conclusions* as such, did summarize some of the principal aspects of their papers and discussions, and this summary has been incorporated into the *Foreword*.

The Pontifical Academy of Sciences is pleased to be able to make available, by means of this volume, the material presented and discussed at the December 1989 *Working Group*. The Academy, an autonomous institution within the Holy See, applies the principle of full freedom of expression. Each author is therefore responsible for his or her expressed opinions, which may not necessarily coincide with the views of the Academy.

G. B. MARINI-BETTÒLO

President, Pontifical Academy of Sciences

FOREWORD

In 1985, this Pontifical Academy held a Working Group in order to study, purely on the scientific level, the problems deriving from the use of artificial methods for the prolongation of life; such means have been rendered possible by progress in science and technology. The Working Group attempted in particular to provide a definition of the exact moment of death.

This latter point was particularly delicate in its repercussions not only in a juridical and theological sense, but above all in the determination of the legitimacy of removing organs for transplants, generally before such organs have suffered damage.

The group of scientists who participated at that Working Group were unanimous in affirming by way of conclusion, a series of points proposing that death has taken place when:

a) spontaneous cardiac and respiratory functions have irreversibly ceased, or

b) there has been an irreversible cessation of all brain function.

The concluding document stressed the fact that brain death is the true criterion for death, given that the complete cessation of cardio-respiratory functions leads very quickly to brain death. The document also contains other points to indicate the means to establish the cessation of brain activity and deontological and ethical norms for organ transplants.

The acts and conclusions of that Working Group were published in 1986 and enjoyed general agreement among doctors and scientists as well as in general among those who saw the beneficial aspects of organ transplants. However among certain moralists and philosophers, questions and even strong opposition was aroused. For this reason, the Academy found it opportune, following the suggestion of the Congregation for the Doctrine of the Faith, to convoke a further meeting in December 1989, with the participation not only of medical scientists, but also of philosophers, theologians and legal experts. This meeting aimed to study more deeply the scientific principles within a wider cultural context which would take into account the special nature of the human personality.

On this occasion, Pope John Paul II stressed in his discourse to the participants that the task and responsibility of medical scientists must be that of indicating with certainty the signs of death. This teaching is in the line of Pius XII who during an audience granted to anaesthetists in November 1957 stated that: "It is the task of the doctor... to give a clear and precise definition of 'death' and of the 'moment of death' of a patient" (AAS 49 [1957] p. 1031).

The meeting of 1989 involved a direct encounter of philosophers, theologians and moralists with doctors. On the scientific level, four years of study and research completely confirmed the conclusions proposed in 1985 as was the criterion of brain death as death of the human being. It was observed, however, that it is more accurate to speak of the state of death rather than of the exact moment of death. The medical scientist can clearly ascertain the state of death, while it is practically impossible to establish medically the beginning of this state or the moment of death. It is in this context that the title of the conclusions and acts of the 1989 meeting has been decided as *The Determination of Brain Death and its Relationship to Human Death*.

There has been a deepening of the philosophical, legal and normative consequences of this question, as seen for example in the legislation of various States. Certain contrary opinions which emerged in the discussion opposing the agreed medical definition of the state of death came mainly from the philosophical sector. Some philosophers think that total brain infarction is not a certain sign of death; they would add that they have great reservations concerning transplants. These opinions do not undermine the definition which represents the consensus of the international scientific community, and constitute in a certain sense an illegitimate extrapolation outside the philosophical realm.

The group of philosophers, legal experts and theologians, having participated in the sessions of the meeting with their papers and discussions, proposed certain comments which are now set forth:

- It has been confirmed that the spiritual element, the soul, is the form of the human subject which unitarily determines all its physical and spiritual functions. Death is the separation of the spiritual principle from the body. In the Christian tradition, this is a sorrowful mystery which is linked to sin. Such a separation cannot be perceived by any of the senses but there are visible signs which give moral certainty that it has taken place. In the light of current knowledge, besides such signs which are universally known and accepted, the complete destruction of the encephalon has been indicated as capable of excluding any doubt, uncertainty or ambiguity since there is no

further possibility of organic or vital functions. The medical practitioner's task is to inform the relatives that such an event has been verified. It is also his task to establish and notify such an event, in these cases suspending the use of instruments in keeping with ethical and solidarity principles.

- The dignity of the human body as deriving from its profound relationship with the soul and its ultimate resurrection was also confirmed. From this flows the deep respect due to the body of man even after death, being a symbol of the person and an object of love for his relatives and many others. As regards the practice of transplants, the solidarity aspect on the part of the donor is to be emphasised. It therefore follows that authorization for the transplantation of organs is not at variance to the principle of respect for the body but rather being an act of profound human solidarity. Nevertheless legal regulations are necessary. Respect for human life prohibits any act directed at bringing about or speeding up death as well as any omissions that may result in death. The sign that the medical practitioners present have set forth to indicate death has been considered to be in line with the general criteria of certainty in moral order.
- The importance of defining correct criteria regarding death is further reinforced by their fundamental relation with morality and theology. These latter disciplines must be utilized in connection with medical deontology in establishing when it is permissible to interrupt artificial support measures, including artificial respiration systems. The participants have suggested certain easily detectable clinical signs and specific forms of instrumentation for confirmation as criteria for documenting the state of death of persons under reanimation. It was agreed that such criteria take on an added ethical dimension in establishing death in the case of organ transplantation where the lives of many suffering people would be extended through organ donation.

We wish to emphasize that it would not be appropriate to apply the criterion of brain death developed for the adult as the criterion of the death either in the case of human infants born with central nervous system malformation (for example, in the anencephalic infant) or in the case of the aborted fetus. Many related questions were not addressed during this Working Group's deliberations, not to mention the multiple ethical aspects which characterize organ transplantation itself. Such issues remain as matter for experts in ethical and moral theology and lie above all within the competence of the Church's Magisterium.

R. CORTESINI

Università di Roma "La Sapienza"

II Clinica Chirurgica

I-00161 Roma

(Italy)

Born in Milan on 3 November 1931. Professor of General Surgery and Transplants.
Author of various publications in this field.

R. DARDOZZI

Pontificia Academia Scientiarum

Casina Pio IV

00120 Città del Vaticano

JOHN C. ECCLES

Cà a la Grà

CH-6646 CONTRA (TI)

(Switzerland)

Born in Melbourne on 27 January 1903. Nobel Prize for Physiology and Medicine (1963). An expert in the field of mind-body problems. Awarded Honorary doctorates by universities throughout the world. Member of the Pontifical Academy of Sciences since 1961, and of many other academies in different countries. Author of numerous publications in this field.

J. DE FINANCE

Pontificia Università Gregoriana

Dept. of Philosophy

Piazza della Pilotta, 4

I-00187 Roma

(Italy)

Born in La Canourgue, Lozère, France, on 30 January 1904. Professor of Philosophy (now retired) both in France and at the Gregorian University in Rome. Awarded Honorary Doctorate by University El Salvador, Buenos Aires. Author of various publications in this field.

G. GERIN

Istituto Internazionale di Studi sui Diritti dell'Uomo
Via Cantù, 10
I-34127 Trieste
(Italy)

Born in Trieste on 5 January 1921. Holds the Chair in Administrative Law at the University of Trieste. President of the International Institute for Human Rights Studies. Scientific Counselor at UNESCO for moral scientific issues. Legal consultant to the Council of Europe. Member of the Higher Scientific Academy of Arts and Sciences. Author of several publications on law and human rights.

D. H. INGVAR

University Hospital
Dept. of Clinical Neurophysiology
S-221 85 Lund
(Sweden)

Born in Lund, Sweden on 3 February 1924. Vice-President and President for the Swedish Society of Medicine 1981-85. Professor of Clinical Neurophysiology at University Hospital, Lund. Author of numerous publications on epilepsy, brain diseases, the physiological basis of consciousness, coma, and death (brain death).

J. LEJEUNE

Institut de Progènese
45, rue des Saints Pères
F-75270 Paris
(France)

J. M. McDERMOTT

Pontificia Università Gregoriana
Dept. of Theology
Piazza della Pilotta, 4
I-00187 Roma
(Italy)

Born in New York on 8 November 1942. Associate Professor of Dogmatic Theology at the Gregorian University in Rome. Member of the Board of Directors of the Pope John XXIII Medical-Moral Center 1978-81. Editorial consultant for "Thought" 1978-80. Author of various publications.

J.-M. MALDAMÉ

Couvent Saint-Thomas d'Aquin

Impasse Lacordaire – 31, rue des Maraîchers

F-31078 Toulouse Cedex

(France)

Born in Algeria on 31 August 1939. Professor of Theology and author.

G. B. MARINI-BETTÒLO

Pontificia Academia Scientiarum

00120 Città del Vaticano

Born in Rome on 27 June 1915. President of the Pontifical Academy of Sciences since 1988. Ex-President of the Accademia Nazionale delle Scienze. Fellow of many Academies worldwide. Professor of Chemistry at “La Sapienza” and the Università Cattolica del Sacro Cuore in Rome. Awarded Honorary Doctorates by universities throughout the world. A biochemist and environmentalist. Author of numerous publications on the use of natural medicines.

D. OLS

Pontificia Università S. Tommaso d'Aquino

Largo Angelicum, 1

I-00184 Roma

(Italy)

Born in Paris on 25 June 1942. Professor of Theological Dogma at the S. Tommaso Pontifical University in Rome. Author of numerous publications.

D. OTTOSON

Wenner-Gren Center Foundation for Scientific Research

Sveavägen 166

S-113 46 Stockholm

(Sweden)

Born in China on 24 August 1918. Professor of Physiology. Research on sensory physiology, pain, and the development of methods for pain alleviation by physical treatment.

✠ P. ROSSANO

Pontificia Università Lateranense
00120 Città del Vaticano

M. SACCHETTI

Ospedale Pediatrico del Bambino Gesù
Piazza S. Onofrio, 4
00165 Roma

J. SEIFERT

Internationale Akademie für Philosophie
Obergass 75
FL-9494 Schaan (Liechtenstein)

Born in Salzburg on 6 January 1945. Rector and Professor of Philosophy at the International Academy of Philosophy in Fürstentum Liechtenstein. Founding Editor of "Aletheia, An International Journal of Philosophy" and author of various publications on moral philosophy.

A. SERRA

Università Cattolica del Sacro Cuore
Istituto di Genetica Umana
Largo Francesco Vito, 1
I-00168 Roma
(Italy)

Born in Genova-Sampiedarena on 11 March 1919. Appointed Visiting Lecturer on Mathematical Biology at Harvard University early on in his career. Professor of Human Genetics at the "A. Gemelli", Università Cattolica S. Cuore, and Director of the Institute of Human Genetics and of the Clinical Cytogenetics Service. Author of numerous publications on human and medical genetics.

E. SGRECCIA

Università Cattolica del Sacro Cuore
Centro di Bioetica
Largo Francesco Vito, 1
I-00168 Roma
(Italy)

Born in Arcevia, Italy, on 6 June 1928. Professor of Bioethics and Director of the Bioethics Centre at the Università Cattolica del Sacro Cuore. Rector of the Marchigiano Theological Institute. Director of the "Medicina e Morale" magazine.

D. A. SHEWMON

University of California, Los Angeles
Dept. of Pediatrics, Division of Neurology
MDCC 22-464
10833 Le Conte Avenue
Los Angeles, CA 90024-1752
(U.S.A.)

Born in Pulaski, Virginia (U.S.A.) on 16 August 1949. Expert in the field of pediatric neurology with special interest in EEG, epilepsy and coma prognosis. Director of the Pediatric Monitoring Division of UCLA Clinical EEG Laboratory and the Assistant Professor, Department of Pediatrics, Division of Neurology, UCLA Medical Center. Member of many medical societies and associations in the United States including the American Academy of Neurology. Associate Examiner for the American Board of Clinical Neurophysiology. Author of numerous publications on brain death.

R. J. WHITE

Case Western Reserve University
Metro-Health Medical center
Dept. of Neurosurgery and Brain Research Laboratories
3395 Scranton Road
Cleveland, OH 44109-1998
(U.S.A.)

Born in Duluth, Minnesota (U. S. A.) on 21 January 1926. Professor and Co-Chairman of Neurosurgery, at Case Western Reserve University. Director of Neurosurgery and Brain Research Laboratories, MetroHealth Medical Center. Editor of Surgical Neurology, Journal of Trauma, and Neurosurgical Research. Research into brain physiology and chemistry has resulted in the introduction of a number of new techniques in operative neurosurgery. Author of many publications in this field.

DISCOURSE OF JOHN PAUL II TO THE PARTICIPANTS OF THE WORKING GROUP

Distinguished Friends,

1. *It is always a pleasure for me to meet the men and women of science and culture who come together under the auspices of the Pontifical Academy of Sciences for an exchange of ideas and experiences on themes of the highest interest for the advancement of knowledge and the development of peoples. Today I am happy to greet you at the close of this gathering during which you have considered the serious problems connected with defining the moment of death, a topic which the Academy decided to take up as part of a research project begun at a Study Week in 1985. It is also a source of satisfaction that this present meeting has been arranged in cooperation with the Congregation for the Doctrine of the Faith. This in itself indicates the importance which the Holy See attaches to the theme under discussion.*

In order to be as fruitful as possible, the Church's action in and on behalf of the world derives much benefit from an ever increasing and more profound knowledge of man, of the situations in which he finds himself, of the questions he asks himself. While it is not the Church's specific role to advance knowledge of a strictly scientific nature, she cannot ignore or neglect issues which are closely related to her mission of bringing the Gospel message to the thought and culture of our times (cf. Gaudium et spes, Nos. 1-3).

This is particularly so when it is a question of defining the rules which should regulate human conduct. Human action affects concrete and temporal reality. Therefore the values which should inspire human conduct must reckon with that reality, with its possibilities and its limits. If the Church is to fulfil her role as the guide of consciences and not disappoint those who seek light in her, she must be well informed about this reality, which provides immense scope for positive new scientific and technical discoveries and

achievements, while also involving advances which are sometimes disturbing and not infrequently perplex the human conscience.

2. *This is especially the case when the reality in question is human life itself in relation to its beginning and temporal end. Life, in its spiritual and somatic unity, commands our respect (cf. *ibid.*, Nos. 14, 27). Neither individuals nor society are permitted to endanger life, whatever the benefits that might possibly accrue as a result.*

*The value of life springs from what is spiritual in man. The body too receives from the spiritual principle—which inhabits it and makes it what it is (Council of Vienne, Constitutio “Fidei Catholicae”, Denzinger-Schoenmetzer, Enchiridion Symbolorum, No. 902)—a supreme dignity, a kind of reflection of the Absolute. The body is that of a person, a being which is open to superior values, a being capable of fulfilment in the knowledge and love of God (cf. *Gaudium et spes*, Nos. 12, 15).*

*When we consider that every individual is a living expression of unity and that the human body is not just an instrument or item of property, but shares in the individual’s value as a human being, then it follows that the body cannot under any circumstances be treated as something to be disposed of at will (cf. *ibid.*, No. 14).*

3. *One cannot make the body a mere object of experimentation with no other norms than those of scientific research and technical capacity. However interesting or even useful certain kinds of experimentation may appear, however technologically possible they may now be, anyone with a true understanding of values and human dignity will immediately recognize that even an apparently promising avenue of experimentation must be abandoned if it involves the degradation of man or the deliberate termination of his earthly existence. In the long run, apparent benefits of this kind would be of an illusory nature (cf. *ibid.*, Nos. 27, 51). Thus, some form of renunciation on the part of scientists and researchers is called for. It may seem unreasonable to admit that a feasible and promising experiment should be hindered by moral imperatives, especially when it is almost certain that other people, who feel less bound by ethical restraints, will in any case carry out the same research. But is this not the case with all moral imperatives? And are not those who remain faithful to such imperatives often considered as naive and treated as such?*

Here the difficulty is even greater because a prohibition made in the name of respect for life seems to conflict with other important values: not only the value of scientific knowledge, but also values connected with the concrete good of humanity, such as the improvement of living conditions, health, the relief or healing of illness and suffering, etc. This is the very problem you are considering. How does one reconcile respect for life—which forbids any action likely to cause or hasten death—with the potential good that results for humanity if the organs of a dead person are removed for transplanting to a sick person who needs them, keeping in mind that the success of such an intervention depends on the speed with which the organs are removed from the donor after his or her death?

4. At what moment does that which we call death take place? That is the crux of the matter. In essence, exactly what is death?

As you know, and as your discussions have confirmed, it is not easy to reach a definition of death which can be understood and accepted by all. Death can mean decomposition, disintegration, a separation (cf. *Salvifici doloris*, No. 15; *Gaudium et spes*, No. 18). It occurs when the spiritual principle which ensures the unity of the individual can no longer exercise its functions in and upon the organism, whose elements, left to themselves, disintegrate.

This destruction does not of course affect the entire human being. Christian faith—and it is not alone here—affirms the continuation of man's spiritual principle beyond death. However, this state of "beyond"—for those who do not have faith—is without a clear face or form, and everyone feels anguish when confronted by a separation which so brutally contradicts our will to live, our wish to exist. Unlike animals, man knows that he must die and he perceives this as an affront to his dignity. Although in the flesh he is mortal, he also realizes that he ought not to die, because he carries within himself an openness, an aspiration towards the eternal.

Why does death exist? What is its meaning? Christian faith affirms that there is a mysterious link between death and moral disorder or sin. Yet at the same time, faith imbues death with a positive meaning because it has the resurrection as its horizon. It shows us the Word of God who takes on our mortal condition and offers his life in sacrifice for us sinners on the Cross. Death is neither a simple physical consequence nor a mere punishment. It becomes the gift of self for the sake of love. In the Risen Christ we see death

definitively conquered: "death has no more dominion over him" (Rom 6:9). The Christian also confidently looks forward to regaining his own personal totality, transfigured and definitively possessed in Christ (cf. 1 Cor 15:22).

Such is death seen through the eyes of faith. It is not so much an end of living as an entry into a new life, a life without end. If we freely accept the love which God offers us, we will have a new birth in joy and in light, a new dies natalis.

This hope does not however prevent death from being a painful separation, at least as it is experienced at the ordinary level of awareness. The moment of this separation is not directly discernible, and the problem is to identify its signs. How many questions emerge here, and how complex they are! Your reports and your discussions have emphasized this fact, and have provided valuable elements for a solution.

5. The problem of the moment of death has serious implications at the practical level, and this aspect is also of great interest to the Church. In practice, there seems to arise a tragic dilemma. On the one hand there is the urgent need to find replacement organs for sick people who would otherwise die or at least would not recover. In other words, it is conceivable that in order to escape certain and imminent death a patient may need to receive an organ which could be provided by another patient, who may be lying next to him in hospital, but about whose death there still remains some doubt. Consequently, in the process there arises the danger of terminating a human life, of definitively disrupting the psychosomatic unity of a person. More precisely, there is a real possibility that the life whose continuation is made unsustainable by the removal of a vital organ may be that of a living person, whereas the respect due to human life absolutely prohibits the direct and positive sacrifice of that life, even though it may be for the benefit of another human being who might be felt to be entitled to preference.

Even the application of very certain principles is not always easy, for the confrontation with opposite demands clouds our imperfect vision and therefore our perception of the absolute values which depend neither on our vision nor on our emotions.

6. In such conditions two tasks need to be addressed.

Scientists, analysts and scholars must pursue their research and studies in order to determine as precisely as possible the exact moment and the indis-

putable sign of death. For, once such a determination has been arrived at, then the apparent conflict, between the duty to respect the life of one person and the duty to effect a cure or even save the life of another, disappears. One would be able to know at what moment it would be perfectly permissible to do what had been definitely forbidden previously, namely, the removal of an organ for transplanting, with the best chances of a successful outcome.

Moralists, philosophers and theologians must find appropriate solutions to new problems and to new aspects of age-old problems in the light of new data. They must examine situations which were previously inconceivable and which have therefore never before been assessed. In other words, they must exercise what the moral tradition defines as the virtue of prudence, which presupposes moral rectitude and faithfulness to the Good. This virtue makes it possible to assess all the factors and values involved according to their respective importance. It guards against facile solutions or solutions which, in resolving a difficult case, surreptitiously introduce false principles. Thus the acquisition of new data can stimulate and refine moral reflection, just as, by contrast, moral demands which seem perhaps to scientists to restrict their freedom may be and indeed often are an incentive to further fruitful research.

Scientific research and moral reflection must proceed side by side in a spirit of mutual help. We must never lose sight of the supreme dignity of the human person whose well-being research and reflection are called to serve, and in whom the believer recognizes nothing less than the image of God himself (cf. Gen 1:28-29; Gaudium et spes, No. 12).

Distinguished friends, may the Spirit of Truth assist you in your difficult but necessary and most valuable research. I thank you for your cooperation with the Pontifical Academy of Sciences, which seeks to foster interdisciplinary dialogue and a wide exchange of information in fields of human endeavour which involve moral choices and responsibilities of the utmost importance for the well-being of the human family. May God bless you abundantly!

I
PRELIMINARY REMARKS

WELCOMING ADDRESS TO THE PARTICIPANTS

G. B. MARINI-BETTÒLO

President Pontifical Academy of Sciences

The Pontifical Academy of Sciences is extremely grateful for your prompt acceptance of our invitation to come here today to discuss the moral and scientific aspects of the very delicate and interrelated topics of *organ transplantation and the determination of human death*. The latter concept is intimately related to the question of transplant ex mortuo of essential solid organs such as the heart, kidney, and pancreas.

The issues for our consideration during the days of the Study Group are the result of important biotechnical advances occurring in the last several decades. First, the medical technological progress in the development of reanimation techniques and life support systems that now permit the maintenance of the body with a functioning heart even after the cessation of all brain activity; and, second, the advances that have occurred in solid organ transplantation resulting from innovations in surgery and immunology. Due to these advances, a growing number of successful organ transplantations are being performed demanding an ever increasing supply of organs. As a consequence of this increasing need for donor organs, it is essential that the determination of death, both in terms of its exact timing and methodology, must be established.

In order to provide regulation in these matters, legislative bodies in many countries have sought to initiate appropriate laws and restrictions based on moral, legal, and scientific principles in order to offer some control to the entire field of organ transplantation.

I wish to go on record noting that our Academy in 1985 studied and discussed this very question within the framework of one of our Working Groups. Our new group, in a sense, provides an element of continuity with that original meeting in that certain participants, Reverend Dardozzi, Professors Ingvar and White were in attendance at the 1985 discussion.

In 1985 * it was agreed by the Working Group that the criteria to establish a Definition of Death was as follows:

A person is dead when he has suffered irreversible loss of all capacity for integrating and coordinating physical and mental functions of the body.

Death has occurred when:

- a) spontaneous cardiac and respiratory functions have irreversibly ceased, or
- b) there has been an irreversible cessation of all brain function.

From the discussion it appears that cerebral death is the true criterion of death, since the definite cessation of all cardiopulmonary function leads to irreversible cessation of all cerebral function.

These criteria are generally those followed by the Western scientific and medical communities and are invariably included in the legislation dealing with these subjects of those countries where organ transplantation is authorised. Often additional legal norms emphasizing respect for the will of the donors and their relatives are incorporated into the laws in order to provide full respect for the rights of the donor.

Whereas these criteria have been universally accepted in Europe and such countries as America and Australia, they have not always been acknowledged or accepted in Asia. This is because of certain religious and cultural beliefs. While, as stated above, the criteria developed for defining human death only in terms of brain death has been almost totally accepted in Western countries, there has arisen on occasion some disagreement with this concept because of religious beliefs or tradition.

For these reasons, the Pontifical Academy of Sciences in close collaboration with the Congregation for the Doctrine of the Faith has considered it convenient to organize this preparatory meeting for a Working Group, which will analyze in the light of scientific progress and with the most advanced data available the issues surrounding the determination of human death. This analysis should contribute to the understanding not only of the clinical and technical aspects of the question, but also their moral, philosophical, and theological implications.

* Working Group on 'The Artificial Prolongation of Life and the Determination of the Exact Moment of Death (October 19-21, 1985) edited by Carlos Chagas, Pontifical Academy of Sciences Scripta Varia, 113-114.

III

FINAL CONSIDERATION FORMULATED
BY THE SCIENTIFIC PARTICIPANTS

Final considerations formulated by the scientific participants	81
--	----

ADDITIONAL ASPECTS

1. LEGAL ASPECTS

G. GERIN: Preliminary notes on the legal implications of organ transplants	87
--	----

2. PHILOSOPHICAL, THEOLOGICAL AND MORAL ASPECTS

J. SEIFERT: Is "brain death" actually death? A critique of redefining man's death in terms of "brain death"	95
D. OLS, O. P.: Assertions dogmatiques que doit prendre en compte la réflexion sur la transplantation d'organes	145
J. M. McDERMOTT, S.J.: Catholic Doctrine on Death	153
J.-M. MALDAMÉ, O.P.: Réflexion philosophique et théologique sur le moment de la mort	177
L. CICCONE: "Cerebral Death": is this sufficient to establish human death? .	187
I. CARRASCO DE PAULA: The etical relevance of brain death	197

APPENDIX

Conclusions of the meeting of the Working Group held at the Pontifical Academy of Sciences, October 19-21 1985 on <i>The Artificial Prolongation of Life and the Determination of the Exact Moment of Death</i>	207
---	-----

CONTENTS

<i>Preface</i>	XI
<i>Foreword</i>	XIII
<i>List of Participants</i>	XVII
<i>Discourse of Pope John Paul II</i>	XXIII

I

PRELIMINARY REMARKS

G.B. MARINI-BETTÒLO: Welcoming Address to the participants	3
J.C. ECCLES: Introductory lecture	7

II

SCIENTIFIC AND CLINICAL ASPECTS

H. ANGSTWURM: Brain death as the death of a human being	17
A. SHEWMON: "Brain Death": a valid theme with invalid variations, blurred by semantic ambiguity	23
R.J. WHITE: The concept of human death in reference to organ transplantation	53
D.H. INGVAR and S.-E. BERGENTZ: Definition of death and organ transplantation. Experiences from Sweden	63
D. OTTOSON: Perspectives in brain research	73

I would like now to call to our attention the main points that will be discussed at this meeting. As you have noted, our agenda is full of very important questions, and I hope that with your great skill and wisdom you will be able to provide answers and solutions to these great problems within the framework of the protection of the dignity of human life:

1. The meeting will seek to examine in depth the concept of "death" with the aim of arriving at an accepted definition of "death" by means of discussions among scientists, philosophers, and theologians.

2. To examine whether "brain death," based on the elimination of all brain function, is truly sufficient to declare the actual death of the human person.

3. To investigate whether there are other experimental or clinical evidences which might be included, along with "brain death" as valid and absolute indications of "actual death" of the human organism.

4. To survey the present situation as to moral, legal, and scientific implications that are involved when "brain death" has been considered to be a valid criterion for defining human death in medical practice.

With such a review it is hoped to be able to identify any evidence of improper application so that prompt action can be undertaken to avoid such abuse.

INTRODUCTORY LECTURE

JOHN C. ECCLES

There are two primal certainties for each of us:

1. That one exists as a unique self-conscious being.

The world within (World 2).

2. That the world of matter-energy exists, which includes even our bodies and brains.

The world without (World 1).

The body-mind problem is resolved into:

a) The body-brain problem of neuroscience.

b) The brain-mind problem of neurophilosophy.

When we come to consider the brain as the seat of the conscious personhood, we can recognize that large parts of the brain are not essential. For example removal of the cerebellum gravely incapacitates movement, but the person is not otherwise affected. It is quite different with the main part of the brain, the cerebral hemispheres (Fig. 1). They are very intimately related to the consciousness of the person, but not equally. In 95% of persons there is dominance of the left hemisphere since it contains the two speech areas shown in Fig. 1.

Commissurotomy (Sperry) reveals that the left (speaking) hemisphere relates to self-consciousness with all the attributes of the human person, while the other hemisphere is conscious with a very limited self-recognition, but with special spatial, musical and syllabic abilities.

There are important ascending inputs to the cerebral cortex from the reticular activating system, which provides an essential background excitation. Its destruction results in a prolonged cerebral depression, the so-called vigil

coma. Also ascending to the cortex are serotonin, noradrenalin and dopamine inputs, also acting diffusely.

MIND-BRAIN INTERACTION

In Fig. 2 arrows are drawn across the interface between the modules of the neocortex below and the wide range of mental events of World 2 above. This illustrates the extraordinary problem that was first recognized by Descartes: how can the conscious mind and the brain interact? This question is still the great enigma. However, in following up a suggestion of the quantum physicist Henry Margenau, I have recently developed an hypothesis, the microsite hypothesis, according to which the non-material mind can influence synaptic action without violating the conservation laws of physics (Eccles Proc. Roy Soc B 227; 411-428, 1986). (Eccles. Proc. Roy Soc B 220; 433-451, 1990). The hypothesis makes use of the microstructure of the synapse (Fig. 3B) and the discovery that when a synapse is activated by a nerve impulse, there is exocytosis of a single vesicle with its contained synaptic transmitter molecules, not regularly, but only probabilistically. An understanding of this hypothesis is facilitated by a simple account of the microstructure of the cerebral cortex. In Fig. 3Bc there are shown the synaptic vesicles assembled along the presynaptic membrane, so forming the presynaptic vesicular grid (PVG). In order for one vesicle to release its transmitter molecules into the synaptic cleft d for action across the synapse, an extremely small particle (about 10^{-18} g) has to be displaced, which easily brings it into the range of the Heisenberg Uncertainty Principle of quantum physics.

THE MICROSTRUCTURE OF THE CEREBRAL CORTEX

The cerebral hemisphere depicted in Fig. 1 has as its essential structure the neocortex which is composed largely of neural units or neurons and which covers the brain even down the deepest convolutions. There are about 40,000 neurons/mm² and 10,000 million in the whole neocortex. The principal types of neurons are the pyramidal cells that form at least 70% of the cortical neurons and which are seen in Fig. 3A in a perspective drawing showing the 6 laminae of the neocortex. In the part to the left of Fig. 3A there are seen 2 large pyramidal cells in lamina V and 2 smaller pyramidal cells in lamina III. The important feature of the pyramidal cell is its apical dendrite that projects up through the laminae to terminate as a tuft in lamina I. As can be seen in the lamina III pyramidal cell to the right, the spines along the apical dendrites are the sites of synaptic contacts with an incoming nerve fibre. These are the

all important *spine synapses*, one of which is shown enlarged in Fig. 3B with the assembled synaptic vesicles in the bouton, each containing 5,000 to 10,000 molecules of the synaptic transmitter substance. These spine synapses are the principal mode of excitatory connection from neuron to neuron. There are on the average about 2,000 spine synapses on each apical dendrite and its branches and tuftal ending.

There is general agreement by the neuroanatomists Fleischhauer and Peters and their associates that in all parts of the neocortex the apical dendrites of pyramidal cells tend to coalesce into bundles or clusters as they ascend from lamina V to I with additions from laminae III and II. This is illustrated in Fig. 4, where three bundles are drawn, the lamina V cells.

There are up to 100 apical dendrites in a bundle with a total of up to 100,000 spine synapses for a bundle, which is thus the great receptive unit of the neocortex. Since it is composed of dendrites bundled together, it can be called a *dendron*. There are about 200 dendrons/mm².

THE ACTION OF MENTAL EVENTS ON DENDRONS

There are now extensive investigations using radioactive isotopes which reveal that, in wide varieties of silent thinking by a relaxed recumbent subject, there is induced extensive activity of the neocortex, described by Per Roland and associates in Copenhagen.

The active sites are mostly in the prefrontal lobes (cf. Fig. 1), and are in the form of mosaic patches of large areas several centimetres across and composed by tens of thousands of dendrons. For example concentrated thinking on a finger tip on which a just detectable touch is expected, causes a large activation of the finger touch area of the cerebral cortex (cf. Fig. 1). There is excitation of thousands of dendrons. Mental events can thus very effectively excite dendrons. It should be noted in passing that there is no materialist explanation of this effective action of the mind (thinking) on the brain.

LINKAGE OF MENTAL UNITS TO DENDRONS OF THE NEOCORTEX.

THE UNITARY HYPOTHESIS. THE PSYCHON

The new hypothesis is that all mental events and experiences, in fact the entire composition of the outer and inner senses of World 2 (Fig. 2) is a composite of elemental or unitary mental events. Each of these mental units is reciprocally linked in some unique manner to its dendron. The linkage has been crudely indicated in Fig. 2 by the reciprocal arrows across the interface, and now is more precisely drawn in Fig 4.

The pyramidal apical dendrites are shown for 3 dendrons in accord with the experimental evidence. Superimposed on each of these 3 dendrons are 3 mental units that we may call *psychons*, each with its unique experiential character that is indicated in Fig. 4 by filled squares, open squares and filled circles and each ensheathing its whole dendron. No doubt the congruity is idealized in the diagram, and of course there are multitudes of closely related psychons, that could be represented similarly by squares, open squares and filled circles and that are in unitary relationship with similar dendrons. The three different psychons give some insight into the complexity of patterned relationships between dendrons and psychons. There could be thousands of types of psychons, each with its own dendron, as is indicated by the rich variety of mental experiences. The calculated total of about 40 million dendrons is matched by a similar number of psychons.

This unitary hypothesis transforms the manner of operation of the intention. If for example the psychon for the mental intention to make a particular movement is diagrammed by the pattern of filled circles on the right dendron of Fig. 4 it can be seen that the intention is acting on the whole dendron with its assembled pyramidal dendrites and their synapses, which could number tens of thousands. So the mental intention would have a large global operation on that dendron. On the microsite hypothesis referred to above, the psychon would of course operate at each microsite of its dendron in selecting by means of the quantal probability field, a vesicle for exocytosis. However, collectively there could be tens of thousands of such microsites on one dendron, so great amplification is ensured by the unitary operation of the many linked psychon-dendrons.

Besides interacting with dendrons, the psychons interact with each other and so participate in bringing about the experiential unity that we enjoy from moment to moment. The central core of our being arises from a great psychon complex in the world of conscious experience, World 2.

Dendrons are components of nerve cells and so are in the matter energy world, and are dependent on a high metabolism. Irreversible destruction will occur after a few minutes of oxygen deprivation. This is a component of brain death. By contrast the mental units, psychons, are immaterial and would survive oxygen deprivation and the loss of their linked dendrons. Thus the great psychon complex at the core of our being (Fig. 2), the self or soul, survives bodily death, as is traditionally believed for the immortality of the soul.

Our problem in determining the moment of death is to discover when the soul or psychon complex is irreversibly dissociated from the dying dendrons of the brain, and hence also are dissociated from the body.

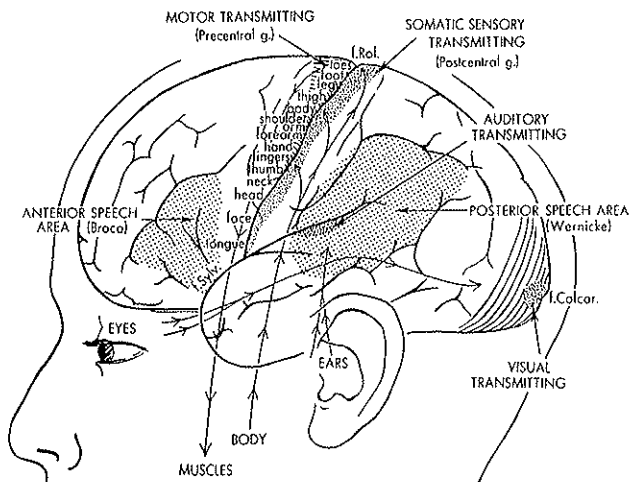


Fig. 1. The motor and sensory transmitting areas of the cerebral cortex. The approximate map of the motor transmitting areas is shown in the precentral gyrus, while the somatic sensory receiving areas are in similar map in the postcentral gyrus. Actually the toes, foot and leg should be represented over the top on the medial surface. Other primary sensory areas shown are the visual and auditory, but they are largely in areas screened from this lateral view. Also shown are the speech areas of Broca and Wernicke. Arrows show inputs from eyes, ears, body (tactile) going to respective primary cortical areas. From motor transmitting area arrows show projection downwards to spinal cord and muscles.

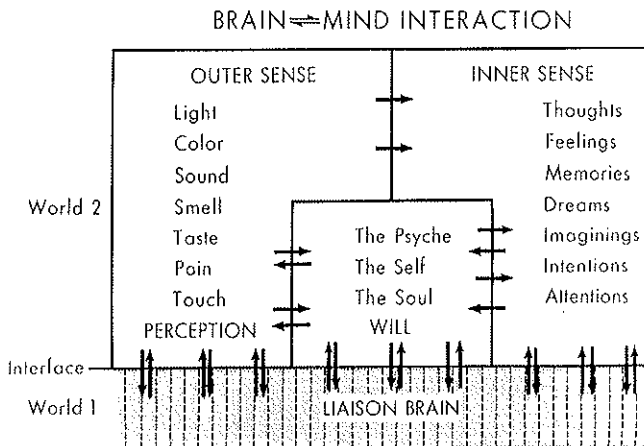


Fig. 2. Information flow diagram for brain-mind interaction in human brain. The three components of World 2: outer sense; inner sense; and the psyche, self or soul; are diagrammed with their communications shown by arrows. Also shown are the lines of communication across the interface between World 1 and World 2, that is from the liaison brain of the neocortex to and from these World 2 components. It must be imagined that the area of the liaison brain is enormous, with dendrons numbering tens of millions, not just the two score here depicted.

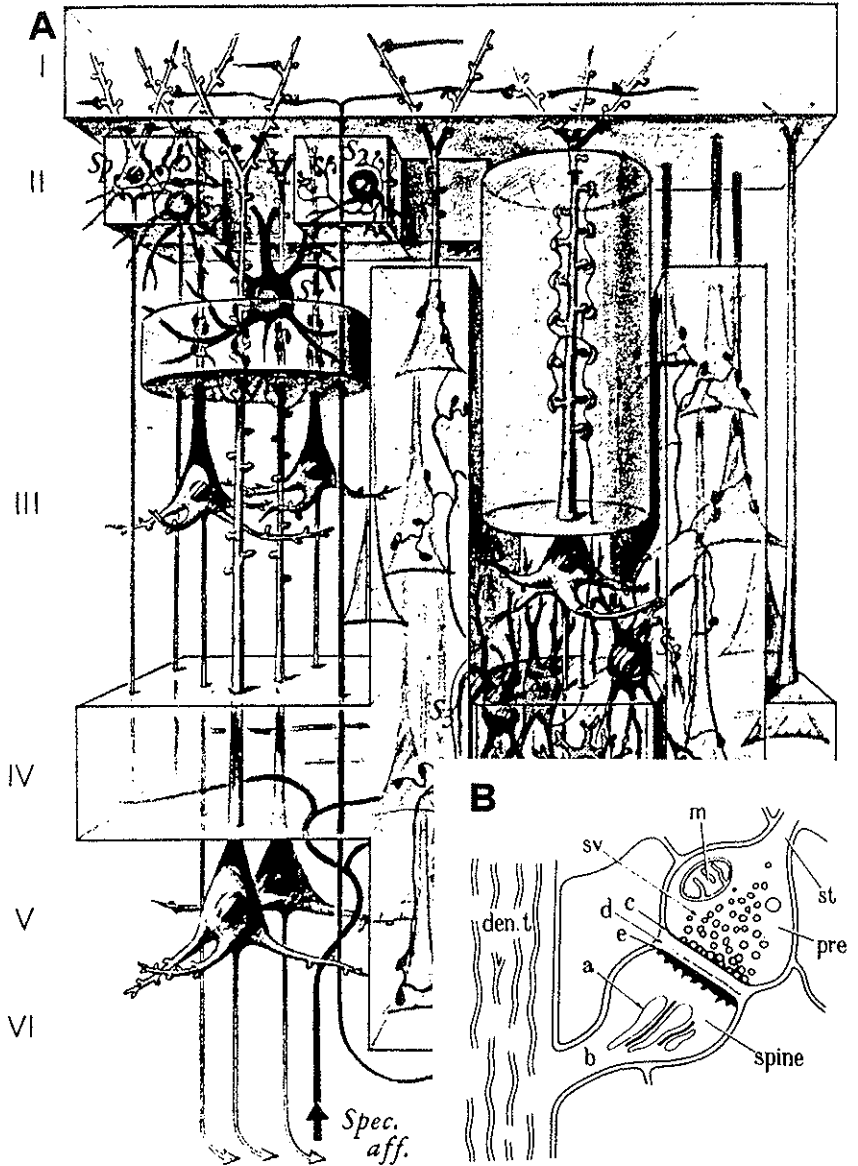


Fig. 3. A. Three dimensional construct by J. Szentagothai showing cortical neurones of various types. There are two pyramidal cells in lamina V and three in lamina III, one being shown in detail in a column to the right. B. Detailed structure of a spine synapse on a dendrite (den.) St, axon terminating in synaptic bouton or presynaptic terminal; Pre; SV synaptic vesicles; C, presynaptic vesicular grid; d, synaptic cleft; e, postsynaptic membrane; a, spine apparatus; b, spine stalk; m, mitochondrion.

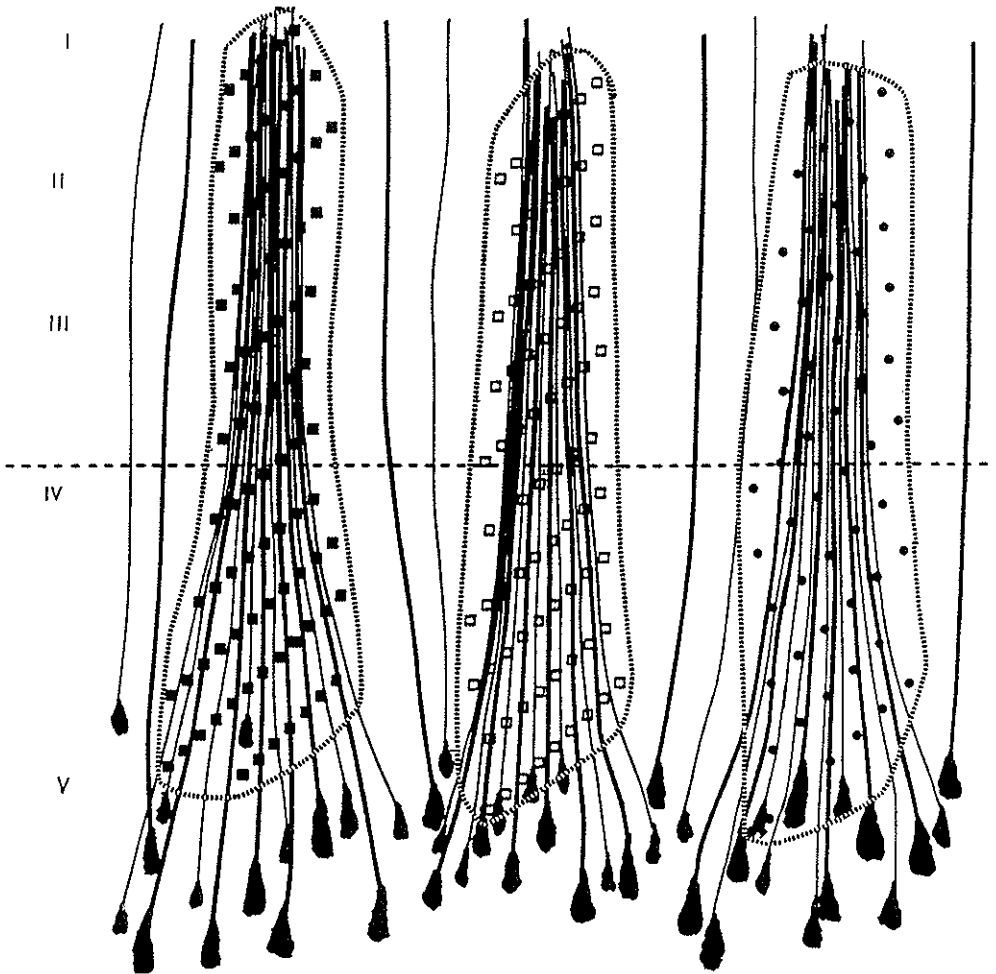


Fig. 4. Drawings of 3 dendrons showing manner in which the apical dendrites of large and medium pyramidal cells bunch together in lamina IV and more superficially, so forming a neural unit. A small proportion of apical dendrites do not join the bunches. The apical dendrites are shown terminating in lamina I. This termination is in tufts that are not shown. The other feature of the diagram is the superposition on each neural unit or dendron, of a mental unit or psychon, that has a characteristic marking (solid squares, open squares, solid circles). Each dendron is linked with a psychon that gives its own characteristic unitary experience.

II
SCIENTIFIC AND CLINICAL ASPECTS

BRAIN DEATH AS THE DEATH OF A HUMAN BEING

HEINZ ANGSTWURM

1. BRAIN DEATH

1.1. *Historical development*

The term brain death was coined by the Frenchman X. Bichat in 1800—long before it had any connection with matters of organ donation after death. The pathological process consists of the entire brain dying before irreversible cardiac arrest, and thus before the remainder of the body. Without medical intervention, brain death cannot readily be distinguished from cardiac death because only minutes elapse between the two events. With the loss of brain function, respiration, which is controlled by the brain stops, among other things. The heart, beating of its own accord, stops as soon as the remaining oxygen has been used up. Only if—and thus only when—mechanical ventilation and other forms of intensive care are able to delay this process by hours or days or, in some cases, by weeks or even months, is the distinction between brain death and cardiac death of clear and practical importance. The first observations of a dissociated brain death were reported in the medical literature in 1959 by the two Frenchmen Mollaret and Coulon, and again this had no connection whatsoever with organ donation after death.

1.2. *The nature of brain death*

The reason for and the proof of the initially isolated death of the entire brain is seen (generally recognized without any doubt) in autopsy after brain death, as follows:

a) All the consequences of a severe rise in pressure in the cranial cavity are seen, with all the effects of complete loss of the cerebral blood flow.

b) Decay after death is more advanced in the brain than in the other organs. The region of the optic nerve and of the upper spinal cord shows tissue changes of the kind that always distinguish living from dead parts of the body. The extent of these two findings depends on the interval between the cessation of brain function and cardiac arrest. These observations result in two unavoidable conclusions:

1. The elevated pressure in the cranial cavity has stopped the cerebral blood flow.
2. The brain has died before the other organs.

The occurrence of brain death independent of causes such as injuries or internal diseases of the brain, or the effects of other diseases on the brain, is also demonstrated by observation at the bedside. Thus, the pressure in the cranial cavity can be measured, and in brain death it will show that it has become higher than the blood pressure. The resultant loss of cerebral blood flow can be visualized by x-ray procedures. It is known from experience that the brain can survive only a few minutes after the loss of its blood supply.

1.3. *Definition*

The definition of brain death is based on this pathological process; brain death is the complete and permanent loss of all brain activity during intensive care with mechanical ventilation. The definition of brain death is provided by nature, and merely describes and summarizes the pathological process. It is not the product of a deliberate agreement, and so cannot be altered at will. It objectively excludes from the state of brain death even the most severe malformations and damage where there is only partial loss of brain function, as well as conditions with only temporary absence of brain activity, including the development of the foetus in the womb.

1.4. *Diagnosis of brain death*

The diagnosis of brain death matches its definition, and is absolutely reliable. Brain death is established by scientifically recognized findings and examinations, irrespective of whether organ donation after death is possible or not. In various countries, medical teams have standardized the examinations required. The procedure differs slightly in individual countries, but only for historical reasons, not in the degree of reliability. The medical diagnosis of brain death provides proof of an already existing situation. It is therefore

neither a matter of discretion or a decision, nor an assessment of the further pathological process (with the associated possibility of error), nor even a certification of death that is merely legally binding but can if necessary be revoked. It is not possible to state exactly how long before its certification brain death occurred. For this reason brain death is taken to occur at the time at which the criteria for it have first been met. The World Medical Association has recommended that brain death should be certified by two physicians. They must not on any account participate in any possible ensuing organ transplantation.

2. BRAIN DEATH AS THE DEATH OF A HUMAN BEING

Medical science regards death as the loss of vital signs. It distinguishes between the death of the human being and the death of the individual parts of the body. Brain death makes this difference between the human being and its individual parts particularly clear.

With brain death, a human being loses two characteristics of its earthly existence as a living being.

Firstly, the brain—in man and in other living beings—coordinates the functions of the individual parts of the body and its many interactions with its surroundings. It is just this purpose and organization which turns the various separate parts and their functions into a whole individual, an organism. As a superior unit, the organism is something fundamentally different from the mere sum of its constituent parts, which exist only for its sake. The organism—and only the organism—is the actual living being. One of the biological features of the individual being is its independence. With the cessation of brain function, the independent and self-contained unity and order collapses, and the living being dies. What is left are the individual organs, which can only function with constant outside assistance. With the death of the brain, there is loss not just of spontaneous respiration, but also of the regulation of heartbeat and circulation, the internal glands, the thyroid and the adrenals, the water and salt balances, and body temperature. The condition of the rest of the body after brain death might perhaps be best characterized by the fact that even the individual organs can in the long term survive only by transplantation into another body. But it is precisely this that also shows the difference between them and the organism.

Secondly there is, associated with the brain, the unique human spirit. This fundamentally distinguishes man from all other living beings. Here, spirit means understanding, reason and consciousness, but also cultural achieve-

ments and the ability to transcend the realm of material objects and sensual perception and to relate to a higher world independent of man. This spirituality is also possessed by the human soul as the epitome of inner unity, the essence of the individual human being. Medical science is as incapable as any other science of saying how the materially incomprehensible aspect of man (which can, however, be perceived by its effects) is connected with man's brain. In the context of brain death science must leave the question open as to whether man consists—according to the dualistic view—of body and soul or—according to the monistic view—he is a unit comprising the body and the soul which moulds it (*anima rationalis forma corporis humani*, according to St. Thomas Aquinas).

The view that on the death of his brain, man loses the physical basis needed for his spirit in this world, is sufficiently justified by the fact that the human brain is a necessary and irreplaceable condition for the existence of the human spirit. This is not contradicted either by the fact that perceptions also need the sensory organs and their nerve pathways, or by the fact that the spinal cord, individual nerves and even individual blood vessels can respond to stimuli; only conscious perception and its spiritual significance and the conscious and personally willed—i.e. non-stereotyped—responses depend on the brain. In no way does the brain become the “seat” of the soul through its importance for the human spirit.

These two consequences mean that for medical science brain death is just as much human death as irreversible cardiac arrest. Anyone living with a transplanted heart demonstrates that even if a person's own heart ceases to function, death is only produced via brain death.

3. DEALING WITH BRAIN-DEAD PEOPLE

Understandably, the possibility of keeping the corpse/trunk and the internal organs alive artificially for a time after brain death—for example, to permit a child to mature in the womb until it is able to survive after birth by Caesarean section—has not only led to mistrust of brain death as the death of a person and of the reliability of its diagnosis; it has also aroused all the concerns that are habitually felt even if the effects of new medical technology and other scientific advances cannot be foreseen. Thus it was feared that brain-dead corpses—externally not readily distinguishable from unconscious but living, mechanically ventilated persons—might be used not only for organ donation after death, but also for other purposes, such as the training of

physicians or to obtain essential substances such as hormones or blood from a particularly rare blood group.

Such fears probably cannot be allayed by the fact that they have to date proved groundless, or by pointing out what nature does to the body after death. Instead, it can be said that physicians have never had to decide alone who can do what with the body of a dead person, or when it can be done. This question is answered differently in different parts of the world, and even in Western Europe it is dealt with differently today than was the case 200 years ago. The corpse is protected by relatives of the deceased and by laws, but also by legal and ethical principles, by the respect and sense of responsibility of the living, and by convention. If the current view of respect for (brain-) dead persons were to change, medicine, as an empirical science, assumes that philosophy and theology and not least of all the Church's pastorate would help society—not only physicians—to act in a way responsible in the eyes of God and man.

4. SPECIAL MEDICAL TASKS ON BRAIN DEATH

For nurses and physicians, brain death also means the realization that all their efforts to save the patient have ultimately been unsuccessful, and that the situation is hopeless. This realization is always painful and difficult, even for those who believe they know the conditions and limitations of human capabilities. Nevertheless, for all those involved in the fruitless treatment, the diagnosis of brain death should result in the inner acceptance of this situation.

For the relatives of the deceased, this task of acceptance also means accepting brain death as the death of the person, even though intensive care is still going on. They need the sympathetic and patient attention of the physician even if they have heard of brain death before. In any event, relatives who are faced with the actual experience of brain death are helped by having previously come to terms with it. For this reason not only physicians but also pastors, philosophers and theologians should be encouraged to help spread knowledge of brain death.

“BRAIN DEATH”: A VALID THEME WITH INVALID VARIATIONS, BLURRED BY SEMANTIC AMBIGUITY

D. ALAN SHEWMON

I. INTRODUCTION

Despite the widespread acceptance of diagnosing death neurologically over the past two decades, considerable confusion continues to surround the concept of “brain death”. There is a disturbing lack of unanimity over the very meaning of “brain death” and the reasons for its legal equivalence with personal death [77, 125, 129]. I say “disturbing” for the following reasons.

1. Some uses of the term are philosophically equivalent to personal death, while others are not.
2. The issues are so complex and so subtle that many health care workers are oblivious to the confusion and, worse, to the fact that they themselves are among the confused.
3. Consequently, some of those involved in organ transplantation subjectively believe that their organ donors are not *really* dead, so that in conscience they view themselves as participating in what amounts to societally approved medical homicide, beautified by legal euphemisms [22 (p. 13), 72, 128].
4. Some with this erroneous premise reason (quite logically) that if the need for organs justifies defining as “dead” this category of patients, then it likewise justifies defining as “dead” other categories of dying or permanently unconscious potential organ-sources. Such conceptual extensions of “brain death” have already been dignified by receiving serious consideration in the medical profession [80, 109] and mass communications media [25, 104 (p. 1777)]. They have also served as the basis for extending medical experi-

mentation on “brain-dead” bodies [22, 29, 60] to nontherapeutic and potentially harmful experimentation on patients in a persistent vegetative state [35].

5. Even if some present diagnostic criteria for “brain death” are valid determinants of death, many proposed revisions which are supposedly based on the same concept are actually based on a different one not equivalent to death. Implementation of such new criteria would predictably result in some future “brain-dead” organ donors being actually alive.

The goal of this article therefore is twofold: first, to refine the concepts and terminology related to life and death; second, to propose two conceptual syntheses which hopefully will place a neurological formulation of human death on firmer philosophical ground.

II. THE PREVAILING SEMANTIC CONFUSION, A SOURCE OF FALLACIOUS REASONING

A. *Semiotic themes and variations*

1. “*Life*” and “*death*”. Unless everyone agree on the essence of death, there is no point in discussing how to diagnose it; yet the terms “life” and “death” are frequently left undefined in the “brain death” literature, and their implicit meanings often fluctuate subtly. Insofar as death is the cessation of life, its definition logically follows from that of life. Traditionally, a living organism has been defined intuitively as a substance that “moves itself” (motion taken in the broadest sense) [4 (I, q. 18, a. 1 & 2), 63 (pp. 14-38)]. This formulation includes not only immanent activity but also unity: a complex organism is more than a mere juxtaposition of simpler organisms, as it possesses gestalt properties irreducible to the sum of properties of lower-level components.

One of the primary sources of confusion surrounding “brain death” is the failure to recognize the analogous nature of “life” and “death”. Life can be possessed in different degrees and on different levels: there is the life of a cell, of an organ, of an organism, even of a pure spirit. Plainly, the word “life” does not apply to all of these in exactly the same sense. At each level is a complementary concept of death. Yet in discussions about “brain death”, these terms are often used univocally across all levels, creating logical fallacies and obstacles to communication. For instance, one of the objections to all brain-based determinations of death (How can a “corpse” assimilate nourishment, exhibit wound healing, gestate children, etc.? [93, 98 (pp. 179,

184-185), 106]) completely misses the point. The ontological level pertinent to human death is not that of cells or tissues but of the organism as a whole [12, 50, 58 (p. 135), 91 (p. 28)].

2. "*Brain death*". Another source of much confusion is the term "brain death" itself. This is an exceptionally poor term for such a key concept, as it is susceptible to several very different interpretations [55, 77, 98 (pp. 173-176), 101, 116]. It can mean simply the death of an organ, the brain, implying nothing *per se* about life or death at the organismal level.

Many take it as equivalent to organismal death, though they lack a clear understanding of the basis for that equivalence. Some interpret it as one of two *kinds* of death: traditional death and a novel "brain death," with all the problems such a dichotomy entails [91 (pp. 62-63)]. Others regard it as one of two diagnostic *criteria* for a single physiological state, death [20]. But this does not correspond to biological facts: a corpse with impending rigor mortis is surely in a very different physiological state from one with spontaneous heart beat and intact functioning of all noncerebral organs [45, 126].

Still others conceive of "brain death" as merely one of two *clinical contexts* for diagnosing (directly or indirectly) that a single criterion (destruction of the brain) has been met for a single concept of death (loss of somatic integrative unity) [12, 55, 67 (pp. 28-31)]. This is the only interpretation of "brain death" that is coherent, consistent with physiological facts, and potentially equatable with organismal death. Unfortunately, it is also the meaning probably least commonly understood.

Finally, some physicians and bioethicists interpret "brain death" in neither a biological nor a philosophical sense. To them, death in general is not so much an objective reality as a societal convention; the choice of a definition, therefore, should be based largely on utility [24, 66, 97, 116 (pp. 215-217), 123]. This amounts to regarding "brain death" as a mere legal fiction invented to facilitate, among other things, organ harvesting from persons whose biological vital status is at best unclear and at worst actually alive.

3. *Other neurological and psychological "deaths"*. An even worse term is "cerebral death" [23 (pp. 113-114), 62, 87, 121]. Insofar as the cerebral hemispheres are only the upper part of the brain, to equate "cerebral death" with "brain death" only adds anatomical inaccuracy to semiotic ambiguity. Similar confusion also afflicts every parallel neologism involving some supposedly key part of the brain, such as "neocortical death" [34, 92], "brain-stem death" [81, 83], "hypothalamo-pituitary death", "mesencephalic death" and "bulbar death" [87], to say nothing of nefarious nonanatomical concoctions such as "cognitive death" [11, 44], "intellectual death" or "social death" [7].

B. *Examples.* To illustrate the seriousness of this confusion, consider some representative pieces of journalism:

“The baby.... was brain dead after one day, said Dr. Stiller, and kept alive on the respirator for nine more days. At that point, when no recipient had been found, the life support was cut off and the baby died.” [15]

Newspaper headline: “3 agents shot in drug buy; 1 killed, another brain dead.” [6]

Not surprisingly, legislators tend to share the same misconceptions. For example, to promote defining anencephalic infants as “dead” on the basis of a perceived equivalence with “brain death”, a California senator wrote:

“Only a few years ago, the concept of brain death... was not legally or medically accepted. Only after much controversy, undue hardship and trauma to friends and relatives of *surviving brain dead* or *comatose* individuals... were the law and medical practices changed to meet contemporary conditions.” (emphasis added) [73 (p. 5)]

Of greater concern is that not a few physicians also fall into these same equivocations. For example, an article about maternal “brain death” during pregnancy stated:

“Several recent reviews have discussed the clinical definition of brain death, which is characterized as an ineluctably fatal state... Attempts to prolong maternal life in the face of brain death are... ultimately futile.” [36 (pp. 1089, 1091)]

Similarly, an article in *American Medical News* carried the headline:

“Brain-Dead Woman Ordered Kept Alive.” [38]

A more recent medical article stated: “A respirator-dependent, brain-dead patient is alive but no longer considered *a* life since he or she is no longer self-determined.” (emphasis in original) [16 (p. 116)]

A pediatric surgeon has argued that, since anencephalic infants are “brain absent” (a misnomer to begin with), they should be considered equivalent to “brain dead”. But his understanding of the latter state was revealed when he declared that a “brain-absent” (= “brain-dead”) infant “should be considered a person, albeit one who is dying,” and that organ removal should be carried out “in a way that would not conceivably cause suffering, and would not detract from the dignity of dying or abridge the right to die.” [51]

A neurologist and a lawyer, both prominent in bioethics, have stated candidly:

“It seems then that permanently unconscious patients have characteristics of both the living and the dead. It would be tempting to call them dead and

then retrospectively apply the principles of death, *as society has done with brain death.*" (emphasis added) [33 (p. 243)]

Other health-care professionals and bioethicists declare biological vital status intrinsically indeterminable or even meaningless apart from societal convention:

"[J]ust as society has devised brain death at one end of the life spectrum for certain benefits, so society is in need of devising an analogous concept of brain life at the other edge of life for likewise identifiable benefits.... definitions of death are socio-medical constructions." [123]

"[W]e have reason to think of death not as a simple organic condition but as a biologically based social status.... societies have considerable leeway in pinpointing death at the stage [of personal decline] where functions of particular interest to them become impossible to perform." [66 (pp. 239-240)]

Even the famous "Harvard criteria" had an explicitly utilitarian basis. In the words of the chairman of that committee:

"At whatever level we *choose* to call death, it is an arbitrary decision. Death of the heart? The hair still grows. Death of the brain? The heart may still beat.... It is best to choose a level where, although the brain is dead, usefulness of other organs is still present. This, we have tried to make clear in what we have called the new definition of death.... Can society afford to discard the tissues and organs of the hopelessly unconscious patient so greatly needed for study and experimental trial to help those who can be salvaged?" (emphasis in original) [7 (p. 1430), 8 (pp. 120-122)].

C. *Moral consequences.* Unfortunately, these are by no means isolated or atypical examples of what even sophisticated experts understand by "brain death." If anything, such conceptual chaos seems almost to be more the rule than the exception. As Fost has noted,

"In the early days of transplantation, organs were regularly removed from brain-dead patients who had not yet been considered legally dead. We may say that our new understanding of death informs us that those patients were in fact dead, even if the transplant surgeons then didn't know it. But the fact remains that there was broad social acceptance of removing organs from patients who were thought to be alive." [45 (p. 7)]

Two decades of legal recognition and promotion of the "brain death" concept, however, seem to have made surprisingly little impact on this state of affairs [34, 128, 129].

III. DEATH IS A UNITARY PHENOMENON

A. *Unity of knowledge from various disciplines*

It is often stated or implied that, because the disciplines of theology, philosophy, biology, medicine and law have their own proper objects of study and methodologies, they proceed strictly in parallel and contribute nothing to one another as regards death. It were as though death defined in terms of absence of the soul could be one thing, but death diagnosed by a physician might be something completely different, while the moment of legal death were a mere pragmatic convention not necessarily coinciding with either of the other “deaths” [24, 97]. Although this may be historically understandable, it is intellectually intolerable, morally dangerous, and predisposes to ethical and legal pseudodilemmas.

One manifestation of this disjunctive mentality, for example, is the distinction sometimes drawn between “biological death” and “clinical death” (131 (p. 95)). More serious is the contention that a person could be both dead philosophically and alive medically, or vice versa (sometimes expressed in terms of “personal” versus “biological” death [105].)

For example, some theologians and philosophers argue that, since the soul’s departure from the body is intrinsically unobservable, the precise timing of that moment is a mystery known only to God [19 (pp. 482-486), 98 (pp. 190-191)]. Thus, if the heart is spontaneously beating and the majority of organs functioning, that body deserves the benefit of the doubt concerning vital status, regardless of the condition of the brain [19 (pp. 467-468), 58 (p. 138), 98 (p. 193)].

Conversely, the vast majority of doctors, biologists, and jurists conclude from the very same line of reasoning that any consideration of the soul is at best sheer speculation, with no practical relevance at all for the real world of patients in intensive care units [12, 24 (p. 988), 55 (p. 66), 91 (pp. 41-43)].

If these fields truly proceed inherently along completely independent paths, each with its own brand of “death”, everyone might as well stop all the futile discussions and join the ranks of the pure skeptics. The only alternative, which is intuitively more reasonable anyway, is to regard human death as a singular reality, which can be considered from a variety of perspectives.

B. *Substantial unity of the human person*

1. *Cartesian dualism: a ubiquitous culprit.* An important obstacle to this conceptual unity is a pervasive Cartesian notion of the soul-body relationship, held implicitly by perhaps most theists as well as by most agnostic and atheists

(who erroneously believe the Cartesian type of soul-body relationship to be the only conceivable one, which they justifiably reject).

Descartes reified both soul and body as distinct entities, the former a pure spirit (identified with the conscious self) and the latter like an animal (viewed in terms of mechanistic reductionism) with its independent "life". The two interacted somehow through a particular part of the animal-body, the pineal gland. (For neocartesians like Penfield [86] it was the brain's "centrencephalic" system, while for Eccles [37] it is the language area of the left cerebral cortex).

This "ghost-in-the-machine" notion strongly predisposes to the conclusion that the soul's presence or absence should have no direct impact on the body's physiological processes, which proceed according to their own (essentially mechanistic) physical laws. This leads to one of two practical conclusions: either (a) a declaration of death is an arbitrary matter to be determined mainly by pragmatic factors, or (b) we must use what is said to be the only infallible indicator of death, namely, the cessation of *every* manifestation of physical life.

2. *Hylomorphism respects both unity and duality.* But such a view of the soul-body relationship is a mere caricature of the true one. The proper conceptual dichotomy is not between soul and body as somehow linked entities, but rather between soul and matter as ontological co-principles of a single entity, the human being [57, 110]. In the scholastic tradition, the soul, or life-principle, is the *substantial form*, which "informs" the matter of a living organism (including subhuman ones), conferring both unity and essence.

This "hylomorphic" (matter-form) cosmology is actually much more consistent with the data of modern biology than is the atomistic, mechanistic reductionism prevailing among biologists. When dynamicists study the complex interplay of feed-back and feed-forward processes underlying the unity and immanent activity of living organisms [61, 112], they are (usually without realizing it) describing aspects of that very "life principle" which scholastic philosophers have been calling "substantial form" or "soul". Because some operations of human beings (intellection and volition) are inherently spiritual, and because the unity of the human person is axiomatic, it follows that the human soul is unique among substantial forms in spanning both spiritual and physical levels of being [3 (art. 1), 4 (I, q. 76, a. 1), 63 (pp. 253-262)].

A number of common expressions regarding the soul are improper and laden with Cartesianism. For example, at death the soul does not, strictly speaking, "separate" or "depart" from the body. Even to speak of a union of body and soul is not quite correct; what the soul is united to so as to constitute the

body cannot be that very body itself. Rather, soul and matter are the ontological co-principles of a human being [110 (p. 33)].

Because the soul is precisely the principle of biological unity of the body, its presence or absence should be deducible from physical properties of the body. Insofar as medical definitions of death focus on the moment of loss of organic unity, the corresponding diagnostic criteria will *ipso facto* identify the moment of deanimation, about which philosophers and theologians are concerned.

Beyond the intuitive appeal of this more unifying version of the soul-body relationship, the specific role of the spiritual soul as “substantial form of the body” has been dogmatically asserted by the Council of Vienne (1311-12) and the Fifth Lateran Council (1512-17) [26 (par. 336, 345)]. It was also expressed in the *Schema* prepared by the theologians of the First Vatican Council (1869-70), although the matter never came up for definition [26 (par. 348)]. Moreover, it has been endorsed implicitly by the Magisterium of the Church, insofar as Thomism has been repeatedly declared the philosophical system most congruous with the deposit of revelation [27, 88, 89, 113, 114].

IV. DEATH IS AN EVENT, NOT A PROCESS

Dying and decomposition obviously entail a continuum of physical changes at molecular, cellular, and grossly visible levels, involving the various organs at diverse times and rates. Thus, not a few authors and even some medical organizations have maintained that death is not an event, but a process [31, 46, 61, 78, 90 (p. 88); 119 (p. 76)]. Moreover, what *practical* difference does it make whether death is viewed as a continuous process or as an event occurring at some unknowable moment?

First, the notion of death-as-process is radically incompatible with a theological view of man. If the human soul is indeed spiritual, its presence as life-principle of the body must be all or none, and any transition discontinuous. Second, if death is really an event but everyone mistakenly considered it a process, there would be much vital-organ harvesting from actually living patients. From many other standpoints as well, it seems necessary to consider the transition from life to death as instantaneous [59, 67 (pp. 73-76)]. The process view is ultimately based on the fallacy of treating “life” and “death” univocally across hierarchical levels, together with an atomistic/reductionistic view of reality.

Moreover, the developments of modern science, contrary to the claims of process advocates, have rendered death-as-event more intelligible than ever.

Advances in nonlinear dynamics have provided a theoretical framework for understanding how a gradual change in some critical parameter of a dynamical system can bring about a discontinuous, instantaneous change in the very nature of that system [69]. The concurrence of continuity and discontinuity at different levels is also at the heart of quantum mechanics, with which significant analogies in biological dynamics probably exist [112]. Thus, if any viewpoint deserves castigation as "simplistic and naive" [61 (p. 22)], it is surely death-as-process.

V. TWO BASIC APPROACHES TO DEFINING DEATH:

LOSS OF INTEGRATIVE UNITY AND LOSS OF ESSENTIAL PROPERTIES

A. *Axiomatic need for their convergence*

The vast literature on "brain death" reveals two basic schools of thought regarding the essence of human death: loss of integrative unity of the body and loss of specifically human properties. If the intellectual soul is indeed the substantial form of body, these two aspects ought to converge to one and the same pathophysiological event. I take this conceptual unity to be as fundamental an axiom as either separate notion, so that convergence of the two approaches could be used as a kind of litmus test for formulations of death.

B. *Instantiation of both aspects in destruction of the entire brain*

1. *Loss of integrative unity*

a) *Somatic functions integrated by the brain.* Space does not permit a review of the brain's central role in the coordination or performance of virtually all functions necessary for the unity of the post-embryonic human body, including internal homeostasis, adaptive interaction with the environment, and the intimate connection between mental and physiological states. Most experts agree that, if death is rightfully regarded as the "total and irreversible loss of all capacity for integrating and co-ordinating the functions of the body — physical and mental — into a functional unit," to quote the Swedish Committee [55], then that definition is unquestionably fulfilled in total brain destruction [50 (pp. 76-78), 55, 61, 67 (pp. 37-40), 82, 91 (pp. 32-34)].

Parenthetically, the final four words of that definition, "into a functional unit," are terribly important but were unfortunately omitted from the definition of death adopted by the first Working Group [23 (p. 113)]. Without

them, a literal interpretation would seem to include conditions such as transection of the upper spinal cord or medulla, which effectively dissociate mental from most physical functions, but which hardly constitute death.

b) The fatal-lesion fallacy. Upon total brain destruction (usually in the form of infarction), multiple vital functions become so unstable that, despite modern intensive care, cardiac arrest usually supervenes in a matter of hours or days. This tendency to imminent somatic death is often advanced as proof of the validity of either “whole brain death” [14, 55, 121] or “brain-stem death” (which is often said to constitute the essential ingredient of the former) [67 (pp. 36-37, 48-50), 82].

But many disease processes result in imminence of cardio-pulmonary arrest, yet this fact *per se* does not logically imply that those patients are already dead. Unfortunately, not a few neurologists and neurosurgeons fall prey to such pseudo-reasoning. One of the most egregious examples is from no less prestigious a source than the New England Journal of Medicine:

“There is... continued medical discussion about the best [diagnostic] criteria for brain death. No set of criteria currently proposed by physicians seems to allow for the possibility of long-term survival, let alone recovery, however. *Patients fulfilling any one of them die within a few months* even with maximum therapeutic support.” (emphasis added) [14 (p. 399)]

Such confusion becomes particularly serious when it underlies the methodology of clinical studies intended to “validate” particular diagnostic criteria for “brain death” [62, 76, 107], including such influential ones as the NINDS Collaborative study [121] and two in Great Britain widely cited by supporters of “brain-stem death” [56, 83].

Although this fallacy is ubiquitous throughout the “brain-death” literature, the recent debate over anencephalic infants as potential organ-sources has revealed it more than ever [104]. For example:

“‘Brain death’... has come to be accepted as an alternative definition of death... principally because respiration without artifice cannot exist under these circumstances.” [70]

On the basis of such reasoning, would it not seem just as appropriate to diagnose insulin-dependent diabetics as “pancreas dead”? This is no exaggeration. When Loma Linda announced the discontinuation of its program of organ-harvesting from anencephalic infants, the director of the program stated that on several occasions, infants with less severe conditions, such as hydrocephalus or congenital absence of kidneys, were referred for organ donation by “good” physicians who “couldn’t understand the difference” between such newborns and anencephalics [109].

Besides, it is not even true that whole-brain or brain-stem destruction necessarily entails imminent cardiac arrest. There are well documented counter-examples with somatic survival of 36 days [48], 9 weeks [41], 68 days [84], 201 days [94], and 9 months plus 5 days [32]. But it is really quite irrelevant philosophically whether survival at the level of cells and organs is necessarily less than 5 days, 5 weeks, or 5 months. What matters is that there be no integrative unity at the level of the organism, one manifestation of which is the need for constant, multiple, highly sophisticated medical interventions to maintain the nonneural organs.

To be sure, in a technologically supported, brain-destroyed body some degree of physiological interaction does occur among the various nonneural organs; but this is not essentially different from the mutual interactions that would presumably transpire among the same organs if hypothetically explanted and connected by plastic tubes. To constitute a higher-level unity, an ensemble of organs must possess some gestalt property(ies) that cannot be reduced to the mere sum of the components — and in a post-embryonic body this requires a brain.

2. *Loss of essential properties*

a) *Difference from Cartesianism.* Insofar as human intellection and volition intimately involve the brain's processing of sensory and motor images [4 (I, q. 84, a. 7)], destruction of the entire brain renders the body indisposed to supporting essential human properties. In a very real sense, total brain destruction is physiologically equivalent to decapitation, the presence or absence of the bones and soft tissues of the face being quite irrelevant to either the human essence or the unity of the body [67 (p. 39), 82, 91 (p. 36), 99, 101].

Some philosophers have criticized this line of reasoning as stemming ultimately from a latent Cartesianism, as though it necessarily implied that during life the soul were present only in the brain, which served as its link with the rest of the body [98 (pp. 185-187 & fn. 38, p. 209), 58 (p. 139)]. To be consistent, such critics would also have to doubt that death would occur upon destruction of the entire body except for the kidneys, because that would analogously imply Cartesianism with the "extrarenal" body serving as liaison between the soul and the kidneys. Such criticism is directed only against a straw-man, a caricature of the real philosophical basis for asserting the equivalence between brain destruction and death.

b) *Avoiding the right answer for the wrong reason: "brain death" and "actualism".* The "brain-death" literature frequently asserts or implies that the

reason for this equivalence is that brain destruction renders impossible the performance of any specifically human acts. This derives from the philosophy of “actualism”, which reduces the being of a thing to its operations. The fallacies and dangers of actualism have been discussed at length by Seifert [98 (pp. 182 ff)].

It is extremely important to avoid arriving at the right answer about “brain death” for this wrong reason, as the momentum of logic will lead inexorably to further conclusions that may not be so fortuitously correct. It is actualism, more than anything else, for example, that underlies various contentions that human embryos, newborn infants, the severely retarded or demented are not human [43], or are not persons [65, 108, 111], or do not yet possess “brain life” [9, 47, 95], or have suffered “cognitive death” [44], as though such verbal concoctions were logical extensions of the concept “brain death”.

But it is not actualism to reason that substantial changes (in general) are occasioned by accidental changes that render a thing incompatible with its original substantial form [64]. Contrary to actualism, we should emphasize the enormous ontological difference between naturally brainless embryos and pathologically brainless adults. The two are by no means philosophically equivalent mirror-images, because the embryo does indeed manifest integrative unity and moreover has the innate tendency to form a human brain. This tendency is not merely a future possibility but an actual immanent property already possessed by the embryo. It is this, more than anything else, that makes it a specifically *human* embryo, despite its gross morphologic resemblance to embryos of other species. Politically motivated attempts to twist the concept of “brain death” of fully formed organisms into some pseudorationalization for abortion, research on embryos and other forms of disrespect for early human life, are therefore both intellectually vacuous and morally reprehensible.

But an adult body with a totally destroyed brain has neither such unity nor brain-forming potency. It is an aggregate of organs and tissues no longer compatible with the human essence (no longer “informable” by the soul). To acknowledge this is very different from actualism and in no way implies denial of embryonic humanity or personhood.

C. “Destruction” versus “irreversible nonfunction”

Much confusion has been engendered in the controversy over whether “brain death” should be defined in terms *destruction*, as I and others [18] prefer, versus “irreversible *cessation of all functions* of the entire brain,” as the

U.S. President's Commission [91 (pp. 75-76, 160)] and many others prefer. This controversy derives largely from a failure (once again) to distinguish two possible meanings of a word, this time "irreversible". One is what could be called "essential" (or "intrinsic") irreversibility, which derives from the absence of any physical substrate with a potency for that function; such irreversibility of nonfunction is equivalent to destruction.

The other is what could be called "accidental" (or "extrinsic") irreversibility. To take an absurd but illustrative example, suppose that as part of a devious plot a patient were placed under general anesthesia deep enough to suppress all brain activity, then flown five miles aloft and thrown from the airplane while still attached to the mechanical ventilator. One could say that from the moment of induction of anesthesia, his brain had "irreversibly" lost all functions, in the sense that they would predictably never return. But this is hardly equivalent to being already dead. Intrinsic functional potential remains in the intact brain and is theoretically actualizable (e.g., if the plot were somehow thwarted).

Although through such an example the difference between substantial and accidental irreversibility is obvious, many (if not most) experts on "brain-death" seem to be densely oblivious to it. For example, Byrne et al. [18, 19] have strongly criticized the President's Commission for defining death in terms of irreversible nonfunction; but the former's cogent arguments seem to be directed more against an accidental-type irreversibility rather than the essential type that the Commission undoubtedly intended.

By contrast, others who have similarly misunderstood the Commission's notion of "irreversibility" have erred in the opposite direction, proposing what they believe to be extensions of the Commission's logic, but resulting in fallacious definitions and criteria of "brain death" which reduce to pure actualism and are particularly dangerous on account of the subtlety of the underlying equivocation. Two important examples of such misinterpretation are: the "irreversible" loss of cortical function in so-called "brain-stem death", and the "irreversible" loss of brain-stem function in dying anencephalic infants.

1. "*Brain-stem death*". This is the official notion of "brain death" in Great Britain [30, 31], and it has many adherents in other countries as well [49, 122]. It will be discussed more completely below (VI.B.1.); the present focus is on the rationale typically advanced for its supposed instantiation of "irreversible cessation of all functions of the entire brain." This is well summarized by Lamb, who, after reviewing the importance of the brain stem for vegetative

survival, turns to its role in maintaining the cerebral hemispheres in a state of alertness:

“In so far as the brain cannot function as a whole without a functioning brainstem it follows that, once reliable criteria for loss of brainstem function have been met, the patient can be diagnosed dead.... No argument so far produced has shown that the intentions behind the [President’s] Commission’s proposed UDDA would be thwarted when adequate criteria for the irreversible loss of brainstem function were met.” [67 (pp. 49-50)]

One of the consultants to the first Working Group expressed the same idea in different words:

“Without hypothalamo-pituitary system and without brain stem, cortical and subcortical functions are abolished. Thus hypothalamo-pituitary and brain stem death means the death of the whole brain. The demand for complete loss of function of the whole brain, including the brain stem as a criterion for definition of death, seems therefore to be irrelevant.” [87 (p. 9)]

These authors are quite correct that brain-stem destruction does indeed bring about “irreversible cessation of all brain functions”, understood in one sense. The problem is that this is not the sense equatable with personal death. It is in fact possible for the cerebral hemispheres to mediate consciousness even after loss of input from brain stem’s reticular activating system, as demonstrated by Hassler in patients comatose from various brain-stem lesions [52]. By means of surgically implanted electrodes, stimulation of the reticular formation above the level of the lesion caused these patients to awaken from coma sufficiently to recognize their families and exhibit appropriate emotional responses, only to lapse back into unconsciousness immediately upon cessation of the stimulation. Now beyond all doubt, a patient in whom consciousness can potentially be restored is hardly dead.

To base the clinical definition of death on “irreversible cessation of all functions of the entire brain,” without further qualification, is therefore a virtual invitation to serious misinterpretation. There are already neurologists in the United States, for example, who maintain that patients with pure brain-stem lesions and EEG activity resembling physiological sleep are “brain dead” and can be treated as such [49, 102]. Others claim to be able to diagnose “brain death” even in premature infants on the basis of the clinical examination alone (which reflects only brain-stem function), regardless of the condition of the cortex [101 (p. 53), 122].

2. *Anencephalic infants.* Due to the same misinterpretation of “irreversibility” many physicians believe they can diagnose “brain death” in anencephalic infants as soon as all signs of brain-stem function have ceased. Although such

nonfunction will certainly be "irreversible" if artificial ventilation is foregone or vital organs removed, it might be due not so much to any intrinsic degeneration of the exposed brain stem as to trauma during the birth process (a protective skull being absent) and therefore may be potentially reversible [100, 104]. The experience at Loma Linda University indicates that several days of intensive care will, in some cases, allow the brain stem to recover sufficiently to maintain spontaneous respiration far beyond the usual life-span of untreated infants [85, 122]. Such extrinsic "irreversibility" is irrelevant to the diagnosis of death, yet constitutes the basis for the widespread belief that "brain death" can be accurately diagnosed in anencephalic infants [74].

The avoidance of all these misinterpretations of "irreversibility" is the main reason why clinical definitions of death based on brain destruction are preferable to those based on "irreversible cessation of all functions of the entire brain." To formulate the *definition* in terms of destruction by no means precludes the establishment of specific *diagnostic criteria* in terms of cessation of various functions and would keep forever in focus the reference point for all further refinements of those criteria.

VI. DESTRUCTION OF "THE WHOLE BRAIN" VERSUS DESTRUCTION OF "THE BRAIN AS A WHOLE"

We have seen that it is unnecessary that every cell in the body die for the body to lose its integrative unity and cease to be a body; it suffices that the central integrating organ, the brain, be destroyed. Analogously, neither should it be necessary that every neuron in the brain die for the brain to lose its own integrative unity and cease to be a brain. Is there some part of the brain that is to the whole brain as the brain is to the body?

A. *Theoretically valid, though pragmatically perilous, examples of destruction of the "brain as a whole"*

Post-mortem examination of the brain in cases of competently diagnosed "brain death" often reveals incomplete necrosis, with variable patches of relatively preserved tissue [14 (p. 395), 79, 120]. Such inhomogeneity results primarily from variation in the timing of the autopsy with respect to brain herniation and vagaries of collateral blood supply.

Disconnected islands of relatively preserved brain tissue can produce laboratory signs of isolated neuronal cellular functioning, such as some electrical activity on surface EEG [5, 39], deeply implanted electrodes [54,118], and

evoked potentials [10, 124]. Some residual hypothalamic function, manifested by absence of diabetes insipidus, occurs fairly commonly in "brain death" [40, 48, 87 (p. 10)]. Similarly, isolated jaw or snout reflexes (mediated at the pontine level of the brain stem) can at times be preserved [1 (pp. 72-75, 91)]. Some primitive autonomic functions can remain (mediated perhaps by the hypothalamus or lower medulla), such as temperature and blood pressure autoregulation [1 (pp. 72-73), 40, 48] or rise in heart rate and blood pressure in response to skin incision for organ retrieval [29, 124]. In the context of known brain herniation, such residual function in some cells by no means excludes a diagnosis of death based on destruction of the brain as a whole. It is to the dead brain as the temporary growth of hair is to a dead body.

On the other hand, these phenomena do effectively give the lie to the official myth that "brain death" corresponds to "total brain infarction", as maintained by the Swedish Committee [55], or that it involves the absence of all brain functions, as maintained by the U.S. President's Commission [91 (p. 160)]. They give reason for diagnostic concern, and prudence in such cases may well dictate offering the benefit of the doubt and prescinding from a diagnosis of death.

B. *Theoretically invalid examples of destruction of "the brain as a whole"*

Most advocates of "partial-brain death" (if we may call it that) have traditionally fallen into two main camps. Each is characterized by an exclusive emphasis on one or the other fundamental aspect of the essence of death, applied to an exaggerated functional/anatomical dichotomy between brain stem and cerebral cortex. Those who focus on somatic integrative unity advocate "brain-stem death", while those who focus on specifically human functions advocate "neocortical death".

1. *"Brain-stem death" and loss of integrative unity*

One of the two main rationales for the purported equivalence of "brain-stem death" with personal death, namely the "irreversible" cessation of all functions of the "brain as a whole", has already been dealt with in section V.C.1. The other main rationale is that brain-stem destruction eliminates the integrative unity of the body. If indeed destruction of the entire brain entails a loss of somatic unity, then so should destruction of the brain stem alone, as this is the part of the brain where most of the body's vegetative functions are coordinated [67 (pp. 36-37), 81, 82].

But this raises a major conceptual problem if indeed it is possible that through electrical stimulation of the reticular activating system rostral to the

brain stem, some form of consciousness could be restored to a brain-stem destroyed, somatically disunified body (cf. V.C. 1.). This seems to entail an inconsistency between the two fundamental approaches of integrative unity and essential properties, necessitating one of three conclusions: either (1) convergence of these two approaches should be abandoned as a fundamental axiom; or (2) the lack of integration of vital functions resulting from brain-stem destruction is of insufficient degree to constitute true bodily disunity and death; or (3) isolated brain-stem destruction reduces the body (in the technical philosophical sense) to the cerebral hemispheres.

The first solution threatens the very foundations of metaphysical realism, which in my opinion should be taken as more self-evident and inviolable than any secondary conclusions about the neurological core of death. The second undermines "whole-brain death" as much as it does "brain-stem death" and seems counterintuitive in light of the considerations in section V.B. 1. The third solution, by default, is what I tend to favor. The disunited organs can be regarded as philosophically equivalent to an oxygenation/perfusion machine attached to the vasculature of the cerebral hemispheres, only in this case the "machine" is composed of biological rather than inorganic materials, supported by intensive care technology [cf. 127]. (A similar kind of analysis has been advanced by Koren to explain the relationship between two souls, two heads and one common body in the rare congenital anomaly of dicephaly [63 (pp. 44-45)].)

In any case, although it is certainly true that "death of the brain as a whole" does not require "death of the whole brain", so-called "brain-stem death" by no means instantiates "death of the brain as a whole" or death of the person.

2. *"Neocortical death" and loss of essential properties*

Conversely, exclusive emphasis on specifically human properties and the neocortex (upon which they are said to depend), irrespective of integrative unity, is fallacious and hazardous for different reasons.

Traditional neurologic theory holds that the cerebral cortex is absolutely necessary for any sort of mental functioning [2, 33]. Many, including two of the consultants in the first Working Group [75 (p. 55), 87 (p. 10)], have attempted to draw from this the philosophical conclusion that patients with a diffusely destroyed cortex, and clinically in a persistent vegetative state (PVS), are no longer human beings, even if their bodies might be biologically alive [9, 33, 34, 92, 99, 115, 127].

But how can anyone really know that PVS is not subjectively something like a combination of dementia and paralysis? It is inherently impossible to

determine empirically whether selective destruction of the cortex removes all consciousness or merely all means of externally manifesting some limited form of consciousness [cf. 19 (p. 460), 67 (p. 43)]. After all, mere absence of evidence is hardly evidence for absence (i.e., of consciousness). The almost religious fervor and dogmatism with which the cortical theory of consciousness is held is largely explainable by the powerful influence of behaviorism on the past century of neurological thinking. Nowhere is this revealed more explicitly than in the designation of that subspecialty of neurology dealing with higher mental functions as "Behavioral Neurology". It should come as no surprise, therefore, that the related metaphysical error of "actualism" pervades the literature on "neocortical death", radically undermining appreciation for the transcendence and spirituality of the human person [cf. V.B.2.b. above; 98 (pp. 182-3)].

But aside from the inherent unverifiability of the traditional theory, there is actually positive evidence that subcortical structures have the capacity to mediate some form of consciousness.

a) Lower vertebrates without a developed cerebral cortex or following experimental decortication can carry out complex interactions with the environment, which, if performed by a brain-damaged human, would be taken as clinical evidence for conscious awareness [42, 53, 117].

b) Lesions of the somatosensory cortex produce loss of tactile discrimination, vibratory and joint position sense, but not of pain and temperature perception [17 (p. 114)]. In such cases, the conscious experience of such pain and temperature seems much more likely to be mediated by subcortical structures (particularly the thalamus) than by the non-sensory areas of cortex that remain.

c) The subjective unity of conscious experience that each of us appreciates within ourselves is difficult to reconcile with the multiplicity and dispersion of functional areas into which the cortex is organized. This led the great neurosurgical pioneer Wilder Penfield to posit the central brain-stem and thalamic reticular formation (what he called "centrencephalic system") as the actual neuroanatomical site of consciousness [86]. Although the content of consciousness and the effectuation of volitional acts would still depend heavily on the cortex, the unification of all this in a single seamless subjective experience might well occur through the neuronal feltwork of the reticular formation, which communicates extensively not only with the cortex but with virtually every other part of the central nervous system as well [17 (pp. 394-447), 96].

This offers a fitting anatomical correspondence between the "central core" of consciousness and the central core of the brain.

d) Children born with hydranencephaly (prenatal destruction of the cerebral hemispheres with intact skull and scalp) do not necessarily remain in a PVS, as traditional theory would predict, but in some cases develop apparently conscious, discriminative interaction with persons and the environment, such as: orienting, visual tracking, distinguishing mother from others, associative learning, consolability, and conditioning [13, 100, 104]. These and related considerations have led some investigators to speculate that subcortical structures may play a more important and direct role in the mediation of consciousness than is usually assumed [13, 68, 71].

Permit me to describe two cases which reinforce these points and have radically altered my own thinking on this issue over the last several years. When last seen by the author, one, a boy, was 6 years old and the other, a girl, was 13 years old. They both live with a remarkable adoptive mother, a pediatric nurse who has dedicated herself to the care of severely disabled children. Both have hydranencephaly, and review of the medical records and CT scans leaves no doubt concerning the diagnosis. They are both severely impaired motorically from spastic quadriplegia.

The boy definitely sees and can track objects visually despite the complete absence of occipital lobes (visual cortex). He can tell whether or not the door to the sun porch is open and will laboriously scoot himself out through the middle of the door by pushing with his legs; similarly, he can navigate around the floor of the house by visual guidance, avoiding collisions with walls, furniture and other objects. Despite the absence of an auditory cortex, he distinguishes new from familiar music and clearly enjoys favorite pieces; while listening to music, his behavior appropriately reflects the changing mood of the music. He reacts jovially when mother talks to him playfully, but becomes serious and quiet when she speaks in a stern tone of voice. He loves to be played with and responds by smiling, laughing, and moving more animatedly.

The girl has less motoric and visual function than her adoptive brother but manifests more discriminating cognitive abilities. She recognizes certain individuals by sound and/or touch, and responds to them according to degree of familiarity, being most at ease with and responsive to her mother, next with familiar home therapists, and least with strangers. When I approached and began to talk to her and touch her gently, she became fearful and turned her eyes pleadingly in the direction of her mother at the other side of the bed. I witnessed her reaction of quiet puzzlement, then delayed recognition and de-

lighted enthusiasm when her former music therapist returned after an absence of several months and snuck up on her singing her favorite song ("Send in the Clowns"). She did not have that reaction when I played the same piece on the piano or when the therapist played or sang less favorite music. With other pieces known to be particularly enjoyable for her (mostly ballads) and with some happy, bouncy dances of Bach, her face lit up, she moved her head more and vocalized, but with Mozart, which mother said she always hated, she had no reaction at all.

Had I known nothing of these children's diagnoses, I would have concluded from their behavior that they were severely brain damaged, but unquestionably conscious. Their pediatric neurologist and I believe that they exemplify a property of the developing brain called "plasticity," a capacity for compensatory self-reorganization following partial damage [103]. Admittedly, they do not manifest any symbolic language and have severely limited cognitive function; what is remarkable, however, is that they are conscious at all and not in the persistent vegetative state that traditional neurophysiological doctrine would predict (and that all their early doctors did predict).

Although these are highly unusual cases, it takes only a single exception to disprove a universal rule. They demonstrate that the human brain stem and diencephalon, in the absence of cerebral cortex, can mediate consciousness and purposeful interaction with the environment. Whether this depends uniquely on the plasticity of the infant brain or exists also in adults in PVS remains unknown. In any event, with such phenomena as precedents, intellectual honesty demands admitting that it is intrinsically impossible to test empirically whether a patient in PVS is utterly without consciousness or rather has some primitive form of consciousness but is simply unable to manifest it externally. I am hardly alone in this skepticism regarding what officials of the American Academy of Neurology [2] recently declared to be firm scientific fact. No less respected a group than the President's Commission concluded that;

"it is not known which portions of the brain are responsible for cognition and consciousness; what little is known points to substantial interconnections among the brainstem, subcortical structures and the neocortex. Thus, the 'higher brain' may well exist only as a metaphorical concept, not in reality." [91 (p. 40)]

For all these reasons, I have come to reverse my earlier position, which theoretically equated "neocortical death" with personal death (while cautioning against acting upon this theory unless certainty of its correctness could be established and misinterpretations and abuses avoided) [99, 101]. I am now convinced that, whether or not the metaphysical reasoning was formally

correct, the neuroanatomical assumptions from which it proceeded were incorrect or at best not scientifically demonstrable. In short, the "physiological kernel" [81, 82] of "death of the brain as a whole" can no more be limited to the cerebral cortex alone than to the brain stem alone.

VII. AN ANATOMICO-PHILOSOPHICAL SYNTHESIS

The above considerations suggest that, *vis a vis* the physiology of consciousness, the traditional dichotomy between "upper brain" and "lower brain" is exaggerated. The central nervous seems to enjoy sufficient functional redundancy that destruction of either the cortex or the brain stem alone is insufficient to eliminate all intrinsic potential for consciousness or to constitute death. There seems to be no single anatomical compartment of the brain that is both necessary and sufficient for consciousness.

There is, nevertheless, a functional subdivision with such qualities, namely, what could be called the reticular-formation/cortical unit. Conceivably, this "physiological kernel" of consciousness could even be narrowed down further to the brain's reticular core, spanning both brain stem and diencephalon (Penfield's "centrencephalic system" [86]). Moreover, in a broad sense this same functional unit seems to be the central integrator of the body. On both counts therefore, (integrative unity and essential properties), it seems to be the *sine qua non* of post-embryonic human life. Because of the brain's functional redundancy and plasticity, one cannot be sure that this unit is destroyed unless both its brainstem and cerebral components are destroyed.

In addition to being physiologically plausible and philosophically coherent, the proposed revision, which is based on a more holistic view of brain functioning, is also clinically useful — perhaps even more useful than most "whole-brain death" formulations, on account of its transcendence beyond that legalistic caricature which would require the death of every cell in the cranial cavity. For example, a diagnosis of death based on destruction of the reticular-formation/cortical unit, in the context of known brain herniation and/or prolonged absence of intracranial blood flow, would not at all be contradicted by the presence of a snout reflex or a persistent cervicomedullary peak on somatosensory evoked potentials or the absence of diabetes insipidus. On the other hand, it would exclude loose and facile equations of "death of the brain as a whole" with philosophically invalid and pragmatically dangerous constructs such as "brain-stem death" or "neocortical death".

Based on the combination of current neurophysiologic knowledge and a proper philosophical framework, it should indeed be possible to diagnose

death in many potential organ donors with moral certainty, fulfilling that requirement so well expressed by the Holy Father to our Working Group:

“[O]nce such a determination has been arrived at, then the apparent conflict, between the duty to respect the life of one person and the duty to effect a cure or even save the life of another, disappears. One would be able to know at what moment it would be perfectly permissible to do what had been definitely forbidden previously, namely, the removal of an organ for transplanting, with the best chances of a successful outcome.” [57]

REFERENCES

1. ALLEN N., BURKHOLDER J.: Clinical criteria of brain death. *Ann. NY Acad. Sci.* 315:70-96, 1978.
2. American Academy of Neurology, *Position of the American Academy of Neurology on certain aspects of the care and management of the persistent vegetative state patient.* *Neurology* 39. 125-126 (1989).
3. AQUINAS T., *De Anima.*
4. AQUINAS T., *Summa Theologiae.*
5. ASHWAL S., SCHNEIDER S.: Brain death in the newborn: Clinical, electroencephalographic, and cerebral blood flow determinations. *Ann. Neurol.* 24:337, 1988.
6. Associated Press, *3 agents shot in drug buy: 1 killed, another brain dead.* *Tulsa World Tulsa, OK,* p. A22 (February 6, 1988).
7. BEECHER H.K.: Ethical problems created by the hopelessly unconscious patient. *N. Engl. J. Med.* 278:1425-1430, 1968.
8. BEECHER H.K., DORR HI.: The new definition of death. Some opposing views. *Int. J. Clin. Pharmacol.* 5:120-124, 1971.
9. BELLER F.K., REEVE J., *Brain life and brain death: the anencephalic as an explanatory example. A contribution to transplantation.* *J. Med. Philos.* 14. 5-23 (1989).
10. BELSH J.M., CHOKROVERTY S.: Short-latency somatosensory evoked potentials in brain-dead patients. *Electroencephalogr. Clin. Neurophysiol.* 1987; 68:75-78.
11. BERESFORD H.R.: Cognitive death: Differential problems and legal overtones. *Ann. NY. Acad. Sci.* 315:339-348, 1978.
12. BERNAT J.L.: The definition, criterion, and statute of death. *Seminars in Neurology* 4:45-51, 1984.
13. BERNTSON G.G., MICCO D.J.: Organization of brainstem behavioral systems. *Brain Res Bull* 1:471-483, 1976.
14. BLACK P.M.C.L.: Brain death. (Two parts) *N. Engl. J. Med.* 299:338-344, 393-401, 1978.
15. BLAKESLEE S., *New attention focused on infant organ donors.* *The New York Times* p. 18 (December 14, 1987).
16. BOISVERT M.: All things considered... Then what? *J. Palliative Care* 4:115-118, 1988.
17. BRODAL A., *Neurological Anatomy in Relation to Clinical Medicine*, 3rd ed., New York, Oxford University Press, 394-447 (1981).
18. BYRNE P.A., O'REILLY S., QUAY P.M., *Brain death: An opposing viewpoint.* *JAMA* 242. 1985-1990 (1979).

19. BYRNE P.A., O'REILLY S., QUAY P.M., SALSICH P.W. JR., *Brain death — the patient, the physician, and society*. *Gonzaga Law Review* 18, 429-516, (1982/83).
20. CAPRON A.M.: Anencephalic donors: Separate the dead from the dying. *Hastings Center Rep*, 17(1):5-9, (February) 1987.
21. CASADO DE FRIAS E., BALBOA DE PAZ F., PÉREZ MARTÍNEZ A., PALACIO MESTRES C., *Inappropriate secretion of antidiuretic hormone and the effect of lithium in its treatment*. *J. Pediatr.* 96, 153-155 (1980).
22. CASTELNUOVO-TEDESCO P., *Cardiac surgeons look at transplantation — Interviews with Drs. Cleveland, Cooley, DeBakey, Hallman and Rochelle*. *Seminars in Psychiatry* 3, 5-16 (1971).
23. CHAGAS C. (ed.), *Working Group on the Artificial Prolongation of Life and the Determination of the Exact Moment of Death*. Vatican City, Pontifical Academy of Sciences, (1986).
24. CHARRON W.C., *Death: a philosophical perspective on the legal definitions*. *Washington Univ. Law Quart.* 1975, 979-1008 (1975).
25. CLARK M., KING P., BUCKLEY L., SPRINGEN K.: Doctors grapple with ethics. A new dilemma is whether patients should be kept alive so that their organs can help save others. *Newsweek*, December 28, 1987, pp. 62-63.
26. CLARKSON J.F., EDWARDS J.H., KELLY W.J., WELCH J.J. (eds.), *The Church Teaches. Documents of the Church in English Translation*. St. Louis, MO, Herder (1955).
27. *Codex Iuris Canonici*. (1983) C. 252, par. 3.
28. COLLER B.S., SCUDDER L.E., BERGER H.J., IULIUCCI J.D.: Inhibition of human platelet function in vivo with a monoclonal antibody, with observations on the newly dead as experimental subjects. *Ann. Int. Med.* 109:635-638, 1988.
29. CONCI F., PROCACCIO F., AROSIO M., BOSELLI L.: Viscero-somatic and viscerovisceral reflexes in brain death. *J. Neurol. Neurosurg. Psychiatr.* 49:695-698, 1986.
30. Conference of Medical Royal Colleges and Their Faculties in the United Kingdom, *Diagnosis of brain death*. *Br. Med. J.* 2, 1187-1188 (1976).
31. Conference of Medical Royal Colleges and Their Faculties in the United Kingdom, *Diagnosis of death*. *Br. Med. J.* 1, 3320 (1979).
32. CRANFORD R.E., *The neurologist as ethics consultant and as a member of the institutional ethics committee. The neuroethicist*. In: BERNAT J.L. (ed.), *Ethical Issues in Neurologic Practice*. *Neurologic Clinics* 7(4), 697-713 (1989).
33. CRANFORD R.E., SMITH D.R., *Consciousness: the most critical moral (constitutional) standard for human personhood*. *Am. J. Law Med.* 13, 233-248 (1987).
34. DEVIETTERE R.J.: Neocortical death and human death. *Law Med. Health Care* 18:96-104, 1990.
35. DICKSON D.: Human experiment roils French medicine. *Science* 1988; 239:1370.
36. DILLON W.P., LEE R.V., TRONOLONE M.J., BUCKWALD S., FOOTE R.J.: Life support and maternal brain death during pregnancy. *JAMA* 1982; 248:1089-1091.
37. ECCLES J.C., *Evolution of the Brain: Creation of the Self*. London, Routledge (1989).
38. EVERSON J.: Brain-dead woman ordered kept alive. Second recent case to save fetus. *American Medical News*, Aug. 15, 1986, pp. 14-15.

39. FACKLER J.C., ROGERS M.C., *Is brain death really cessation of all intracranial function?* J. Pediatr. 110, 84-86 (1987).
40. FACKLER J.C., TRONCOSO J.C., GIOIA F.R.: Age-specific characteristics of brain death in children. Am. J. Dis Child 142:999-1003, 1988.
41. FIELD D.R., GATES E.A., CREASY R.K., JONSEN A.R., LAROS R.K. JR., *Maternal brain death during pregnancy: medical and ethical issues.* JAMA 260, 816-822 (1988).
42. FINGER S., STEIN D.G.: *Brain Damage and Recovery: Research and Clinical Perspectives.* New York, NY, Academic Press, 1982.
43. FLETCHER J., *Indicators of humanhood: a tentative profile of man.* Hastings Cent. Rep. 2(5), 1-4 (November, 1972).
44. FLETCHER J.C., ROBERTSON J.A., HARRISON M.R., *Primates and anencephalics as sources for pediatric organ transplants. Medical, legal, and ethical issues.* Fetal Therapy 1, 150-164 (1986).
45. FOST N., *Organs from anencephalic infants: an idea whose time has not yet come* Hastings Cent. Rep. 18(5), 5-10 (October/November, 1988).
46. GILDER S.S.B., *Twenty-second World Medical Assembly (Declaration of Sidney).* Br. Med. J. 3, 493-494 (1968).
47. GOLDENRING J.M., *The brain-life theory: towards a consistent biological definition of humanness.* J. Med. Ethics 11, 198-204 (1985).
48. GRENVIK A., POWNER D.J., SNYDER J.V., JASTREMSKI M.S., BABCOCK R.A., LOUGHHEAD M.G.: Cessation of therapy in terminal illness and brain death. Crit. Care Med. 1978; 6:284-291.
49. GRIGG M.M., KELLY M.A., CELESIA G.G., GHOBRIAL M.W., ROSS E.R., *Electroencephalographic activity after brain death.* Arch. Neurol. 44, 948-954 (1987).
50. GRISEZ G., BOYLE J.M. JR., *Life and Death with Liberty and Justice. A Contribution to the Eutbanasia Debate.* Notre Dame, IN, University of Notre Dame Press, pp. 59-78 (1979).
51. HARRISON M.R., *The anencephalic newborn as organ donor.* Hastings Cent. Rep. 16(2), 21-22 (April, 1986).
52. HASSLER R., *Basal ganglia systems regulating mental activity.* Int. J. Neurol. 12, 53-72 (1977).
53. HOVDA D.A., SUTTON R.L., FEENEY D.M.: Amphetamine-induced recovery of visual cliff performance after bilateral visual cortex ablation in cats: measurements of depth perception thresholds. Behav Neurosci 103:574-584, 1989.
54. HUGHES J.R.: Limitations of the EEG in coma and brain death. Ann. NY Acad. Sci. 315:121-136, 1978.
55. INGVAR D.H., *The concept of death: comments on an official inquiry in Sweden.* In: Chagas [23], pp. 65-74.
56. JENNETT B., GLEAVE J., WILSON P.: Brain death in three neurosurgical units. Br. Med. J. 1981; 282:533-539.
57. JOHN PAUL II, Pope, *Determining the moment of death.* Address to the Working Group, December 14, 1989. L'Osservatore Romano, English edition p. 10 (January 8, 1990).

58. JONAS H.: Against the stream. In Jonas H.: *Philosophical Essays: From Ancient Creed to Technological Man*. Englewood Cliffs, NJ, Prentice-Hall, 1974, pp. 132-140.
59. KASS L.R., *Death as an event: a commentary on Robert Morison*. *Science* 173, 698-702 (1971).
60. KOLFF J., DIEEB G.M., CAVAROCCHI N.C., RIEBMAN J.B., OLSEN D.B., ROBBINS P.S., *The artificial heart in human subjects*. *J. Thorac. Cardiovasc. Surg.* 87, 825-831 (1984).
61. KOREIN J., *The problem of brain death: development and history*. *Ann. NY Acad. Sci.* 315, 19-38 (1978).
62. KOREIN J., MACCARIO M.: A prospective study on the diagnosis of cerebral death. *Electroencephalogr. Clin. Neurophysiol.* 31:103-104, 1971.
63. KOREN H.J., *An Introduction to the Philosophy of Animate Nature*. St. Louis, MO, Herder (1955).
64. KOREN H.J. (ed.), *Readings in the Philosophy of Nature*. Westminster, MD, Newman Press, (1965).
65. LACHS J., *Humane treatment and the treatment of humans*, *N. Engl. J. Med.* 294, 838-840 (1976).
66. LACHS J., *The element of choice in criteria of death*. In: Zaner [130], pp. 233-251.
67. LAMB D., *Death, Brain Death and Ethics*. Albany, NY, State University of New York Press (1985).
68. LEWIN R.: Is your brain really necessary? *Science* 1980; 210:1232-1234.
69. LINKENS D.A. (ed.), *Biological Systems, Modelling and Control*. London, Peter Peregrinus, Ltd. (1979).
70. LOEWY E.H., *Anencephalic infants: weighing the symbol and the reality*. *Medical Ethics for the Physician* (publ. by Beecham Laboratories) 3(2), 11-12, (1988).
71. LORBER J.: Hydranencephaly with normal development. *Devel Med. Child Neurol.* 1965; 7:628-633.
72. MANNINEN D.L., EVANS R.W.: Public attitudes and behavior regarding organ donation. *JAMA* 1985; 253:3111-3115.
73. MARKS M., *The Anencephalic as a Source for Pediatric Organ Transplants: A Question of Medical Ethics*. From the office of California Senator Milton Marks, Sacramento, CA, p. 5 (October 29, 1986).
74. Medical Task Force on Anencephaly, *The infant with anencephaly*. *N. Engl. J. Med.* 322, 669-674 (1990).
75. MILHAUD G.: La prolongation artificielle de la vie et le temps. In: Chagas [23], pp. 51-55 (especially p. 55).
76. MOHANDAS A., CHOU S.N.: Brain death: a clinical and pathological study. *J. Neurosurg* 1971; 35:211-218.
77. MOLINARI G.F., *Brain death. irreversible coma. and words doctors use*. *Neurology* 32, 400-402 (1982).
78. MORISON R.S., *Death: Process or event?* *Science* 173, 694-698 (1971).

79. MOSELEY J.I., MOLINARI G.F., WALKER A.E., *Respirator brain: report of a survey and review of current concepts*. Arch. Pathol. Lab. Med. 100, 61-64 (1976).
80. OSKI F.A., FOST N.C., FREEMAN J.M., SEIDEL H.M., JOFFE A., *Ethical dilemma: should organs be taken from this patient?* Contemp. Pediatr. 4, 110-117 (1987).
81. PALLIS C., *ABC of brain stem death: from brain death to brain stem death*. Br. Med. J. 28, 1487-1490 (1982).
82. PALLIS C., *Whole brain death reconsidered: physiological facts and philosophy*. J. Med. Ethics 9, 32-37 (1983).
83. PALLIS C.: *ABC of brain stem death: The arguments about the EEG*. Brit. Med. J. 286:284-287, 1983.
84. PARISI J.E., KIM R.C., COLINS G.H., HILFINGER M.F., *Brain death with prolonged somatic survival*. N. Engl. J. Med. 306, 14-16 (1982).
85. PEABODY J.L., EMERY J.R., ASHWAL S., *Experience with anencephalic infants as prospective organ donors*. N. Engl. J. Med. 321, 344-350 (1989).
86. PENFIELD W., *The Mystery of the Mind. A Critical Study of Consciousness and the Human Brain*. Princeton, N.J., Princeton University Press (1975).
87. PIA H.W., *Cerebral death*. In: Chagas [23], pp. 1-11.
88. PIUS X, Pope, *Doctoris Angelici. Motu Proprio* (June 29, 1914).
89. PIUS XI, Pope, *Studiorum Ducem*. Encyclical (June 26, 1923).
90. PONTÉN U., *Artificial prolongation of life and the determination of the exact moment of death*. In: Chagas [23], pp. 85-94.
91. President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research, *Defining Death: Medical, Legal and Ethical Issues in the Determination of Death*. Washington, U.S. Government Printing Office (1981).
92. PUCETTI R., *Does anyone survive neocortical death?* In: Zaner [130] pp. 75-90.
93. RIX B.A: *Danish ethics council rejects brain death as the criterion of death*. J. Med. Ethics 16:5-7, 1990.
94. ROWLAND T.W., DONNELLY J.H., JACKSON A.H., JAMROZ S.B., *Brain death in the pediatric intensive care unit: a clinical definition*. Am. J. Dis. Child. 137, 547-550 (1983).
95. SASS H.-M., *Brain life and braindeath: a proposal for a normative agreement*. J. Med. Philos. 14, 45-59 (1989).
96. SCHEIBEL A.B., *The brain stem reticular core and sensory function*. In: BROOKHART J.M., MOUNTCASTLE V.B., DARIAN-SMITH I., GEIGER S.R. (eds.), *Handbook of Physiology*. Bethesda, MD, American Physiological Society, Section 1: The Nervous System, Vol. III, Pt. 1, pp. 213-256 (1984).
97. SCOTT C.E., *The many times of death*. In: Zaner [130], pp. 229-231.
98. SEIFERT J.: *Abortion and euthanasia as legal and as moral issues: some reflections on the relationship between morality, church and state*. In: TONTI-FILIPPINI N. (ed): *Bioethics Update and the Role of Catholic Hospitals*. Proceedings of 1987 Annual Conference on Bioethics. Melbourne, St. Vincent's Bioethics Centre, 1987, pp. 162-212.

99. SHEWMON D.A., *The metaphysics of brain death. persistent vegetative state, and dementia.* *The Thomist* 49, 24-80 (1985).
100. SHEWMON D.A., *Anencephaly: selected medical aspects.* *Hastings Cent. Rep.* 18(5), 11-19 (October/November, 1988).
101. SHEWMON D.A., *Caution in the definition and diagnosis of infant brain death.* In: MONAGLE J.F., THOMASMA D.G. (eds.), *Medical Ethics: A Guide for Health Professionals.* Rockville, MD, Aspen, pp. 38-57 (1988).
102. SHEWMON D.A., *The semantic confusion surrounding brain death.* *Arch. Neurol.* 46, 603-604 (1989).
103. SHEWMON D.A., HOLMES G.L., *Brainstem plasticity in congenitally decerebrate children.* *Brain & Devel.* 12:664, 1990.
104. SHEWMON D.A., CAPRON A.M., PEACOCK W.J., SCHULMAN B.L., *The use of anencephalic infants as organ sources: a critique.* *JAMA* 261, 1773-1781 (1989).
105. SHRADER D.: On dying more than one death. *Hastings Ctr. Rep.* 16(1):12-17, 1986.
106. SIEGLER M., WIKLER D.: Brain death and live birth. *JAMA* 1982; 248:1101-1102.
107. SILVERMAN D., MASLAND R.L., SAUNDERS M.G., SCHWAB R.S.: Irreversible coma associated with electrocerebral silence. *Neurology* 20:525-533, 1970.
108. Singer P., *Sanctity of life or quality of life?* *Pediatrics* 72, 128-129 (1983).
109. STEINBROOK R.: Frank admissions and infant organ harvesting. *Los Angeles Times*, Aug. 19, 1988, pp. 3, 33.
110. TONTI-FILIPPINI N.: Determining when death has occurred. *Linacre Q* 58(1):25-49, 1991.
111. TOOLEY M., *Abortion and infanticide.* In: GOROVITZ S., JAMETON A.L., MACKLIN R., et al. (eds.), *Moral Problems in Medicine.* Englewood Cliffs, NJ, Prentice-Hall, pp. 297-317 (1976).
112. VARELA F.J., *Principles of Biological Autonomy.* New York, North Holland, [Series in General Systems Research, Vol. 2] (1979).
113. Vatican Council II, *Gravissimum educationis momentum.* Declaration, n. 10 (1965).
114. Vatican Council II, *Optatam totius Ecclesiae.* Decree, nn. 15, 16 (1965).
115. VEATCH R.M., *Whole-brain, neocortical, and higher brain, related concepts.* In: Zaner [130], pp. 171-186.
116. VEATCH R.M.: The definition of death: unresolved controversies. In: KAUFMAN H.H. (ed): *Pediatric Brain Death and Organ/Tissue Retrieval: Medical, Ethical, and Legal Aspects.* New York, Plenum, 1989, pp. 207-218.
117. VILLABLANCA J.R., BURGESS J.W., OLMSTEAD C.E., LEVINE M.S.: Recovery of function after neonatal or adult hemispherectomy in cats: I-III. *Behav Brain Res* 19:205-226, 20:1-18, 217-230, 1986.
118. VISSER S.L.: Two cases of isoelectric EEGs ("Apparent exceptions proving the rule"). *Electroencephalogr. Clin. Neurophysiol.* 27:215, 1969.
119. WALDER H.A.D., *The artificial prolongation of life and the determination of the exact moment of death.* In: Chagas [23], pp. 75-84.

120. WALKER A.E., DIAMOND E.L., MOSELEY J., *The neuropathological findings in irreversible coma: a critique of the "respirator brain"*. J. Neuropathol. Exp. Neurol. 34, 295-323 (1975).
121. WALKER A.E., et al., *An appraisal of the criteria of cerebral death. A summary statement. A collaborative study*. JAMA 237, 982-986 (1977).
122. WALTERS J.W., ASHWAL S., *Organ prolongation in anencephalic infants: ethical and medical issues*. Hastings Cent. Rep. 18(5), 19-27 (October/November, 1988).
123. WALTERS J.W., ASHWAL S., *Anencephalic infants as organ donors and the brain death standard*. J. Med. Philos. 14, 79-87 (1989).
124. WETZEL R.C., SETZER N., STIFF J.L., ROGERS M.C.: Hemodynamic responses in brain dead organ donor patients. Anesth. Analg. 64:125-128, 1985.
125. WIKLER D., WEISBARD A.J., *Appropriate confusion over brain death*. JAMA 261, 2246 (1989).
126. YOUNGNER S.J.: Drawing the line in brain death. Hastings Ctr. Rep. 17(4):43-44, 1987.
127. YOUNGNER S.J., BARTLETT E.T., *Human death and high technology: the failure of the whole brain formulations*. Ann. Int. Med. 99, 252-258 (1983).
128. YOUNGNER S.J., ALLEN M., BARTLETT E.T., et al., *Psychosocial and ethical implications of organ retrieval*. N. Eng. J. Med. 313, 321-324 (1985).
129. YOUNGNER S.J., LANDEFELD C.S., COULTON C.J., JUKNIALIS B.W., LEARY M., *"Brain death" and organ retrieval: a cross-sectional survey of knowledge and concepts among health professionals*. JAMA 261, 2205-2210 (1989).
130. ZANER R.M. (ed.), *Death: Beyond Whole-Brain Criteria*. Dordrecht/Boston, Kluwer Academic, (1988).
131. ZERBINI E.J., *The prolongation of life and the criteria of death*. In: Chagas [23], pp. 95-99.

THE CONCEPT OF HUMAN DEATH IN REFERENCE TO ORGAN TRANSPLANTATION

ROBERT J. WHITE

STATEMENT I

The defining of human death exclusively in terms of brain failure is appropriate scientifically, theologically, and philosophically.

During the last two decades, the definition of human death has been based on the irreversible failure of all functions of a single organ—that of the human brain. This has been particularly true in Western countries, notably those with advanced medical technology.

Human death has been based primarily on a clinical diagnosis, utilizing established neurological protocols that document the total absence of organized brain function. Often, these neurological examinations have been supplemented with specialized instrumentation, such as electroencephalography, cerebral arteriography, nuclear scanning, computerized tomography, and magnetic resonance imaging, and, on rare occasions, positron emission tomography. The employment of this sophisticated technology has only further confirmed the ability of medical science to document, with an extreme degree of accuracy, the diagnosis of human death based on the concept of total brain failure.

The classical physiological events that were associated with human death (cessation of circulation and respiration) and that were in appropriate for organ transplantation have now been superseded by a far more scientific concept of death, that of irreversible organizational dissolution of brain function.

This definition is far more compatible with the physiological and biochemical requirements for organ transplantation.

STATEMENT II

The present scientifically accepted definition of human death, based on brain failure, will require modification if certain advances, particularly in pediatric transplantation, are to be accommodated.

1. The anencephalic infant born with a minimum of brain substance (absence of cerebral hemispheres, but with at least a partial brain stem) has become a controversial source for organ transplantation. This has involved both the kidneys and heart, as well as other organs and tissues.

2. The products of abortions in the form of fetal tissues and organs represent a major resource for experimentation and transplantation. This has included the actual removal of specific areas of the fetal brain and grafting of these cellular collections to selected loci in the adult human brain suffering from such diseases as Parkinsonism.

The use of tissues, whether cellular aggregates or formed organs from the neurologically malformed infants. Such as an anencephalic or from the fetus itself, raises the serious question as to whether the present methods of diagnosing human death are applicable to these individuals or whether significant clinical and physiological modifications must be made.

3. Serious questions had also arisen in regard to the management of patients who are in a decorticate or chronic vegetative state, patients who are evidencing irreversible coma, but do demonstrate evidence of brain stem function. Thus, they do not fit the present concept of total brain failure. Obviously, what passes for human functioning consciousness, memory, cognition, etc., is absent in these individuals. Society and medical science are asking whether it is morally appropriate to continue these patients in these states and whether brain death criteria should be changed so that these individuals could be included by employing a less stringent definition. For example, is there a place for a decorticate brain death diagnosis?

4. Even the human embryo, primarily because of the new field of in vitro fertilization, has become an issue in terms of defining death. For example, is it justifiable to experiment or even store the fetal ovum at extremely low temperatures? If one is willing to assign complete human rights to the embryo, one must have an entirely new definition of not only brain death, but cellular death as well.

In summary, the present definition of human death based on established criteria for brain failure seems most appropriate for the field of organ transplantation, indeed, for human society in general. With the recent advances of medical science, particularly in the area of human transplantation, the well

established criteria for the diagnosis of human death, based on brain death, may require alterations.

Defining Clinical Death

Clinical death has enjoyed a renaissance of interest, not only amongst physicians, but philosophers and theologians as well. In fact, the legal profession and sociology are not far behind in displaying concern for the definition of death. Much of this appears to have begun in the 1960's, when the possibility of human organ transplantation became a reality and the growing interest on the part of the medical profession, as a whole, in dealing with patients who were defined as being in irreversible coma.

Such obvious questions immediately arose as: "Where do we have a source for solid organs for transplantation?" and "Are patients in irreversible coma really dead?" True, under certain circumstances, when the organ is duplicated, the living can serve as a source for such tissue, but, in general, medical science began to look to the cadaver as the major source for the harvesting of organs. Parenthetically, some interest is still retained in utilizing animals; for example, certain large subhuman primates, as organ donor resources, but much investigation in the areas of tissue compatibility and immunology must be done before non-humans can be utilized.

Traditional Human Death Conceptualization

Classically, human death has been associated with the cessation of respiration and cardiac activity. Invariably, a period of time in which the individual, without circulation and oxygenation, slowly, but inevitable, lost cellular function in all of the system organs, including brain, ultimately resulting in putrification, preceded by rigor mortis.

Since, prior to the time of organ transplantation and tissue replacement, dead human bodies were of little or not economic value, the need to define this pathological state was of little or no consequence, beyond its religious or legal significance. In attempting to define death in a clinical sense, one early finds that what one is working with is really a process and not a biological end point per se. In a theological sense, most Christian religions, notably the Catholics, perceive death as when the soul leaves the body (which appears to have no biochemical or physiological activity to document the event) and we are comfortable with the longstanding pathophysiological state of prolonged cessation of respiratory and circulatory activity that has, in general, not assigned a time limit to the process.

Even in the old, well-established physiological criteria for clinical death, unknowingly, the brain was placed in a central position, for it, as a functioning organ, lost its viability and its recoverability within a few moments, when its circulation has ceased. Other organs, the heart itself, the kidneys, liver, etc., survive for some time in the body of the person who has been pronounced dead, using the old criteria of cardiopulmonary arrest. The question, then, before us, even utilizing the classical definition of clinical death, is: At what moment in time, and under what physiological or biochemical conditions, does clinical death really ensue?

Eventually, organs lost their capability to function, but individual tissue, such as skin or bone, would persist for many hours after death as living cells. Total putrefication or cremation of the body would appear the only circumstances in reasonable time where total destruction and, therefore, death of every single cellular component of the body had been accomplished, unless, of course, the individual (and all of his or her tissues) were instantaneously consumed by high temperature flame or subjected to extremely high pressure, then, in both situations, immediate destruction of body cells would occur.

Contemporary Human Death Conceptualization

In the mid 1960's, and in the face of rising demands for organs for transplantation, the Harvard Corporation set up a study to review comatose patients in the hopes of developing criteria that would allow them to determine when a person was in irreversible coma and that this determination could be used to define brain death. Fascinatingly, we had reached a point where brain death equated with human death. The result of this investigation was the landmark publication entitled, "Definition of Irreversible Coma", which, in a sense, has underwritten all of subsequent discussion and decision in the area of brain death.

In essence, what they stated and what myriad subsequent studies have shown is that it is possible to determine that the human brain has entered a state of total and irreversible failure. While there is now sophisticated instrumentation to assist in making this diagnosis, a knowledge of the patient's medical history and repeatedly conducted neurological examinations are often sufficient to make this determination.

Without question, the Western World, both professionally and publicly, appears to be quite comfortable with this new single organ definition of human death. In the process, it accords a unique status to the human brain, arguing that it is what determines and characterizes the uniqueness of the human person. It is almost as if all other elements of the human body are subser-

viant, in a physical sense, to the brain and are responsible to nourish and nurture this single organ. If one pauses to consider this unusual state, it has much to commend itself. After all, all that has been accomplished by mankind, including its values, is exclusively associated with the human mind, whose tissue repository is the human brain. As a matter of fact, the world of transplantation only further emphasizes this concept, for even the heart can now be transplanted from one individual to another.

Certainly, no one is going to argue that memory, cognition, indeed, even personality and emotion are exclusively located in the human cerebrum. As always, there are concerns here, since the human brain can be transplanted (under very unusual circumstances) in whole or in part.

In many ways, then, defining human death in terms of the brain is more scientific and exact than the previous classical definition, yet one must admit that not only has the demand for solid organs for transplantation forced a reexamination of human death, but the cost of health care, even in the most advanced countries, has demanded reconsideration of the meaning and significance of clinical brain death.

Contemporary Definition of Brain Death

But, how does one define brain death? Are we talking about the whole brain? Are we talking about the brain stem? Or are we talking about the entire central nervous system?

Present day conventional criteria involve the whole brain, including the brain stem. Under these circumstances, we are speaking of a person in deep coma, whose brain is incapable of evidencing any responsivity to sensory input. While some of the other elements of the neurological examination are more precise and exacting, we are speaking of an individual who has no capability of initiating respiration and whose brain stem, as a result of these studies, is felt to be nonfunctional. Of course, the other part of the definition requires irreversible evidence that, under no circumstances, will functional activity return to the brain organ.

Neocortical Death

Recent developments, particularly in the Western Countries, have raised doubts as to whether or not what has become known as traditional brain death definition is too precise and too exclusive. Some clinicians have raised the possibility that patients who are in continual coma, but demonstrating

some primitive brain stem function (for example, retention of respiratory capabilities, eye movements, etc.), are still “dead” in a neocortical sense.

An example of such a case was Karen Ann Quinlan. This young woman, whose cause for «coma» was never exactly determined, survived for almost a decade without regaining consciousness, requiring only hydration and nutrition.

Such persons as she are referred to as being in a “chronic vegetative state”, where the mantle of the brain, the cerebral cortex, has been destroyed, but deeper parts of the brain are functional or partly so.

These patients are unable to understand or appreciate and respond to their environment. These types of individuals are becoming the subject of law suits, whereby the Courts are being requested to allow discontinuance of such minimal exogenous support as food and water being administered through a simple feeding tube, allowing patients to die through dehydration and starvation.

Anencephalic Death

Another area of great concern in the overall concept of brain death is the problem of the anencephalic infant, who is often defined as being born without a brain. In truth, the majority of these infants have some semblance of a brain stem and, therefore, can breathe, and, frequently, move their limbs. Still, many of them will succumb within a few days of their birth, even with extraordinary means.

These little patients have become an international issue because of world wide transfer of these infants to provide solid organs for transplantation in the newborn. A serious question here is whether or not these infants with only a brain stem and no possibility of survival, are dead. Obviously, they do not fit conventional brain death criteria since the brain stem continues functioning for a short period.

Brain Death By Anatomical Level

It is almost as if the human brain can be divided up in some sort of conventional way to help in providing a scientific definition of death; for example, the cortex, the diencephalon, and the brain stem. The question is whether or not all of the above must be destroyed in order to make the appropriate diagnosis. It is well to remember, even under the conventional total brain failure, that the diagnosis of brain death is made when many of the individual cells are undoubtedly still alive and functioning.

One would speak here of living glia brain, where the supporting cells are living, but most, if not all, of the central brain cells—the neurons—are destroyed. What has truly been lost is the exquisite architecture of cells and their fiber connections, which provide the organizational matrix for the human brain. In other words, those unique fiber systems that underwrite memory, cognition, emotions, and personality are no longer a functional design.

So, while the brain (some parts of it) may still be capable of initiating respiration and maintaining circulatory activities, the very essence of what makes an individual human has been destroyed and, like Humpty-Dumpty, cannot be put back together again.

New Sources of Transplantation Organs

If society could embrace the concept of brain death being defined in terms of chronic vegetative state, then one would have to accept the possibility that such individuals, including the anencephalic infants, would now represent reservoirs for solid organs for transplantation.

Another disturbing issue that cuts across the concept defining human death in terms of total brain failure is the one raised within the framework of the abortion issue. Science is anxious to use tissues, including brain tissues, from the aborted fetus. Procedures have already been carried out in Sweden, Mexico, China, England, and the United States. The immediate question that arises here is that one cannot transplant dead tissue.

Therefore, one must transplant living, potentially functioning fetal brain tissue! In this particular situation, how does one arrive at the fact that the individual is dead (the fetus) based on total failure of the brain, when the plan is to remove tissue from the organ that must be living.

Human death is a continuum and, in the process, it is true of its incredible matrix as well. Thus, if we are to continue to utilize the human brain as a centerpiece for the clinical definition of human death, we must arrive at some consensus as to how much of the brain needs to be destroyed as a physical entity and for how long this degree of cellular tissue destruction has to have existed. Some have suggested that the diagnosis of total brain failure could be determined almost immediately by using standard invasive techniques, such as direct brain biopsy, with biochemical analysis or the insertion of electrode systems deep into the brain in specific loci that are responsible for the neurophysiology of consciousness. Formal cerebral arteriography and nucleotide infusions have also been utilized to demonstrate the absence of circulation in brain, and, therefore, the death of the organ.

More recently, some have argued that the new imaging technology, such as PET scanning, which allows examination and measurement of intrinsic brain neurochemistry, will eventually supersede such standard instruments as CT and MRI scanners in assisting to verify the diagnosis of brain death.

For the foreseeable future, the definition or diagnosis of brain death will remain at the bedside of the patient, where the documentation of the disease process and the neurological examination will continue to hold sway in this clinical setting, supplemented, when appropriate, by electro-encephalography, CT and MRI scans.

Commentary

The definition of clinical death has moved far beyond the totality of body failure and will remain solidly anchored on the single organ concept, that of the brain. The diagnosis of brain death based on the criteria assigned to demonstrate irreversible total brain failure (excluding the presence of low temperature and drugs) has stood the test in literally thousands of cases throughout the world.

The new and disturbing challenge to this well established definition is whether it is too exclusive and should be modified.

If neocortical death, the chronic vegetative state (CVS), the anencephalic infant and aborted fetus are to be included under such a diagnosis (brain death)—at present, this would appear to be very difficult to do—there must be a complete revision of not only the present definition of brain death, but a thorough reconsideration of neuroscience, including neuroembryology as well.

Still, the willingness of intelligent society to accept the concept of clinical death, based on the total irreversible failure of brain, must represent a truly quantum jump in human thinking. Have we reached the point where what we acknowledge as human existence is eliminated when the brain is destroyed but other organs persist? If so, we must accept the corollary of this:

The cellular architecture of the brain is the physical representation of the human soul.

Defining the Death of the Human Fetus

Acknowledging the overriding moral problem associated with the issue of abortion, an additional moral dilemma develops in regard to the aborted fetus and the uses of its tissues. The key issue is whether or not the fetus; now separated from the uterus, is a living, functioning individual or, in actuality, is dead or to be considered non-survivable.

What criteria are appropriate to make the determination that viability or non-viability exists? Is the concept of brain death appropriate here in defining the death of the fetus? It must be appreciated that organs and tissues have been removed from fetuses over a considerable period of time and utilized for research purposes. Obviously, the problem of fetal viability requires resolution. With the mega advances in transplantation biology, an additional problem has developed in relation to the use of fetal tissue for human transplantation. Perhaps the most provocative of this type of clinical usage involves the transfer of fetal brain tissue into the adult brain of a patient suffering from such a disease as Parkinsonism. While there is an important additional problem of justifying this type of research within the framework of human experimentation, the issue of defining fetal death, particularly if it is based on the concept of brain death presents a unique problem. The issue here is that one must transplant living brain cells; therefore, the brain, and most particularly its neuronal cellular structure, must be intact. Consequently, defining death within the framework of the human fetus presents an extremely difficult problem.

The Human Embryo

With the rapid advances in reproductive technology, the issue of the human fetus as a living entity and endowed with a concept of total "humanness", has become highly controversial. The Church has expressed its opinion in reference to the use of the embryo within the framework of in vitro fertilization and, to some degree, in the area of embryonic experimentation and storage. Still, the issue of whether or not these cells or cellular complexes should be utilized for experimentation or placed in deep refrigeration raises the issue of defining death at a unior multi-cellular level.

DEFINITION OF DEATH AND ORGAN TRANSPLANTATION. EXPERIENCES FROM SWEDEN

DAVID H. INGVAR and SVEN-ERIK BERGENTZ

Introduction

The two authors of this survey have been officially engaged in Government Commissions in Sweden concerning Definition of Death (DHI) and Transplantation (SEB). The first-mentioned commission delivered its report in 1987, and a summary in English is available. The transplantation commission's report was delivered in early 1990. In the present paper a summary is given of the two reports, with emphasis on matters of general and of international importance.

Background

In Sweden, as in many countries, an increasing need has been felt during the last decades, amongst laymen, authorities and indeed with the medical profession, to analyze the concept of death. This need has become urgent due to 1) the rapid development of intensive care of severely ill patients, and 2) the rapid development of transplantation surgery of both paired and unpaired organs. Without clear guidelines, accepted by society and the general public, there cannot be ethically acceptable procedures related to death in man. And, without a generally accepted concept of death the transplantation, especially of unpaired organs (heart, liver) will risk its future development.

SECTION I

The Commission on Defining Death

From the start it was evident to the *Swedish Commission on Defining Death* that its work had to begin with a very broad analysis of the concept of death itself. This analysis could *not* be made from a pure medical and/or medico-legal aspect only. This mistake has confused many discussions on the so-called "brain death" issue. It has also impeded the development of solid guidelines for transplantation surgery.

The concept of death is, needless to say, one of the most important to mankind. An analysis of this concept, therefore, must by necessity be of a very broad kind, and be carried out without preconceived opinions.

During the three years of its work the *Swedish Commission on Defining Death* adapted from the very beginning a wide-angle perspective. Contacts were made with many scientific disciplines such as philosophy, theology, psychology, sociology, and with legal experts, as well as with a number of medical specialities, several of which have continuous experience of handling severely ill patients who may be dying, and who perhaps die. In addition, a great number of professional and political organizations, plus groups of laymen and patients had their say. All were able to more or less directly influence the final wording of the report.

The final report on *The Concept of Death* was delivered to the Swedish Ministry of Social Affairs in December 1986. A year later, in January 1988, the Swedish Parliament passed "An Act Concerning the Determination of Human Death".

Definition of Death

Step 1. Formulation of a basic definition of the concept of death.

The Swedish Commission rejected a number of alternatives.

— Death cannot be defined as "the irrevocable separation of the soul from the body". There is, as is well-known, no general agreement on or definition of the soul which can be described in sufficiently accurate terms to provide a basis for clinical and legal actions.

— Neither can death be defined as "the irreversible cessation of metabolism in each individual cell of the body". Such a definition would be impossible and indeed inapplicable as it would be impossible to postpone the declaration of death until all biochemical processes of the body have ceased to

function. Furthermore such a definition only includes bodily functions of the individual. Mental functions are not considered.

— “The irreversible loss of the capacity for circulation of oxygenated blood in the body” was also rejected as inappropriate, since this would reduce human life to a basic bodily function, a function which, furthermore, can be substituted by artificial means. Failing circulation, as everyone knows today, can be artificially maintained by means of a respirator etc.

— The following definition of death was also rejected: “the irreversible loss of all mental functions (including consciousness)”. This definition differs from several general concepts about death. There are many forms of coma with permanent loss of consciousness and, presumably, mental functions, such as speech, memory, voluntary motor activity and emotions, which cannot be equated with death. Furthermore, many chronically comatose patients suffering from brain injury, degenerative disorders, senile dementia etc. have a well-preserved respiration and heart activity, and cannot for obvious reasons be considered to be dead. Finally, there is no general consensus about what is meant by “mental functions” or by “consciousness”.

The Committee on Defining Death applied a *holistic* view of man and emphasized that death implies that the organism has succumbed as a functional unit, not that the whole organism and its cells are dead in the strict biological sense. The following definition was finally approved:

A person is dead when he/she has suffered a total and irreversible loss of all capacity for integrating and coordinating all functions of the body—physical and mental—into a functional unit.

This definition is exempt from the criticism mentioned above regarding the other alternative definitions. It does not overemphasize mental or physical functions, but takes both into account. It does not involve any quantitative or qualitative value judgments. It does not highlight particular physical or mental “properties” of the human organism. Instead, it stresses the coordination of all mental and physical functions into a unit. The definition also emphasizes that the capacity to coordinate physical and mental functions should have been lost *in all respects* and that this state should be *irreversible*. Thus a person can be dead although certain functions still remain, such as some metabolism and circulation in individual tissues and organs. These circumstances are of no interest, however, if all capacity to *coordinate* mental and bodily functions has been lost. Such evidence of remaining tissue and organ functions may be looked upon as signs that the biological process of life which ends in complete cell destruction has not yet reached its terminal point. Such remaining tissue and organ functions cannot persist as isolated phenomena for any consider-

able length of time if the coordination between the functions has been lost. It is a unique capacity of the organism to unite and to coordinate mental and physical functions into a unit which cannot be replaced by artificial means or medical technology.

It should be observed that the definition above includes the word *total* capacity for integration. This means that various types of mental deficiency, even the most severe, caused by congenital or acquired disorders can never be equated with death since, in such cases, *e. g.* even in autistic, demented, senile and chronically comatose persons, a number of coordinating functions still remain, although in a highly reduced form in many cases. The definition arrived at by the *Swedish Committee on Defining Death* is thus not only attuned to a general human view of what it means to die, but it is also in line with fundamental ethical viewpoints concerning the wholeness of man.

Step 2. Refinement of the basic definition.

This refinement was carried out by establishing which of the human organism's functions whose total and irreversible loss can be said to empirically imply that the individual has irreversibly lost all capacity for uniting and coordinating physical and mental functions of the body into a unit.

Obviously, the brain occupies a special position in this respect. It is unnecessary to recapitulate the extensive medical and biological research which proves the overriding and coordinating functions of the central nervous system (the brain) for all mental and bodily functions. The brain is a prerequisite for consciousness, intellectual activity, voluntary movements, memory and emotions, as well as for the regulation of respiration, blood pressure, temperature, digestion etc. If *all* such higher and lower regulatory functions of the brain are totally and irreversibly lost, there is no remaining coordination of the functions of the organism, and due to the irreversibility the organism ceases to be alive.

Here one would like to emphasize that individual physical functions of the body are not instantaneously, but only successively eliminated once the brain has ceased to function. Some of them, *e.g.* respiration—and heart activity—cease almost instantaneously, but these functions can, as aforementioned, be sustained for a limited time, usually not more than a few days, with the aid of artificial means—respirator etc. (Some spinal reflexes may survive for a few days even after complete and irreversible cessation of all brain functions).

Step 3. Definition of *criteria* of total and irreversible loss of the functions specified in Step 2, i.e., of human death.

The point of departure for defining these criteria of death was that they must be based upon accepted medical and biological facts. They must in addition enable a complete and certain differentiation between a living and a dead individual. They must be clear and unambiguous so that every physician can apply them without any risk of making an error. There are *two types of criteria* of death: A) the *indirect* and B) the *direct* ones.

A. *The indirect, heart-related criteria of death*—the total and irreversible loss of all brain functions—imply permanent cardiac and respiratory standstill, as a rule for more than 15 to 20 minutes. During this time the brain tissue succumbs irreversibly due to lack of oxygen. Hence, the indirect criteria are *always sufficient* to prove a total and irreversible loss of all brain functions.

However, as pointed out and as is well-known by the readers of this report, the indirect criteria are in our days not always valid, since respiration and cardiac activity can be artificially maintained even though all brain functions have been irreversibly lost. Nevertheless, the indirect criteria of death have been and will remain applicable in the future in more than 99% of all deaths. This point must be strongly emphasized. The conclusions reached by the Swedish Committee do not imply the introduction of a “new” type of death or any new criteria of death. They only stress the central role of the brain and the basic fact that cessation of respiration and heart activity can be used as *indirect criteria* or irreversible and total cessation of all brain functions.

B. *Direct, brain-related criteria of death* are used in a small number of patients, usually under intensive care, in whom heart and lung activity is artificially maintained by means of a respirator. We have calculated that these direct, brain-related criteria will only be used in about 0.2-0.7 of all deaths, that is in about 200-300 cases per year in Sweden (population about 8 million).

The direct, brain-related criteria of death are used in patients who have undergone so-called *total brain infarction* or, to use a less well-defined popular expression, “brain death”. Total brain infarction is in most cases caused by brain anoxia and subsequent brain swelling, originally caused by severe head injury, cerebral hemorrhage, or asphyxia. The brain swelling and the intracranial pressure inside the skull becomes so large that all circulation ceases inside it. Then all the cells of the brain succumb.

Briefly, the brain-related criteria of death include:

1. Absence of all cerebral functions and reflexes.

The patient is unresponsive and non-arousable, with no signs of higher brain functions. There is absence of all brainstem functions.

2. The patient does not breathe.

Cephalic reflexes are extinguished from, *e.g.* the eyes and pupils.

3. The electrical activity of the cerebral cortex has ceased.

4. The cerebral circulation has ceased. (See below).

By testing for these criteria repeatedly for 6-12 hours, the *irreversibility* of this state can be established.

In order to apply the direct, brain-related criteria of death, the cause of the brain injury which has led to the increased intracranial pressure etc. must be known. Drug intoxication and hypothermia must be ruled out. It also suffices to determine by neuroradiological techniques that the intracranial blood flow has ceased for not less than ca. 15-20 minutes. During such a period all brain cells will succumb. There is an extensive medical literature to support this view.

Step 4. Examination procedures to ascertain whether the criteria of death have been satisfied in a given case.

There is no need to describe the examination procedures for the *indirect, heart-related criteria*. The method to establish death by diagnosing the cessation of respiration and heart activity are indeed classic. These methods are familiar not only to the medical profession but also to the general public.

The examination procedures referring to *direct, brain-related criteria* include clinical neurological examinations of the brain functions. It must be established that the patient is totally unconscious, unresponsive and non-arousable. Pain stimulation of the cerebral nerves should not produce any reaction. Limited spinal reflexes may persist. All brainstem functions must be lost, such as respiration and blood pressure regulation, regulation of body temperature, fluid regulation etc. The EEG should not be present, and finally the cessation of the cerebral circulation might be established by cerebral angiography or by isotope techniques.

Differential diagnosis of total brain infarction

The state of total brain infarction should, by means of pertinent clinical techniques, be differentiated from the following states which *shall not* be equated with death:

— *The analytic syndrome* (sometimes called “chronic vegetative state”). This is caused by cerebral anoxia which leads to loss of the cerebral cortex. In this state the EEG might be absent, but brainstem reflexes and respiration retained. The cerebral circulation is still present, but very low. Such a state may last for months or years. We have published once lasting 17 years.

— *Permanent coma* may develop following brainstem lesions of the reticular activating system. Such cases lack all higher mental functions. The brain stem reflexes may be present, but defective, and the EEG is normal. *The cerebral blood flow is low. The duration of such cases may be more than one year.*

— *Stupor* is a collective name for various states of distributed and severe lesions of the brain in which the higher functions may be rudimentary. The brainstem reflexes may also be defective, and the EEG pathological. Stupor cases have a very low cerebral blood flow. Their duration may be several years. The stupor group includes patients who have been exposed to severe head injuries as well as those who present degenerative disorders, or malformations.

— Finally, *akinetic mutism* should be mentioned, a rare form of cerebral disorder in which the efferent, outgoing pathways of the brain are more or less completely severed. The afferent pathways, as well as the central functions of the brain, may be preserved. Some such cases are called *locked-in syndromes*. The patient appears unreactive, but he or she may have retained eye movements. EEG may be normal, and so is the cerebral blood flow. States of this type may last for several years. It appears likely that several of these cases have a well-retained consciousness behind the mute facade.

Safety of the diagnosis

Modern clinical methods in neurology, neuroradiology, neurosurgery as well as in clinical neurophysiology, have demonstrated the safety of the diagnostic procedures mentioned above. No patient has been reported to survive who demonstrated all the criteria of irreversible loss of all brain functions due to total brain infarction. It should also be emphasized that this state, total brain infarction, in spite of supportive measures (respirators, drugs etc.), only lasts one to five days.

Public opinion and the definition of death

Few medical issues have been discussed so extensively by Swedish laymen and the media’s “the brain death issue” (as it was generally called). Two issues have been in the foreground.

1. Some laymen found it hard to accept that a human organism with a continuing heart activity, looking "alive", ventilated by a respirator, should be considered as dead. The classical coupling of life to heart and lung activity was maintained by several groups opposing the "new" legislation on the definition of death.

2. It was also apparent during the work of the *Committee on Defining Death* that several individuals and groups, including medical ones, found it hard to accept the somewhat abstract definition of *indirect* and *direct* criteria for determining death—the *indirect* (heart-related) criteria being the classical ones, which will be used in 99% of the cases, namely to establish that the heart no longer beats and that respiration has stopped, and the *direct* (brain-related) criteria being those applied to establish directly that the brain has ceased to function (see above).

However, during the two years in which the law has been in action the insecurity has in general died down. Within the medical profession it is fair to say that the new rules and concepts have been well accepted since they provide a solid basis for clinical actions in patients with severe head injuries. It has also, as will appear below, created a firm basis for transplantation policies.

SECTION II

Transplantation issues

From the report of the *Swedish Commission on Organ Transplantation* (final report delivered in January 1990), the following general viewpoints might be presented.

Statistics

The number of organ donors with total brain infarction in Sweden since the law on brain death was passed, has been 140-150 annually. This corresponds to about *18 donors per million inhabitants and year*, which is a rather high figure, internationally. Kidneys have been explanted from all these donors, which means that 280-300 patients have benefitted from kidney transplantations from these donors. About 50% of the donors were above 50 years of age, and can therefore not usually be accepted as donors of hearts. It has been calculated that at the present time between 70 and 90 heart donors are

available annually in Sweden, and about 120 liver donors. So far, since January 1988, about 40 heart transplantations and 46 liver transplantations have been performed in Sweden, but the rate of transplantation of these organs is rapidly increasing.

The number of donors is not sufficient. With regard to kidney transplantation, about 100 additional kidneys are made available per year by donation from living donors having family relationships to the recipients. This makes it possible to transplant at a rate that for the time being keeps the waiting lists constant. The number of hearts and livers available is now sufficient, but we do not know if it will continue to be so when transplantation of these organs has become routine. Furthermore, we do not know the real total number of patients dying of total brain infarction who, for various reasons, do not come into consideration for organ donation. At the present time, a prospective study is being performed in all Swedish hospitals to analyze that question.

The attitude of the public

Several studies have been performed both in Sweden and in other countries to analyze the attitude of the public to organ donation. The vast majority has a positive attitude, and those who are directly opposed to donation are usually not more than 5-20%. Those with a negative attitude are mostly found among elderly people, and among people with limited education. Another common finding is that far more people are positive about donating their own organs than about donating organs of their close relatives.

Medical-legal aspects on transplantation

When a patient suffers from brain death, and has been found to be a possible organ donor, the close relatives are asked if they know anything about the opinion of the deceased. If the deceased has expressed an opinion, this should always be obeyed. In the vast majority of cases nothing is known about the opinion of the deceased. At the present time, it is therefore usually necessary to ask the relatives for *their* opinion. If they are positive, organs can be removed even if the opinion of the deceased is unknown. This is, of course, an unsatisfactory situation for two reasons. The relatives have to make a difficult decision in an emergency situation which is very critical for them. Furthermore, since they do not know the will of the deceased, they prefer to say "no" in about 30% of the cases.

The Swedish Committee on Organ Transplantation has emphasized the importance of *information* to the public about organ donation. Everybody should, if possible, form his own opinion on this matter, and in some way let it be known to his relatives. While the next of kin should always be able to veto the taking of organs, it is necessary to have a compulsory information duty towards the next of kin. If the patient's opinion regarding organ donation is unknown, and no next of kin is available or can be traced, organ donation cannot be accepted.

PERSPECTIVES IN BRAIN RESEARCH

DAVID OTTOSON

In the last two decades there has been a dramatic development in brain research, only rivalled by the advances in molecular biology in the early 1950s and the progress in physics at the beginning of this century.

A major leap forward in our understanding of the higher functions of the brain was the discovery by Roger Sperry of the functional specialization of the two hemispheres of the brain. Since the two hemispheres are anatomically almost identical it had for long time assumed that in principle the two brain halves had similar functions. However, as early as in 1861 it was demonstrated by a French neurologist, Pierre-Paul Broca, that the center for speech is localized in the left hemisphere. When presenting his observations to the Société d'Anthropologie in Paris, he made the now famous dictum: "Nous parlons avec l'hémisphère gauche".

Sperry's research established that each of the two hemispheres are specialized, each having its own specific functional characteristics. The left hemisphere is analytical, sequential and rational while the right is synthetic, holistic and intuitive. The left hemisphere is to quote Sperry "the more aggressive, executive, leading hemisphere with control of the motor system". This is the hemisphere that we mainly see in action and the one with which we communicate. The right hemisphere is "the silent passenger who leaves the driving of behaviour to the left hemisphere". The right hemisphere cannot express itself in language, and is therefore unable to communicate any experience of perception or consciousness.

RECENT DEVELOPMENT

In the last two decades a number of new methods have been developed for the study of the brain which have provided new tools for the study of the

functions of the brain and therefore are of particular relevance to the topic of this conference.

This development is progressing at a rapid rate and the results already obtained have provided us with unprecedented data on many aspects of the brain involving information processing, perception, brain control of pain, neurotransmitter actions, brain plasticity, regeneration, learning, memory, behaviour and emotion. It is not possible to cover all these aspects in a short presentation. I have therefore singled out a few areas which are representative of the progress in brain research in recent years. These areas are the following:

1. The development of new techniques for visualization of brain functions;
2. Pain research;
3. Brain grafting.

VISUALIZATION OF BRAIN FUNCTIONS

Neuroscientists have long dreamed of being able to see the activity in neurons and in the brain directly. In recent years a number of techniques have been developed which seem to promise that this dream may be fulfilled.

One of these methods, the positron emission tomography (PET), provides a new and powerful tool for the study of higher brain functions. In positron emission tomography a chemical compound is labelled with radioactive isotope that decays by emitting positrons with the emission of gamma rays as result. The gamma rays are recorded by a circular array of detectors placed around the head and a computer reconstructs the distribution of radioactivity and displays it as a color-coded image on a TV-screen. With this technique it is possible to see how different regions of the brain are activated during various kinds of mental activities.

PET-scan has been used to study the metabolic and biochemical events that accompany storage, retrieval and recognition of memories and the achievement of skills. The results rely on the assumption that these processes are accompanied by regional changes in metabolism and regional blood flow. Recent development in PET-scanning has allowed the possibility to visualize the distribution of neuroreceptors in the living human brain. Using highly selective compounds it has thus been possible to map the distribution of for instance the receptors involved in Parkinson's disease.

PET-scan also provides a new way to relate brain chemistry to emotions such as fear, violence, anguish, aggression and destructiveness and thereby it

also offers a new basis for monitoring the treatment of mental illness. These studies are still in an early stage but it can be expected that PET mapping of cerebral functions will soon make major contributions to better understanding of the brain in health and diseases.

Studies of EEG and event related potential have in the past greatly contributed to our knowledge of brain functions. The recent introduction of computer-analysis and display of multiple scalp recordings of brain potentials have greatly extended the possibilities for both basic and clinical research in this field.

The development of superconductive devices has recently opened up the possibility of measuring magnetic fields generated by neuronal activity in the brain. This technique has been flourishing in the past five years. Magnetoencephalography, MEG, measures the magnetic field that emerges and re-enters into the head during neuronal activity. It allows the identification of the sites of activity within the brain to a depth several cm beneath surface of the scalp at real time. Because it allows recording the activity deep in the brain and has a good space resolution MEG has also found clinical applications, for instance in the localization of epileptic foci.

PAIN RESEARCH

Another field in which brain research has witnessed a dramatic development is the study of pain and particularly in the physiological mechanisms for modulation and control of pain. It is well known that in certain situations even severe physical damage may not include pain. This suggests that there exist central mechanisms by which pain can be controlled. These mechanisms remained a mystery until 1969 when it was discovered that electrical stimulation of a small area in the brain of rats made the animals virtually insensitive to pain stimuli. Early attempts to relieve pain in patients suffering severe chronic pain by stimulating the brain were met with failure. The target area is located deep in the brain and close to structures from which adverse effects are induced. These technical difficulties have now been solved and electrical stimulation of the brainstem centers has been employed with success in thousands of patients suffering from excruciating pain.

The pain control centre in the brain acts by preventing pain signals from reaching the brain by closing neural gates to the central nervous system. It has been discovered that these gates can be effectively closed by electrical stimulation of skin and muscles. As a result of this discovery various methods have been developed, the most widely used being transcutaneous electrical stimulation, TENS. This kind of stimulation has been found to be very effective

against muscle pain and is at present one of the most widely used methods for alleviation of pain. It seems likely from recent work that the analgesic effects of acupuncture also depend on activation of the pain control system of the brain.

Pain research is one of the areas in neuroscience where achievements in basic research have contributed in an extraordinary way to clinical medicine and hundreds of thousands of patients today benefit from these advances.

BRAIN GRAFTING

One of the most remarkable advances in brain research in recent years is the discovery that foetal brain tissue can be successfully transplanted into the adult brain. This discovery has opened up possibilities for the restitution of impaired brain functions. It has been demonstrated that transplantation is viable if the tissue is taken from an embryo or from a neonatal donor and has the capacity for continued growth after transplantation.

This method has been used in studies of transplantation in rats in which a lesion has been made in a particular region of the brain to produce symptoms similar to those in Parkinson's disease in humans. In the rat model these symptoms can be eliminated by grafts taken from appropriate regions of fetal rat brain. This method has now been applied in patients suffering from Parkinson's disease. However, much more basic research is needed before this technique can be used as a routine clinical tool for the treatment of Parkinson's disease and other brain diseases of a similar nature.

Particularly interesting is that this new intracerebral grafting technique may provide a tool for obtaining restitution of behavioural impairments associated with ageing. Aged rats like aged humans show a decline in brain functions, such as sensorimotor coordination, learning and memory. It has recently been reported from several laboratories that brain grafting in aged rats can ameliorate impairment in motor coordination. Even more remarkable is the finding that grafts of fetal tissue in aged rats can improve memory functions. This is the first time it has been demonstrated that intracerebral neural implants may be able to restore age-related impairments in complex cognitive behaviour.

CONCLUSION

The development in brain research outlined above has been paralleled by corresponding progress in several other fields of brain research. The specific topics presented have been singled out because they represent areas in

which basic research has provided data of particular significance for the understanding of the human brain. Equally important is that these data have had a profound impact on clinical medicine and have led to new concepts in our understanding of higher brain functions in the normal human brain and in mental disorders. The development described is only just at the beginning. In the future we can expect new discoveries and advances which will give us the answers of many questions which today remain unresolved. Research of this nature is one of the mankind's great cultural quests and the results should be shared by all people of the world and not be limited by national resources.

III

FINAL CONSIDERATIONS FORMULATED BY THE SCIENTIFIC PARTICIPANTS

FINAL CONSIDERATIONS FORMULATED BY THE SCIENTIFIC PARTICIPANTS

At the invitation of the Pontifical Academy of Sciences, a Working Group met on the 11, 12, 13 and 14 December 1989 to restudy the conclusions concerning the determination of death reached at a similar meeting in 1985. The Working Group has reviewed recent progress in the medical-scientific field concerning severe cerebral damage and related advances in reanimation. Considerable time was given over to a profound discussion on the related moral, philosophical and theological issues. In the medical section of the Working Group, we have mainly dealt with the definition of death as well as criteria for establishing the diagnosis of death. We have concluded, as did the meeting in 1985, that it is well-established that when the whole brain has suffered a complete and irreversible loss of function (brain death), any possibility of mental activity and coordination of bodily functions is definitively abolished, even if some bodily functions like heart activity and respiration can be maintained artificially for a brief period of time.

I. CLINICAL DEFINITION OF DEATH

A person is dead when there has been total and irreversible loss of all capacity for integrating and coordinating physical and mental functions of the body as a unit.

Thus death has occurred when:

- a)* spontaneous cardiac and respiratory functions have irreversibly ceased, which rapidly leads to a total and irreversible loss of brain functions, or
- b)* there has been an irreversible cessation of all brain functions, even if cardiac and respiratory functions which would have ceased have been maintained artificially.

From the renewed discussions at this Working Group in 1989 several general conclusions have emerged: from the present discussion, it again appears evident that the establishment of total and irreversible loss of all brain functions is the true medical criterion of death and that this criterion can be

established in two ways. Either indirectly by establishing the cessation of circulation and respiration or directly by demonstrating the irreversible loss of all brain functions (brain death).

This present group of '89 has also reviewed the various clinical methods which determine this irreversible cessation of all brain functions. We have concluded that the previous and almost universally accepted guidelines to establish the indirect and direct criteria of death are still valid. They include a clinical history and examination of the patient and may involve the establishment of electrocerebral silence, as well as the absence of cerebral circulation as confirmatory evidence. Previous warnings, also generally accepted, indicate that these criteria cannot be applied in patients who are under the influence of drugs or are in a state of hypothermia.

The Working Group also emphasized the need for a sufficient period of observation, which includes repeated documentation of the criteria mentioned in order to establish the diagnosis of death. These criteria do not apply to the human life in utero.

II. DIFFERENTIAL DIAGNOSIS OF DEATH

The Working Group of 1989 also considered the differential diagnosis of brain death. The discussion demonstrated that there are still misunderstandings prevalent amongst the general public and also within the medical profession about chronic states of severe brain damage which might be confused with the above defined state of brain death. It is generally agreed by the Working Group, based on evidence from a vast clinical literature, that these cases of chronic severe brain damage still have retained some however reduced brain functions, hence that they cannot be included under the above definition of brain death. They are patients who need care and also treatment.

III. ARTIFICIAL PROLONGATION OF ORGAN FUNCTIONS

In case of brain death, artificial respiration can prolong cardiac function for a limited time thus permitting a short period of survival for organs for the possibility of transplantation. This is possible only in cases of complete irreversible loss of all brain functions (brain death).

The Working Group of '89 is aware of the fact that the deliberations have not covered all problems related to death, thus it remains for future discussions to consider: 1) the detailed consequences for transplantation, 2) the special problems related to the diagnosis of death in embryos, foetuses and infants as well as the use of foetal tissues for transplantations.

ADDITIONAL ASPECTS

1

LEGAL ASPECTS

PRELIMINARY NOTES ON THE LEGAL IMPLICATIONS OF ORGAN TRANSPLANTS

GUIDO GERIN

The legal implications of organ transplant in man lead us to consider the two landmarks of life on earth: birth and death.

Human rights can be interpreted respectively in the light of positive law, or else be regarded as basic individual rights. As a general rule, it can be said that the right to live is pre-eminent in both cases. Indeed, on the one hand, the right to live is one of the pillars of international law (e.g. the European Convention, the United Nations Charter, etc.), and, on the other hand, it forms the basis for human rights by attracting « consensus omnium gentium », thus standing as a mainstay of positive law. Likewise, St. Thomas defined life as something « immanenter et intrinsece operatur » and he added that « primo dicimus animal vivere quando incipit ex se motum habere... quando vero jam ex se non habet aliquem motum, sed movetur tantum, ab alio tunc dicitur animal mortuum per defectum vitae. Ex quo patet quo illa proprie sunt viventia, quae se ipsa secundum aliquam speciem motus movent » (in *Summa Theol.* XXXI, q. 18 art. 1).

This implies that life is motion per se. Thus, motion not only occurs in the body, but from the body too. These points—still applying to our current world, in spite of the pervasive development of science—support a few remarks.

1. At this stage, as legal experts, our attention must be focussed on the time of death rather than the idea of life. The time of death can only be ascertained by the scientist. However, it must be stressed that there are some theories which question the existence of one and only criterion, in fact, irrespective of the methodology followed to ascertain the time of death, some authors advocate the idea of death in stages. Defining the time of death is an essential fountain of the law: thus, death must be regarded as a single event, i.e. an in-

stantaneous event. Sidney's statement already relied on the "judgement of the physician to assess the death event". To the legal expert, then, this approach stands as a firm starting point with respect to the feasibility of organ transplant.

However, the problem of death is not only important in connection with organ transplant, but also for its implications in terms of inheritance. For instance, it may happen that several persons—say, mother, father and child—die in a car accident; in order to determine the correct priorities with respect to inheritance rights, the exact times of death of each person must be established.

2. In dealing with transplants, consensus must be obtained upstream from the entitled person. Widespread agreement exists on this point, even though, in some cases silent consensus by the deceased person is presumed. However, the donor's will, once his clinical and legal death has occurred, is a vital requirement.

3. Artificially-induced survival entails more complicated questions. I personally think that the expression « artificial survival » still indicates in itself the presence of life; however, I do not really know whether real life can be said to exist during ventilatory and circulatory activity assisted by external devices in the presence of irreversible brain injury.

If I may revert to St. Thomas' idea of life as an immanent activity, some recent studies in the field of genetics purport that genes are the main determinants of life duration, although a vital role is also played by external factors, i.e. conditions externally related to life, e.g. violent death, and although it ultimately depends on God's will. Thus, external activity by assisted circulation and ventilation cannot be defined as artificial survival, but rather as an artificial means of maintaining life at a minimum level. Indeed, out of the three vital functions of circulatory, respiratory, and neural activity, only the first and second are artificially restored, whilst neural activity—the irreplaceable and sufficient prerequisite of human life—is not.

As a matter of fact cardiac and respiratory (ventilatory) functions can be resumed after cardiac arrest by adequate stimulation and maintaining through mechanical devices. But, because neural activity is an essential precondition of life if irreversible cerebral lesions are present, the organism can no longer be said to be living. Since no artificial device can ever replace it, the individual is dead. This implies that, indeed, since neural activity depends on the brains and the neurochemical system (see Pende), artificial devices cannot really be said to maintain life in the individual. As previously shown, one vital function of the body cannot be artificially restored.

In a nutshell, the only relevant argument is that if the central nervous system is not working what obtains is life in a limited and dissociated sense. This is not enough to establish a real survival of man in his entirety. Without such an entirety life is non-existent.

4. On the basis of biology, we must be able to tell when the human body is no longer apt to hold the principle of his own activity. Such a condition should describe the death event. As has been previously pointed out, the legal expert cannot accept the idea of death occurring in stages as advocated by A. Dastre ("La vie et la mort", Paris, 1908) and R.S. Morrison ("Death: process or event?" in *Science*, 175, 1971, pp. 964 and 698). As a consequence, artificial survival without cerebral function is nonsense.

It must be emphasized that we are talking about death in man, not about the death of one organ in man. However, the concept of death as a single event coincides with the theological concept of death. Indeed, from a theological point of view, death is defined as the « momentum a quo pendet aeternitas », i.e. the time when the soul departs from the mortal remains. Thus, in addition to its biological dimension, death acquires a legal importance: the legal effects which stem from it must have a single starting point. Therefore, the theological concept of death does coincide with this point of view.

5. Thus resuscitation techniques are no longer relevant, because, indeed, if neural arrest at cerebral level is ascertained by the physician, death has already anneared, even though, as previously emphasized, external resuscitation can temporarily restore the respiratory and circulatory functions by resorting to mechanical devices or, in turn, various kinds of stimulation. As a consequence, the interruption of what is known as artificial survival can be said to be legitimate. In this respect, talking about euthanasia caused by neglect is nonsensical, as the latter can exclusively derive from positive law.

As early as 30 December 1967, the *British Medical Journal* reported that "if the cerebral function has been destroyed, the patient is really dead and the maintenance of tissue integrity through an artificial device does not modify this fact". Therefore, no crime would be committed just because this crime is an impossible one.

6. However, when resuscitation is applied, whenever it is required, it must be resorted to regardless of the patient's conditions—rich or poor, in a coma or not. The physician cannot deliberately decide to use this technique for certain patients and not for others. Hence the need on the part of the physician to decide on the basis of the criterion of safeguarding life. The legal science is very straightforward in this respect. The very foundation of human rights lies in life, irrespective of normal or abnormal psycho-physical condi-

tions (R. Nicolò, "Quaderni di traumatologia cranioencefalica », Roma 1960 vol. I, p. 263).

A physician, or team of physicians must fulfil the task of establishing the death event, the need to resort to resuscitation devices or, finally, decide not to use them when cerebral death has been diagnosed.

7. Other problems are worth analysing. First of all, the safety margin, i.e. whether or not a minimum period should be foreseen to make sure that no mistake has been incurred in the assessment of death. Death can be certified even before such a term, but clinicians must express themselves as to the reversibility of coma, for instance. In this respect, the safety margin will have to be considered.

However, establishing such a term on the basis of transplant feasibility would be not only unfair—that is against the law—, but even amoral. This question concerns the dying rather than potential transplant recipients. Arguing about the duration of patient monitoring is useless; the medical science is exclusively competent for this. On this subject, the legal expert can only accept the limits which have been fixed. Therefore, clinicians must point out the term needed for death to become irreversible when dealing with injuries still regarded as incompatible with life.

8. Resuscitation, or what is known as artificial survival, can have legal consequences. These in turn might be intentionally created. For instance, sometimes it is advocated that by keeping some organs of the body alive, the individual himself is kept alive. However, this might have serious consequences, especially in some specific cases. Indeed, resuscitation might well alter the succession order by postponing the time of death, thereby discarding the legal criterion of pre-decease. For example, a husband who, after a long period of legal separation, can re-marry only after his wife's death, can see his plans fall through because of fictitious survival imposed on purpose by the family of the dead. Again, by postponing the time of death, a child conceived after the husband's death—at a time when marriage could be said to be dissolved—can be certified to have been conceived during marriage.

These examples show that the approach to resuscitation must be revised by introducing the idea of certified death based on the absence of nervous cerebral activity. It is quite plain that, in addition to ethical aspects, resuscitation also has economic implications.

As a consequence, resuscitation techniques should maintain cardiocirculatory and respiratory functions for a short period of time. The physician will then be confronted with the task of determining when cerebral activity has

disappeared and when artificial survival of certain functions is ineffectual. As has been shown, this process has extremely delicate legal implications.

9. Artificial survival of some organs for transplant purposes in a person showing no cerebral activity is legally unacceptable and morally reprehensible. The use of important parts of the corpse is admissible, especially in the spirit of Christian ethics inspired to mutual love. However, this is only possible within the framework of the limits established by the law.

The physician might well decide to interrupt resuscitation, but resorting to resuscitation for the purpose of transplantation only would be inconceivable. Interrupting resuscitation after harvesting the organ would be both illegal and immoral.

10. In conclusion, it must be stressed that organ donation must never be submitted to any kind of economic transaction whatsoever. No legal procedure must ever contemplate the possibility of economic compensation applied to organ transplantation. Even though both legal experts and scientists have always been aware of the problem, sometimes this principle has been disregarded. International laws and conventions safeguard life the health of individuals the human person as the expression of a will. This principle is based on the one hand on a rigorous respect for life, and, on the other hand on the absence of economic implications when dealing with organ transplantation. All men are equal before the law, as they are before God. Likewise, all men must be equal before the physician who is entrusted with organ transplantation surgery. Thus, priorities must be established exclusively on the basis of illness severity and actual predictability of transplantation success.

Therefore, the dignity of the individual is vital in ensuring equality both in front of death and in terms of life-saving attempts. Legal and ethical interests can overlap, but they must never be intertwined with economic interests. In these cases, public interests coincide with the obligation to safeguard human life: yet, they cannot be served by mean bargaining.

11. Finally, from a strictly philosophical point of view, it must be emphasized that the Cartesian "cogito ergo sum" principle is still applicable in our days. Life means that the individual has the right and/or the ability to think freely. Death steps in when the brain is no longer able to think. In this respect, the stand-points of the philosopher, legal expert, physician and clergyman are finally reconciled.

To the philosopher too death is a one and only event, i.e. the end of cerebral activity. Death can only be defined on the basis of an accurate definition of life. Considering that life is the starting point of man's independence,

thinking and activity, death can only arise from the cessation the ability to think. Death is nothing but the cessation of life; life events are irreversible. Every birth or death have an intrinsic sense, they are something completely original and new. But death rises within the original process of individual life. It is a process in life, the ultimate stage. Jakob Bohme said that from the time of his birth, man is old enough to die, and Heidegger went even further by stating that man is essentially a death-bound entity, Goethe himself maintained that death is an act that man accomplishes by himself ("Tod und Fortleben").

In conclusion, death, just like life, is an autonomous act of man, inherent in birth itself, closing the overall life cycle of the individual.

2

**PHILOSOPHICAL, THEOLOGICAL
AND MORAL ASPECTS**

IS “BRAIN DEATH” ACTUALLY DEATH?

A Critique of Redefining Man’s Death in Terms of “Brain Death”

JOSEF SEIFERT

PREFACE

1. *Science, Philosophy and Cerebral Death*

The 1968 statement of an “Ad Hoc Committee of the Harvard Medicine School to Examine the Definition of Brain Death” has given rise to a worldwide movement towards a new conception of death: brain death.

While death in the ordinary sense is a fundamental albeit mysterious datum in the experience of every man and easy to “diagnose” by anyone, “brain-death” is such a highly technical notion of death that both its theoretical discussion and its concrete verification seem to be reserved to medical staff only. For this reason, most legal systems even demand that—preceding any organ explantation—a whole team of medical specialists decide unanimously on the condition of brain death. In the face of such a “death for specialists only”, those who are not medical professionals easily cede all rights to pronounce themselves on life and death to medical professionals.

There are indeed many empirical facts about life and death which only empirical science can establish. Yet, in leaving the determination of death entirely up to medical scientists, philosophers and theologians forget that the key issue of what human life and death are is a philosophical one. Besides, no scientist can even have a “purely scientific notion” of “brain death” without making some philosophical assumptions.

All men must take their starting point from the fundamental datum of death and try to understand it rather than creating it through some definition. In this respect, philosophy has a certain precedence over medicine because it explores—within the limits of human wisdom and knowledge—the ultimate

nature and essence of death, and of its relationship to man's life, while medicine as such does not address this issue but concentrates on partial, scientific aspects of death and dying. Certainly, both philosophy and medicine should collaborate in the clarification of this question.

The philosopher has to explore those highly intelligible and essentially necessary as well as those ontological aspects of death which no other human science investigates.¹ This task includes a phenomenology of life and death, of the death of the other person and my own death, an ontology and metaphysics, as well as a philosophical anthropology of death.² The philosopher also has to warn representatives of other disciplines and himself against concluding from the little he knows that he also knows other things of which he knows nothing, and to repeat the Socratic wisdom "I know that I do not know."

Moreover, given the mystery of human death, the Catholic will believe that only Divine Revelation (as well as, aided by theology, the Magisterium of the Church) can inform us about the deepest meaning of death.³

2. "Brain Death" as an "Open Question"

Thus—for purely philosophical reasons and at least as long as there is no definitive pronouncement of the Church on brain-death—nobody can pronounce himself on this issue in a dogmatic way that should not remain open to further discussion: to a discussion not only of refinements of the notion of brain death but also of the foundational issue whether or not brain death in any of its many senses is to be identified with man's actual death. The Pontifical Academy of the Sciences has, with this Meeting, explicitly opened up a new for discussion this Academy's previous stance on brain death,⁴ which had identified brain death with actual death, by informing on the purpose of this Meeting in the following way: "... 2. To be examined; whether "cerebral death," being the suppression of an essential function of the human person, is a sufficient indication of actual death..."⁵

¹ See on this Adolf Reinach: 1989; Dietrich von Hildebrand, 1976; Josef Seifert: 1976², 1973, 1987.

² One may think here of Kierkegaard's investigations in *Sickness unto Death*, of Heidegger's analyses of "Angst" and of works like Dietrich von Hildebrand: 1989.²

³ For these reasons, and because of the existential and moral importance of death, any explanation of death—and thus also the definition of brain death—stands certainly in need of being examined carefully and critically not only by the philosopher but also by the theologian as well as by the Magisterium.

⁴ Pontifical Academy of Sciences, 1986, p. 25.

⁵ Pontificia Academia Scientiarum: 1989.

To anticipate my conclusion: I have come to reject this new definition of death⁶ and conclude that the very notion of "brain death" is in itself confused and besides does not do justice in any of its interpretations to the nature of death nor provides an adequate scientific-philosophical reason for identifying the states designated as "brain death" with the "actual death" of man. According to the results of the following investigations, the identification of man's death with the so-called brain death at least introduces as a matter of fact the fruit of a most uncertain speculation.⁷

I shall begin with fundamental questions about the confused meaning of brain death. My central arguments, however, shall seek to establish two theses: 1) Brain death as such—in any of its meanings—is not man's death. 2) Even in as much as this anthropological thesis (which I shall defend with strong theoretical reasons) remains deprived of indubitable evidence, a minimal ethical tutorism demands that we *must not act* on the assumption of the identity of "brain death"—in any of its meanings—with man's actual death. For if the "brain-dead" individuals are possibly or probably live human beings, we must not kill them actively, just as we ought not to shoot into a bush to kill an unknown living being hidden therein if we have good reason to assume that this being is likely to be a man.⁸

1. THE MEDICAL AND PHILOSOPHICAL AMBIGUITY OF "BRAIN DEATH"

Eminent American Doctors and Medical Researchers observe in 1989 that "defenders of the whole-brain definition have yet to make a convincing case... for equating loss of all brain function with the end of life" (Wikler and Weisbard, 1989, p. 2246).⁹

1.1. *Unclarity of the Medical Definitions of Brain Death*

Brain death is defined in many different ways. Some have spoken of brainstem death. Others prefer to speak of "mid-brain death", referring only

⁶ See Josef Seifert,² 1889; 1988, 1987 (2), pp. 162-212.

⁷ Other eminent thinkers both in medicine and philosophy (P.A. Byrnes, S. O'Reilly, P.M. Quai, C.P. Harrison, N. Fost, B.S. Currie, A.J. Weisbard, S.J. Youngner, and others), have reached similar conclusions or at least have recognized the same problems. Most powerful are the objections of Hans Jonas who has the distinction of having raised them in the "first minute" (1968) when the Harvard proposal was published.

⁸ A similar twofold mode of argument ought to be used in the abortion debate when it comes to human zygotes or early stages of pregnancy.

⁹ This editorial text signed by D. Wikler and A.J. Weisbard (1989, p. 2246) refers to a report, in the same issue of the Journal of the American Medical Association, by Youngner *et al.*, 1989.

to part of the brainstem, the most important one for man's consciousness and its mediation to the rest of the body. Still others have used expressions such as "total brain death" or "whole-brain death," which would involve also "hemispheric death". Some authors (Engelhardt, Eccles) accept "neocortical death" as sufficient definition of human death, risking the confusion between "(whole-) brain death" and the "vegetative state" ("cerebral death"). Some of them even feel entitled *in principle* to accept the death of starvation and dehydration in "hopeless cases" (at least if their status is unambiguously proven) which they do not regard as live human persons but rather as "humanoid animals" (see D.A. Shewmon's position of 1985, 1987, p. 325, which he has lately modified substantially) or as "living corpses". In as much as such "hopeless cases" do feel pain, a praxis according to this theory would even inflict on "humanoid animals" the excruciating pain of dehydration¹⁰

¹⁰ On the notion of "neocortical" and "cortical death" see, for example, Hans W. Pia, 1985, pp. 217-253. The same author, 1986, pp. 1-11, esp. p. 3. C. Pallis, a firm defender of whole-brain death, with brainstem death as its core, warns against the confusion between brain death and "the vegetative state", which can last years and is not accompanied by cessation of spontaneous breathing and respiration. This "vegetative state" which can last years and is not accompanied by cessation of spontaneous breathing and respiration. This "vegetative state" must also be distinguished from coma, which lasts no longer than 3 weeks, and from *coma dépassé* (Pallis, 1983, 32-37, esp. 34).

This "vegetative state" which was explored by Jennett and Plum in 1972, is also referred to as "apallic state", "cerebral death", or "neocortical death". It is not a comatose state and can last for years. The "irreversible loss of higher functions" is perceived by Pallis as an ambiguous term which could denote the "vegetative state".

D. Alan Shewmon, M.D., has extended the concept of brain death far beyond what any legal code now accepts (1985, pp. 24-80). He argues from an apparently Thomistic and Catholic religious position and goes so far as to consider "brain dead" any man whose neocortical activity, associated with consciousness, is irreversibly lost. Those patients in the "vegetative state" or in a state of "dementia", whose status of living human persons C. Pallis emphatically defends, are "brain dead" according to Shewmon. He argues (p. 78) against the "President's Commission" that persistent vegetative state should be considered as "actual death". He goes still farther and argues against regarding the withholding of nutrition or fluids from a neocortically dead person as tantamount to euthanasia and murder "even when spontaneous breathing is present and no extraordinary means of life-support are needed" (p. 79). He proposes that it would be right to kill "vegetating bodies" (p. 80), persons afflicted by "dementia", and all other cases of babies and adults with irreversible damage of the neocortex. The requirement of "irreversibility" prevents the author from justifying abortion (pp. 66 ff.). Yet if he holds (p. 46) that "the body is the brain", and believes that the human soul is so strictly bound to the body (= brain) that it cannot exist in a man, and that a man does not even live, without neocortical function, it follows that early embryos are not human persons and perhaps not even living humans, although they are not "brain dead" in the sense of *irreversible* loss of brain activity. Even though Shewmon does not at all wish to draw the conclusion that early embryos are not persons, his intelligent and learned paper deviates from the philosophical position of Aristotele and Thomas Aquinas which it invokes, particularly in one respect: it fails to recognize the crucial Aristotelian discovery of potential versus actual being and of the deep foundations of the human

—in Shewmon's case certainly without intending this or interpreting the act in this way.¹¹

In America, "The President's Committee for the Study of Ethical Problems of Medicine" suggested in 1981 that "we recognize as dead an individual whose loss of brain function is complete and irreversible" ¹²). The Scientific Advisory Board of the Federal Chamber of Physicians in Germany defined brain death as "complete and irreversible collapse of the overall function of the brain while a circulatory function is still being

potencies in the *very substantial being* of the human person and soul. Yet we shall return to this point in the main text.

On the wider class of "Untermenschen" who are subsumed under the category of "brain-death", see also J.M. Nolan-Haley *et al.*, 1987, pp. 100-110. See also J.R. Stanton, 1985, pp. 77-85. In Nolan, p. 108, we find a description of the agonizing death caused by withholding intravenous feeding to terminally ill, senile, and patients in a "vegetative state". Also anencephalic and other "brain dead" patients, from whom nutrition is withheld, might experience this pain:

"If food and water are withheld from Brophy pursuant to the guardian's request, his prognosis will be certain death from starvation, or more probably from dehydration, which would occur within a period of time ranging from a minimum of five days to a maximum of three weeks.

During this time, Brophy's body would be likely to experience the following effects from the lack of hydration and nutrition:

- a) His mouth would dry out and become caked or coated with thick material.
- b) His lips would become parched and cracked or fissured.
- c) His tongue would become swollen and might crack.
- d) His eyes would sink back into their orbits.
- e) His cheeks would become hollow.
- f) The mucosa (lining) of his nose might crack and cause his nose to bleed.
- g) His skin would hang loose on his body and become dry and scaly.
- h) His urine would become highly concentrated, causing burning of the bladder.
- i) The lining of his stomach would dry out causing dry heaves and vomiting.
- j) He would develop hyperthermia, a very high body temperature.
- k) His brain cells would begin drying out, causing convulsions.
- l) His respiratory tract would dry out, giving rise to very thick secretions, which could plug his lungs and cause death.
- m) Eventually his major organs would fail, including his lungs, heart and brain.

The above-described process is extremely painful for a human being. Brophy's attending physician was unable to imagine a more cruel and violent death than thirsting to death".

¹¹ I have to stress that I refer here to earlier writings of Shewmon. The author developed his views in later works and changed some of them significantly.

¹² See on this Dr. Edward Byrne, 1984, 1986, pp. 47-54.

maintained ...”,¹³ or as the “irreversible loss of cerebral and brainstem function” (Laufs, 1985, p. 309).¹⁴

Christopher Pallis has suggested: “The irreversible loss of the capacity for consciousness combined with the irreversible loss of the capacity to breathe” (Byrne, E., 1984, 1986, p. 48). This is a partly medical, partly “philosophical” definition of death. It remains open to many interpretations depending on how the term “consciousness” is interpreted. Is perception or only thinking “consciousness”? If it is only thinking, is it only linguistically communicable thought or does there exist also a “private” thinking? Is it the subject of thought or only the activity of thought one is concerned with?

The definition of brain death only in terms of brainstem death is most problematic. For it is established beyond the shadow of a reasonable doubt that neocortical activity is still possible in persons who are “brainstem dead”.¹⁵

¹³ See A. Laufs, 1985, pp. 399-403, p. 399: “Die Bundesärztekammer spricht dort von dem ‘vollständigen und irreversiblen Zusammenbruch der Gesamtfunktion des Gehirns bei noch aufrechterhaltener Kreislauffunktion im übrigen Körper’”.

¹⁴ See also the contributions of K.-A. Hossmann, R.J. White, D.H. Ingvar, E.J. Zerbin, and C. Manni in *WGAP*.

¹⁵ See E. Byrne, 1984, 1986, pp. 52-53:

“A point of terminology arrives here. Fulfillment of brain death criteria has been said to indicate total brain death, whereas, in fact, the tests used all demonstrate death of the brainstem. In the usual sequence of events, such as severe head injury or hypoxia, cerebral destruction progresses from a rostral to a caudal direction with destruction of the cerebral hemispheres before the brainstem, and brainstem death then equates with whole-brain death. *In occasional patients however, especially those with massive posterior fossa haemorrhage, brainstem death may occur before or without hemisphere death* (Emphasis mine, J.S.). The physiological result is the same, as such patients have irretrievably lost the capacity for consciousness, and the capacity to breathe spontaneously, that is, they are brain dead. Brainstem rather than whole-brain death is, therefore, the anatomical and physiological substitute of clinical brain death and the term “*whole-brain death*” should be abandoned.

If “brainstem death may occur... without hemisphere death”, Dr. E. Byrne’s last conclusion to the effect that brainstem death implies the loss of consciousness is surprising. For if the hemispheres are functioning, we must assume consciousness in a patient, even if he is prevented from communicating it or expressing it because the contact between cortex and the rest of the body is impaired.

See D. Alan Shewmon, M.D., 1985, pp. 49 ff.:

“In man unilateral lesions of the brainstem reticular system do not impair consciousness... Of special interest is the fact that, in animals, if multiple smaller lesions are made gradually over a number of days, essentially the entire brainstem reticular system can be destroyed without interfering with the animal’s consciousness...”. There is... at least one report in the medical literature of three (human) patients whose consciousness could be sustained by electrical stimulation, after a brainstem stroke had destroyed the midbrain reticular activating system... “The patients opened their eyes, looked around, performed spontaneous movements of the limbs, and seemed to recognize their relatives, even to the point that they cried out when their relatives tried to leave the room...”. ... “If something so gross as a wire electrode in the thalamus is capable of making up for the lack of brainstem input to the cerebral hemispheres, it is reasonable to conclude that the hemispheres alone contain the structures which are both necessary and sufficient for human consciousness”. (*Ibid.*, p. 50).

Yet other definitions of death and brain death make explicit reference only to consciousness. They are philosophical definitions under the appearance of medical definitions.

Even more ambiguous is the definition suggested by the American Bar Association: "For all legal purposes, a human body with irreversible cessation of brain function according to usual and customary standards of medical practice shall be considered dead" (Byrne, E., 1984, 1986, p. 48). It leaves it entirely up to the clinician to decide what definition of brain death he wants to accept. Still others refer exclusively to the unifying biological role of the brain (brainstem, etc.) for the control and regulation of vital functions of the body.¹⁶

We see that the definition of brain death is in no way clear. This lack of clarity does not only extend to the question of what constitutes "brain death" but it also refers to the problem which physical phenomena brain death does or does not involve and which criteria we can therefore use to establish that it has occurred (for example, repeatedly observed flat EEG-values). Concerning such a crucial question, however, which touches the matter of life and death of human beings, the new definition of "death" is deplorably devoid of precision, even from a medical point of view.

1.2. *Ambiguity of the Philosophical Meaning of "Death" in "Brain Death"*

The remarkable lack of clarity in the medical definitions of death as brain death comes to the fore even more clearly when we ask about the philosophical meaning of that term:

1.2.1. "Brain Death" as Irreversible Non-function or "Destruction" of the Brain as such?

It could mean nothing but the breakdown of the diverse functions of the brain or the "complete destruction of the brain," or of its "cerebral hemispheres" (as some authors demand, leaving it open what distinguishes

Compare also the many references D.A. Shewmon gives to the relevant experimental evidence and literature (*ibid.*, pp. 49 ff). He suggests that the entire brainstem could be removed and still the state of consciousness would remain fully intact. By means of electrodes the patient could even communicate his consciousness (*ibid.*, p. 51).

¹⁶ See Ingvar, 1986, pp. 65D74. Ingvar reports that the definition of death as "irreversible loss of all mental functions (including consciousness)" was originally proposed but later rejected in Sweden in favour of "a total and irreversible loss of all capacity for integrating and coordinating functions of the body—physical and mental—into a functional unit" (*ibid.* p. 67). See also on the distinction between definitions of brain death in terms of the "higher functions" (cortical functions) and those in terms of the lower functions (of brainstem, etc.) P.D.G. Skegg, 1984, pp. 183-227, esp. 180 ff., 202 ff.

“complete destruction of the brain”—which hardly means annihilation or even, in all cases, complete liquefaction—from irreversible breakdown of brain-function).

Then we could with the same right call an irreversible breakdown of the functions of the liver or of the kidneys “liver death” or “kidney death,” indicating that the particular organ has once and for all ceased to function. Often the term brain death seems to suggest just that, and is originally introduced without any further ado, as an equivalent to “a complete and irreversible loss of brain-function”. One will have to agree with Youngner *et al.*, when they say (1989, p. 2205): “The persistence of the term ‘brain death’—rather than ‘death’—indicates some ambiguity and confusion about its meaning and implications. Its use can all too easily imply that it is only the brain, and not the patient, that has died.”

1.2.2. Is “Brain Death” the “*Death of the Human Being* in virtue of the Complete Breakdown or Destruction of the Brain”?

The term “brain death” could also mean the “death of the whole human being *because* of the complete irreversible breakdown of brain-function”, or because of the “complete destruction of the brain” (or of its cerebral hemispheres). Some authors have pointed out the unwarranted transition from the first to the second definition of brain death (Byrne, P.A., *et al.*: 1982/83, p. 453 ff.).

Then one would suggest that it is not just the organ of the brain that is dead but that the human being who has the brain has died *in virtue* of the breakdown of his brain-function.

1.2.3. Does Brain Death mean that only the Human “Person” dies?

Under the same assumption, one could suggest thirdly (with Engelhardt, 1986) that neither the human being nor just the brain but the human person has died, implying a dualism between human person and human being.

1.2.4. Brain Death a Change from Human to Animal?

One might fourthly assume (with earlier work of Shewmon, 1985, 1987) that a substantial change and deanimation have taken place, changing what had been a man into an “anthropoid animal”, while the rational soul could then live separately from the body. This position comes close to Engelhardt’s although the “humanoid animals” are in Shewmon (1985) an incomparably more restricted class than in Engelhardt (1986) who includes normal children up to the second year of their life under this category.

Thus, the philosophical thinking implied in medical language about

"brain death" is seriously confused—with respect both to its elementary philosophical-semantic-logical structure and to its content. This profound ambiguity, however, is intolerable in such an important matter as the question of the medical-philosophical determination of life or death—especially since the alternative is (as the important German Jurist von Savigny said) a very simple phenomenon, known by everybody just as easily as birth: man's death.

1.2.5. The Inability of Science to Confirm "Brain Death" in its ethically and legally Relevant Sense

There is no doubt that medical staff is competent in principle to diagnose the total brain infarction or other physical states which are called "brain death." But do not forget: *Only the instantiation of the first sense of "brain death"* (total or partial brain destruction or total brain infarction) *can be verified competently by medicine.* Yet organ—and especially heart—explantations from "brain dead" humans presuppose the truth of the second or of the third or fourth meanings of brain death. Therefore, if these (intrinsically problematic)—*philosophical* — meanings of brain death are introduced by a mere medical "determination" of the physical state called "brain death", the weighty *philosophical* issue as to whether or not a human being (person) is dead just because his brain does not function any more, while other vital functions continue, is decided not by scientific knowledge or analysis but by a mere philosophical "decree through definition". This is wholly inadmissible.

1.3. *The Ambiguity of the 3 Reasons given why "Brain(stem) Death" is "Man's Death"*

An even more severe lack of clarity relates to the *reasons for which* the irreversible loss of brain-functions or the destruction of the brain is defined as death.

1. Some authors introduce "brainstem death" as definition of death because they hold it to be practically certain that in a brainstem dead person no neocortical function is possible.

2. A second reason advanced in favour of defining death as brainstem death is that it excludes mental activity ("cognitive death"). Human consciousness directly depends on higher brain functions which in their turn depend on the functioning of the brainstem (although this clearly does not accord with the observation on cortical activity in brainstem dead persons).

Shewmon, who recently retracted this view, concluded (1985) for the same reason of the dependence of man's rational life on higher brain func-

tions that neocortical death should be adopted as definition of death. The same view is held by Engelhardt, Sir John Eccles, and others. The argument for brain-death from the irreversible loss of higher consciousness favors higher-brain-centers-oriented definitions of death. Therefore a person should be declared dead if it can be excluded, in virtue of irreversible and irremediable structural brain damage, that he ever will regain consciousness—even if his brainstem functions are intact, as in anencephalic children.¹⁷

If this criterion is introduced, also patients in the “vegetative state,” hydranencephalic and anencephalic children have to be declared brain dead. This is being proposed today¹⁸—even if at times under only *in the case* that the assumption of cortical death would become morally certain.¹⁹ Under the assumption of the irreversible cessation of higher consciousness as reason for brain death, objections against identifying brain death with the vegetative state would collapse.

3. Others argue that in fact in a brainstem dead patient the dynamic integration of his biological life has completely broken down so that life-activity only goes on in individual cells or organs but not in his body as a whole. The “Report of the Swedish Committee on Defining Death” (1984) presupposes a definition of life in terms of an “integration of functions”. The respective definition of death is: “A person is dead when he has suffered total and irreversible loss of all capacity for integrating and coordinating functions of the body—physical and mental—into a functional unit” (Ingvar 1986, p. 67). Ingvar sees an instantiation of this definition only in “total brain-infarction”.

Since it is the brainstem, rather than the cerebral hemispheres, which coordinates vital functions into a “functional unity,” the above definition favors a brainstem definition of death. Yet the loss of vital integration cannot be identified with death if some brainstem-dead patients show cortical activity and thus, presumably, possess consciousness: consciousness in a non-living (non-integrated) patient is either unthinkable or not a sign of man’s death.

Ingvar does not face this difficulty because he adopts a whole-brain definition of death. Interpreting the integration—as the above definition suggests—in “physical *and* mental” terms, it remains unclear why a brain-dead man is dead? A) Either because the brain is regarded as seat and

¹⁷ See A. Laufs, 1985, p. 400. See also Laufs, 1984, p. 76. See likewise Tess Cramond’s comments in her paper “Making resuscitation decisions”, presented in the 1987 St. Vincent’s Bioethics Centre meeting.

¹⁸ Robert C. Cefalo and H. Tristram Engelhardt (1989), H.-M. Sass, F.K. Beller and J. Reeve (1989), and R. M. Zaner (1989) argue in favour of anencephals as organ donors.

¹⁹ Shewmon is careful to insist that one should not draw any practical conclusion from his theory as long as it is not unambiguously certain (verified?) empirically.

origin of consciousness (rather than a soul); this thesis implies some materialism or actualism. B) Or because the soul is thought to depart from the body when the higher brain centers are destroyed (Eccles, Shewmon). C) Or because mental integration is conceived as indispensable part of biological life. In this case, however, the question arises as to how much mental activity is required for integration of bodily functions and whether, for example, conscious life which is (by complete paralysation or brainstem lesions) unable to influence any part of the body outside the brain performs any such integrating role, while nobody will call a paraplegic man dead.

There are certain criteria of functional unity which imply that even many persons who obviously are alive are "brain-dead".

1.4. *Criteria for Brain Death between Ambiguity and Absurdity*

Codes of practice, such as the Harvard criteria for brain death (1968), the first major attempt (after Mollaret's description of the same state as *coma dépassé*) to define brain death (without identifying explicitly irreversible coma with death), have suggested the cessation of neocortical activity as one important criterion for brain death.²⁰ According to the Harvard criteriology of brain death a completely flat EEG was deemed necessary for the diagnosis of brain death. Only one year later, however, this view was revoked by another Harvard report.²¹

Apart from such ambiguities there are clearly absurd criteria: e.g., that a brain dead patient is really dead because he cannot breathe spontaneously and will die within minutes when disconnected from a machine. If this dependence meant death, many persons who depend on dialysis, heart-machines, etc. for reasons other than brain death would likewise be dead. All babies in the womb would likewise be dead. The question whether such a dependence is irreversible or not makes no difference. Would a man whose lungs are irretrievably paralysed and who remains conscious be dead because he needs ventilation? Although the argument is indeed obviously false, it is still being defended.²²

²⁰ See *J.A.M. med.ass.*: 1968, 205, 337.

²¹ See H.K. Beecher, 1969, 281, 1070. See also H.K. Beecher: 1976, pp. 1068-1071. See also the Statement issued by the Honorary Secretary of the Conference of Medical Royal Colleges and their Faculties in the United Kingdom 1976, pp. 1186-1189.

²² See on this Skegg, 1984, p. 202:

"Many of those who believe that brain-dead individuals should be regarded as dead appear to assume that there is no need for any argument in support of that view. Of those who do provide reasons, some mention only the practical advantages of the new approach. Others concentrate on the

1.5. *Value and Limits of our First Objection*

Even if we do not expect the medical profession or the legal system to base their codes of ethics and laws on a deep philosophical reflection on the nature of life and death, we must certainly expect that the set of medical phenomena which are declared to be death, are carefully spelled out. As we have seen, this is in no way the case and *cannot be the case* as long as it remains unclear what brain death means at all. While one can have clear medical criteria for death without a *developed philosophy* of death, it is impossible to introduce clear medical criteria for “brain death,” as long as the latter’s meaning and definition are profoundly ambiguous—philosophically and even on the level of medical science. Thus our first objection against brain death criticizes the radical lack of clarity and of consistent or correct reasons given for the definition and criteria of brain death.

The objection from the inherent ambiguity of the notion, definitions, criteria and reasons of the definition of brain death does not yet prove that the true meaning of brain death could not be ascertained and false definitions and criteria could not be corrected. Yet it demonstrates that a clear and tenable account of brain death, on a broad basis of consensus and on the required level of clarification, has not been found yet and that it is therefore irresponsible to “redefine” death without introducing first any clear notion of what constitutes “brain death” and without providing cogent arguments for why “brain death” should be considered as “actual death”. Moreover, the objection makes the point that neither one of the two hidden arguments has shown yet that the state of irreversible nonfunction or destruction of the brain is actual death. This is being decided chiefly by confusing—in the very term “brain death”—“the empirical fact of irreversible loss of brain function as such” with “the death of the human person in virtue of the destruction of the brain”. To identify the two, however, cannot be established by medicine but is a philosophical thesis for which I do not see any good reason.

We have to consider at least one reason why the question of truth does not even dominate the brain-death debate.

fact that once brain death has occurred the patient’s condition is hopeless, and that heartbeat will cease within a short time in any event”.

In note 83 Skegg argues well:

“The fact that a patient’s condition is hopeless, and that conventional death will occur within a short time in any event, is not a sufficient reason for regarding the patient as already dead—although much of the debate in the United Kingdom, following the controversial ‘Panorama’ programme on BBC television, appeared to proceed on the assumption that it was” (*ibid.*, p. 202).

2. CRITIQUE OF THE SHIFT FROM THE QUESTION "WHAT IS DEATH"? TO A PRAGMATIST DEFINITION

2.1. *The Lack of Philosophical Foundation of Brain Death Definitions*

The new definition of death has a primarily pragmatic background.²³ The redefinition of irreversible coma as death in the Harvard statement had no proper theoretical foundation. One finds only practical motives, chiefly two, which speak for introducing this new definition of death: 1. the wish to have a clear moral and legal ground for disconnecting patients from artificial life support systems. 2. The need to have a justification for the legalization of heart-transplants, which had become possible (in 1967) a suspiciously short time before this definition was first introduced (in 1968).

2.2. *Only the organ-transplants necessitated the "redefinition" of death*

Moreover, only the need for organ-transplants, especially heart-transplants, presupposes the acceptance of the new definition of death. For in the event of an irremediable breakdown of brain function it is no longer obligatory to continue the prolongation of human life by artificial means, at least if the family agrees on letting such a patient die and if other conditions are met under which the continuation of artificial life-support may be deemed an extraordinary means. But in letting him die one does not need to declare him dead. On the contrary, a dead man cannot die anymore (Wikler and Weisbard 1989, p. 2246, p. 2205 ff.).

It is quite generally admitted in the literature that there are also other reasons for disconnecting artificial systems of life-support, under conditions in which they are deemed to be extraordinarily expensive or extraordinarily painful and just prolong life at a point in time where this life is without prospect of real recovery and takes on the character of a prolonged agony or process of dying. Among ethicists and also Catholic moral theologians it was accepted for the longest time, and certainly since the declaration of Pius XII in 1957, that there was no absolute obligation to prolong the life of a patient by extraordinary means (among which I would not include intravenous feeding). Thus "brain death" might be perfectly accepted as the best possible reason to

²³ See P.A. Byrne, *et al.*: 1982/83, p. 437: "It is generally acknowledged that the call for 'new definitions of death' has arisen in order to clear away the legal obstacles to transplanting vital organs or to excising them for purposes of research immediately upon the occurrence of death". The authors quote a long list of publications which evidence this pragmatic origin of the "brain death" definitions. The list could be prolonged indefinitely.

disconnect a patient from a ventilator and to let him die: Yet this does not necessitate calling his state death. Jonas has seen this sharply.²⁴

The only cogent pragmatic motive for introducing brain death is its purpose of allowing organ-transplantations without committing active euthanasia or murder. This renders the new definition of death, however, even more suspicious, not only because it becomes most likely that the more powerful practical interest in organs (cadaver organ donors) than in “freeing heart/lung machines” dictated the content of the definition of brain death, but also for the reason that an incorrect judgment on death leads, in the context of organ-explantation, to manslaughter.

It confirms this suspicion and smacks of a certain disinterest in the non-pragmatic truth about death, reminding of former conceptions of “*lebensunwertes Leben*”, when Engelhardt (1986, p. 207) suggests that it is of little interest whether the respective person still lives because “a possible survivor with severe brain damage may not have a life worth living”. Here the possibility that “brain-dead” men actually live and that, consequently, organ-explantations involve manslaughter, is openly admitted by a defender of defining death in terms of brain death. Pragmatic considerations dominate openly over the question of morally relevant truth.

²⁴ See Jonas, 1974, pp. 129-131: “My other emphatic verdict concerns the question of the redefinition of death—that is, acknowledging ‘irreversible coma as a new definition for death’. I wish not to be misunderstood. As long as it is merely a question of when it is permitted to cease the artificial prolongation of certain functions (like heartbeat) traditionally regarded as signs of life, I do not see anything ominous in the notion of ‘brain death’”. Indeed, a new definition of death is not even necessary to legitimize the same result if one adopts the position of the Roman Catholic Church, which here at least is eminently reasonable—namely that “when deep unconsciousness is judged to be permanent, extraordinary means to maintain life are not obligatory. They can be terminated and the patient allowed to die”.... “All we need to know is that coma is irreversible. For the second purpose we must know the borderline with absolute certainty; and to use any definition short of the maximal for perpetrating on a *possibly* penultimate state what only the ultimate state can permit is to arrogate a knowledge which, I think, we cannot possibly have. *Since we do not know the exact borderline between life and death*, nothing less than the maximal definition of death will do—brain death plus heart death plus any other indication that may be pertinent—before final violence is allowed to be done... When only permanent coma can be gained with the artificial sustaining of functions, by all means turn off the respirator, the stimulator, any sustaining artifice, and let the patient die; but let him die all the way. Do not, instead, arrest the process and start using him as a mine while, with your own help and cunning, he is still kept this side of what may in truth be the final line. Who is to say that a shock, a final trauma, is not administered to a sensitivity diffusely situated elsewhere than in the brain and still vulnerable to suffering, a sensitivity that we ourselves have been keeping alive. No fiat of definition can settle this question. But I wish to emphasize that the question of possible suffering (easily brushed aside by a sufficient show of reassuring expert consensus) is merely a subsidiary and not the real point of my argument; this, to reiterate, turns on the indeterminacy of the boundaries between *life and death*, not between sensitivity and insensitivity, and bids us to lean towards a maximal rather than a minimal determination of death in an area of basic uncertainty”.

Thus it does not seem to be the question of the truth about the nature of death which gives rise to this new definition but the usefulness of the reformulation of death for practical purposes.²⁵ Not this usefulness as such but the consequent and well-nigh invincible influence on falsifying the judgment on the true nature of death or the openly pragmatist substitution of truth by usefulness are to be feared.²⁶

We have to pose, in the following, the pure question of truth about the nature of life and death.

3. BRAIN DEATH FALSIFIES THE REAL NATURE OF HUMAN LIFE AND DEATH

3.1. *What is Death?*

3.1.1. Metaphysical and Medical Conceptions and "Signs" of Death

The question of human life and death, as it enters into the examination of brain death, moves primarily on two levels. In view of revealed truth but also of the philosophically evident distinction of body and mind (Seifert, 1989², 2) we must indeed define death as "the separation of body and soul". On recognizing the spiritual substantiality and immortality of the human mind, we can define human death also as "the separation of man's rational soul from the body". Of course, this "definition" does not do justice to the phenomenology of death, to the terrible fear of sinking into nothingness, to the no lon-

²⁵ See the excellent critique of this point in the article of Jonas, 1985, pp. 219-241, esp. p. 225. See an earlier English version of this paper, 1974. See also H.T. Engelhardt, Jr., 1986, p. 208 f.

²⁶ See H. Jonas, 1974, p. 133:

"My original comments of 1968 on the then newly proposed 'redefinition of death'... were marginal to the discussion of 'experimentation on human subjects', which has to do with the living and not the dead. They have since, however, drawn fire from within the medical profession, and precisely in connection with the second of the reasons given by the Harvard Committee why a new definition is wanted, namely, the transplant interest, which my kind critics felt threatened by my layman's qualms and lack of understanding. Can I take this as corroborating my initial suspicion that this *interest*, in spite of its notably muted expression in the Committee Report, was and is the major motivation behind the definitional effort? I am confirmed in this suspicion when I hear Dr. Henry K. Beecher, author of the Committee's Report (and its Chairman), ask elsewhere: 'Can society afford to discard the tissues and organs of the hopelessly unconscious patient when they could be used to restore the otherwise hopelessly ill, but still salvageable individual?'

... Pure as this interest, viz., to save other lives, is in itself, its intrusion into the *theoretical* attempt to define death makes the attempt impure, and the Harvard Committee should never have allowed itself to adulterate the purity of its scientific case by baiting it with the prospect of this *extraneous* — though extremely appealing—gain".

ger-being-present-with-others, etc. (Gabriel Marcel; Hildebrand,² 1989). Yet it does do justice to an essential and objective aspect of the ontological structure of death.

Assuming death as separation of the soul from the body, death could still be understood as a gradual process in which this separation is accomplished or as the last and definitive moment in which the spiritual subject which is necessarily presupposed, above and beyond the brain, for conscious and intellectual acts of man, is no longer present in the body. At any rate, if we can know philosophically that man must have a soul, we must also maintain that the human personal life on earth objectively begins when the spiritual human soul enters into the human body, that it continues as long as the soul is united with the body, and that our bodily earthly life objectively ends at the moment when the human soul leaves definitively the body.

It cannot be this objective metaphysical definition of death which medical science uses, at least not directly. For the soul is not directly perceptible nor is its leaving of the body. For this reason, medicine needs to use another and more empirically accessible phenomenon of death. And as personal life (and thus also the presence of the human soul in the body) is obviously intimately tied up with the biological life of man, medical science can content itself with more external aspects and “empirically observable” criteria. The notion of life relative to medicine and law must coincide with biological life and that of death with the cessation of biological human life -not with the life of *all isolated* cells and organs but with that of the cessation of all basic vital functions and of life in the human organism as a whole.

But will such an identification of biological and personal human life carry? Is it not obvious that there must be some distinction between biological and personal human life—especially in view of the divisibility and lack of *strict individuality* of biological life—processes and genetic codes versus the absolute indivisibility of the soul, etc.?

Admitting this difference does not force us to admit the separability of man’s soul from his vegetative and sensitive life and to assume living human vegetables whom the soul has left. On the contrary, the close union between personal human life and the biological life of the human organism as a whole is obvious. We must therefore use, as the only viable criterion of life in the personal sense, the criterion of biological life of man. For as long as the biological life of man as a whole is present, we have, in virtue of the unity of body and soul in man, the best reason to assume the presence of the personal human soul. Death in the biological sense is without any doubt intimately tied up, either as its cause or as its consequence, with the parting of the soul from the body. Since biological human life is so closely united with man’s personal

life and since it can be more directly observed, it must be our criterion in medicine.

Yet this does not solve the problem of a medical criterion for life and death yet. For the brain death adherents assert correctly that single life-events (cell-metabolism, growth) can be preserved outside of the biological organism as a whole. When we speak of the biological human life, we must indeed, as noted before, consider this *human life* as the life of the human organism as a whole, and not just as the life-processes in a single isolated organ or cell-culture. Some cells in a cell-culture certainly do not possess the biological life of the human organism as a whole, they do not possess *human* life in the sense of the life of a man. Organs and cells can outlive their master. The same applies when a heart is kept alive artificially outside of the human body on a machine, or in another patient. It happens also in the trunk of the decapitated person, in fingernails, hair, etc.

Thus life and death of the "human organism as a whole" can neither be identified with the life or death of the "whole human organism" including all its organs and cells nor with separated life-processes. But by which method can we recognize the life of the human organism as a whole in contradistinction to mere organic life-processes in human cell-cultures or organs?

3.1.2. Life of the Human Organism as a Whole Preserved in Brain Dead Patients?

Does it follow from this distinction between isolated biological life-processes and the life of the human organism as a whole that the brain dead man is dead as man? Does it follow that growth, metabolism, oxygen acceptance and transfer, most complex biological processes which steer and order the development of healthy pregnancies, regeneration, etc. can occur in an organ-bank?

Hardly. Yet we have to consider two extremely important factors for the determination of human biological life: 1) its "integrated wholeness" and 2) the complexity of the question of the "incarnational tissue".

3.1.2.1. Integrated "life" in "brain dead" humans?

In no man all vital functions are fully integrated. As long as essential parts of the integrated dynamic structure of the biological life of a human organism as a whole are present, however, we must assume, at least as highly probable, that this man's personal human life is present, too.²⁷ That such a man must not

²⁷ See H. Jonas, 1974, pp. 134-135.

be regarded as a mere corpse-collection of "live organs" emerges in the light of the following considerations.

With Kant and Conrad-Martius, we may characterize life as a unique form of being which dynamically brings itself forth, generating and recreating itself: through growth, nutrition, regeneration, and through procreation.

As long as these phenomena occur, the essential self-engendering character of life is preserved. In an actually dead man none of these things will happen, however many machines we use on him. As long as any one or all of the described functions are preserved, they give a convincing indication that man is alive, and only when they have ceased can we declare with any degree of certainty, or even probability, that a given man is dead.²⁸

Nobody will hold that single organs such as an explanted liver are conditions and signs of the life of a human being. But as long as a whole human body or at least the essential parts of trunk and head (after amputation of extremities or loss of several organs) show signs of life and are integrally preserved, such biological life is incomparable with the non-integrated life of single separated organs. It is precisely the life of the human organism as a whole and not the life of separate parts thereof. And it is this life which appears as condition and as medical criterion of the life of the human person.

3.1.2.2. The impossibility of identifying the brain with the "incarnational tissue" (the seat of the presence of the human person) in the body.

Evidently, there is some "incarnational tissue" in contradistinction to other parts of the body which are not indispensable for the presence of the

²⁸ See H. Jonas, 1974, p. 139:

"Now nobody will deny that the cerebral aspect is decisive for the human quality of the life of the organism that is man's. The position I advanced acknowledges just this by recommending that with the irrecoverable total loss of brain function one should not hold up the naturally ensuing death of the rest of the organism. But it is no less an exaggeration of the cerebral aspect as it was of the conscious soul, to deny the extracerebral body its essential share in the identity of the person. The body is as uniquely the body of this brain and no other, as the brain is uniquely the brain of this body and no other. What is under the brain's central control, the bodily total, is as individual, as much 'myself', as singular to my identity (fingerprints!), as non-interchangeable, as the controlling (and reciprocally controlled) brain itself. My identity is the identity of the whole organism, even if the higher functions of personhood are seated in the brain. How else could a man love a woman and not merely her brains? How else could we lose ourselves in the aspect of a face? Be touched by the delicacy of a frame? It's this person's, and no one else's. Therefore, the body of the comatose, so long as—even with the help of art—it still breathes, pulses, and functions otherwise, must still be considered a residual continuance of the subject that loved and was loved, and as such is still entitled to some of the sacrosanctity accorded to such a subject by the laws of God and men. That sacrosanctity decrees that it must not be used as a mere means".

See also note 10, above.

person. Certain body-parts can be removed or die without causing the death of the human person. Hence some parts (tissues) of the body must be essential, others unessential for the life of man. The question, however, as to which tissue exactly is *the* seat of the life of the human person and the indispensable core of the body—while the rest of the body would be something like “secondary additions”—is very difficult to settle as we shall see. Where is the core of the body within our body, that part of it on which our life as person depends, on which it depends that not only some cell-cultures, but *we* live? These parts of the body obviously do not coincide with all the parts which are necessary for the “unaided” continuation of life. For some of these, inclusively of heart and lungs, can be removed or replaced.

This “incarnational tissue” does not simply coincide with the brain. For *a*) there are some parts of the brain which do not constitute the “liaison brain” and can easily be removed surgically without killing or even influencing the person; *b*) the removal of the inactive hemisphere of our brain does not take away the experienced identity of the adult and influences only slightly his psychic well-being; *c*) in children under 3 years of age, even the active hemisphere of the brain can be removed in hemispherectomy without noticeable changes of personality development; *d*) some human beings (embryos in the early stages) certainly live without a brain; *e*) there are cases of implantations of brain tissue without transfer of a person,²⁹ and *f*) the empirical basis for determining the exact locus and limits of the “incarnational tissue” in the body cannot be established with certainty as long as not all necessary experiences and experiments have been made, scientifically explored and philosophically interpreted.

Therefore—while we can exclude with certainty many parts of the body from the range of “potential candidates” for the status of “incarnational tissue”—every man must confess his ignorance about the positive part of the answer to our question. Even the question as to whether there is a clearly delineated or a flexible “incarnational tissue” of the body cannot be settled at the present time. To overlook this ignorance is one of the great difficulties with thought-experiments concerning decapitated persons or transplanted brains (Shewmon, 1985).

Is the human person after decapitation present in the head (brain) only? Or in the relatively integrated trunk? Or in neither one of them? Or in both?

²⁹ Great progress has been made in Paris and elsewhere in the area of (morally most objectionable) injections of brain-cell solutions (from aborted embryos) in other brains. These brain-cells were accepted and led to improved performances. On the hypothesis of a complete regeneration of the brain see P.A. Byrne, *et al.*: 1982/83, pp. 463 ff.

(If one does not hold a primitive materialism or body/mind identity theory, it is not evidently wrong to imagine that in a decapitated man the “incarnational presence” continues for a short time in both parts of the body.)

In view of the considerable measure of “integrated wholeness” of the body and of life in brain-dead humans and in considering the difficulty of determining the “incarnational tissue” in the body, it can thus well be argued that brain dead persons are alive. As the human body as a whole is kept from disintegrating, from putrefaction, from collapsing into mere inorganic substances, as the body-temperature, albeit aided from without, and the processes that are conditions of it, and billions of other signs of life are still preserved throughout the organism, it seems to be wrong to declare a “brain dead” person in irreversible coma actually dead. There is no sound and certainly no cogent reason for this.

3.2. *Gradual Desoulment and Humanoid Animals?—An unacceptable Neo-Cartesian Dualism between Biological and Personal Human Life*

All of these conclusions could be denied by theories which deny the possibility that the mind can “survive” the body after the occurrence of irremediable and irreversible brain damage: namely by a radical materialism or a Neo-Cartesianism. Both of these postulate the separability of biological human life from human personhood. If the mind coincides with, or totally depends ontologically on, higher brain functions, as certain materialistic or “categorially monistic” positions hold, of course the mind cannot survive irreversible dysfunction of the brain (H.T. Engelhardt, 1973, 1986). For then the mind is nothing but these functions or their epiphenomena. Thus a materialist and monistic ontology of the mind logically leads to a radical dualism between biological human life and human personhood in the sense that many live “human beings” are not “human persons”. For example mentally gravely defective humans cannot have a mind or be persons. Before the brain is born (brainbirth, D. Gareth Jones, 1989), no human person can exist. And those whose brain will never function again, even if they are biologically clearly live humans, will never again become human persons.

A similar dualism follows from dualist body-soul theories according to which “ensoulment” takes place only when the brain is formed and/or the soul leaves the body at the moment of irreversible brain damage. According to such theories we can have two times when “human vegetables” or “anthropoid animals” live instead of persons. Before the rational life in a member of the species man begins by a late infusion of the soul, the embryo or baby is an “anthropoid organism” but no person. Likewise, such a dualism can deny

personhood to man after his rational life irreversibly ends, when this happens prior to the end of the biological life in the "body as a whole". Then we have an animal or vegetable in front of us which was deserted by his rational soul. Eccles holds the late ensoulment and early desoulment thesis, Shewmon only the early desoulment thesis. The thesis of late "ensoulment" is in fact widespread in all theories of ensoulment (or hominization) after conception.

While some strict Aristotelians and Thomists in the past held the gradual or late ensoulment theory, however, early desoulment theories used to be rare. They are now being introduced in the discussion of brain death, however. In a radical form such a theory is assumed, e.g., by Eccles, and in a less radical but metaphysically more extensively founded form it is defended by Shewmon's theory of substantial transformation (1985, 1987). By assuming, however, that "personal life" leaves the body before biological bodily life ends, namely when cortical brain-activity irreversibly has come to an end, this theory introduces a strange version of dualism.³⁰

In effect, there are two "dualisms" to be found here. The first one denies the substantial unity of man with respect to biological and rational-spiritual life. The other even denies the unity between the principle of sensitive and that of rational life. Both contradict the Aristotelian-Thomistic philosophy and its thesis of the unicity of the soul of man. (What is much worse, they contradict experience and evidence.) According to Aristotle and Thomas there is a successive ensoulment. The human body must be "sufficiently formed" to become a suitable receptacle of the respective soul. But at each stage of this ensoulment the higher soul assumes also the functions of the lower parts of the soul so that Thomas can say that the *rational soul* communicates to the human body being, life, sensation, and intellection. According to Thomas, the vegetative and sensitive souls—preexisting the arrival of the rational soul—are destroyed when the latter is infused: the one and only (rational) soul of man assumes their functions. Thus it would be impossible for Thomas that a human

³⁰ See H. Jonas, 1974, p. 139:

"I see lurking behind the proposed definition of death, apart from its obvious pragmatic motivation, a curious revenant of the old soul-body dualism. Its new apparition is the dualism of brain and body. In a certain analogy to the former it holds that the true human person rests in (or is represented by) the brain, of which the rest of the body is a mere subservient tool. Thus, when the brain dies, it is as when the soul departed: what is left are 'mortal remains'".

This is exactly the position of Shewmon (1985, p. 61). The confidence with which the author asserts that brain dead persons, humans in the persistent vegetative state or in dementia, have no soul, is surprising. How does the author know this? Does he perceive the soul leaving the body? How does he establish such a sharp separation between a "living body" and a spiritual soul? This is more "cartesian" than Descartes and hardly Thomistic "hyle-morphism" which the author asserts. On entirely different meanings of the term "dualism" see Seifert, 1973; ²1989, 2.

body after ensoulment, as long as it possesses sensitive and biological life, could be “deserted by his rational soul”.

The dualist theory that posits anthropoid animals contradicts the experience of the ontic identity of the subject of sensation and intellectual life in man and is plainly false—except under the more than unlikely assumption that on the occasion of brain death God creates a new sensitive soul to fill the place the departed rational soul has left. Especially with respect to the unity of intellectual and sensitive “soul” in man it is perfectly evident that the *same identical soul-subject* in us perceives sensibly and thinks. Thus the theory, according to which a patient in the state of dementia or in a “persistent vegetative state” could still feel and perceive sensibly but be deserted by his spiritual soul, contradicts the substantial identity of the subject of sense experience and rationality in man.

It is more difficult to maintain a strict identity of rational soul and the principle of vegetative/biological life because biological life does not require one identical and indivisible subject. It is found in each organ and cell which can be isolated in cell-cultures. Thus at least on the level of single biological life-processes strict identity of the subject (soul) which gives rational and vegetative life to man is impossible to maintain.

However, the biological life of the organism (of man) “as a whole”, the deeper unification of the life-processes, and especially the ultimate principle of their unity and integration, as well as of their information by, and essential contact with, the spirit must proceed in man from the single indivisible rational soul. In this sense, also, the rational soul in man is the single form of the body.

Thus as long as a man as a whole is alive biologically, he must not be declared dead as a person. To do so would give rise to an unbearable “dualism” which would jeopardize the substantial unity of man.

Of course, someone could reply that Aquinas held the same position and that the same principles which prompted Thomas to assume later ensoulment, namely that the bodily structure must be sufficiently advanced in development in order to become the recipient of a spiritual soul, could move us today to define the degree of formation necessary for the entering or remaining of a soul in the body in terms of the existence of brain-activity.

Since few thinkers today, however, will defend a theory of successive ensoulment in a new Thomistic sense, we can safely assume that in most authors a body-mind identity theory or an epiphenomenalism constitute the philosophical basis of having introduced the notions of brain death and of brain birth.

If the accounts of the human mind as a brain function or epiphenomenon

or a different categorial structure of the body are fundamentally incorrect, the identification of the irreversible cessation of brain function with death has to be abandoned.

If against the Neo-Cartesian dualism of entrances and exits of substantial souls in human bodies we shall recognize the profound unity of man's rational and biological life, we must assume that as long as a man is biologically alive he lives as a human person.

An unbearable dualism which separates the spiritual-personal life of man from the biological life of the human organism as a whole is contained in the idea of "humanoid animals", i.e., of living human embryos or of adults whose bodily and biological integrity and life are preserved but whose personal life is absent.

4. CRITIQUE OF BIOPHILOSOPHICAL ARGUMENTS AND ARGUMENTS FROM "PHYSIOLOGICAL DECAPITATION" IN FAVOR OF ADOPTING A CEREBRAL DEFINITION OF DEATH

The biological life of man has the character of a life stream that can go on in different cells or organs, albeit the organism as a whole is dead. Thus a heart may be taken out and be kept "alive"; sperm and ova may be taken from the living context of the body and preserved; they may be frozen or kept alive artificially outside of the human body. Hence it would not be absurd in principle to suppose that such a thing happens to all the organs of the human body: that we have in front of us a corpse in which single organs are kept alive.³¹

However, we must have a very good reason to assume that in a particular case, while most of the organs are still "alive", the life of the organism as a whole has irreversibly collapsed. While it is quite easy to see this distinction in principle, and to apply it to living organs outside of the human body, it becomes extremely difficult and precarious to apply this distinction to persons whose whole body is still functioning and who are, from the point of view of the man of the street, perfectly alive. I do not say that it is *absolutely impossible*

³¹ In stating this, I refer to the philosophical anthropology expounded by me, in 1973, and do not assume a "substantial change" in the sense of Aristotle and Shewmon. I do not assume—for reasons expounded in 1973—that separate cell-cultures, the manifoldness of cells as opposed to the indivisible simple self, etc., allow for a strict identity of the rational soul of man with the principle of organic life, as strict Thomistic philosophy assumes it. But I do insist on the deep unity of all levels of being and life in man—a unity which does not allow, in my opinion, to assume that a whole body in which many central vital signs and events take place, is left by the soul.

that the whole body of the brain dead man is a mere colossal "cell-culture" and that he himself is dead. I argue here only from strong plausibilities to the contrary.

With which right does one exclude—and must this not be arbitrary?—some fundamental functions of life which refer to the whole of the body of the organism, from life and suddenly declare, in defiance of hundreds of past generations, that these phenomena are no signs of life? ³² How can one, for example, claim—under British and Australian law—that some neocortical functions, which according to the latest medical reports on brainstem death, can still occur in spite of the application of all the criteria spelled out in the various legal and medical codes on brainstem death, are not a sign of life of the person and even of his possible consciousness? Yet even if one could preclude totally and clearly, in an individual patient who is brainstem dead, any function of the brain that is normally linked to consciousness, how can we claim with certainty that an integrally preserved organism is dead which can be fed intravenously and accepts nourishment? (Regeneration through metabolism and nourishment was always regarded as one of the fundamental marks of a living being: assimilation). How can one claim that an organism which possesses different organs is dead while most of these organs function completely or partially? How is a mother dead who can carry her child to term? ³³

³² See on many versions of this argument David Lamb, 1985, pp. 48-50. See the much clearer version of this objection in Hans Jonas (1974, pp. 134-135):

"The difference between 'organism as a whole' and 'whole organism' which he has in mind is perhaps brought out more clearly if for 'whole organism' we write 'every and all parts of the organism'. If this is the meaning, then I have been speaking throughout of 'death of the organism as a whole', not of 'death of the whole organism'; and any ambiguity in my formulations can be easily removed. Local subsystems—single cells or tissues—may well continue to function locally, i.e., to display biochemical activity for themselves (e.g., growth of hair and nails) for some time after death, without this affecting the definition of death by the larger criteria of the whole. But respiration and circulation do not fall into this class, since the effect of their functioning, though performed by subsystems, extends through the total system and insures the functional preservation of its other parts. Why else prolong them artificially in prospective 'cadaveric' organ donors (e.g., 'maintain renal circulation of cadaver kidneys in situ') except to keep those other parts 'in good shape'—viz., alive—for eventual transplantation? The comprehensive system thus sustained is even capable of continued overall metabolism when intravenously fed, and then, presumably, of divers other (e.g. glandular) functions as well in fact, I suppose, of pretty much everything not involving neural control. There are stories of comatose patients lingering on for months with those aids, the metaphor of the 'human vegetable' recurring in the debate (strangely enough, sometimes in support of redefining death—as if 'vegetable' were not an instance of life!) says as much. In short, what is here kept going by various artifices must—with the caution due in this twilight zone—be equated with 'the organism as a whole' named in the classical definition of death—much more so, at least, than with any mere, separable part of it".

³³ The claim that brain dead persons can be kept alive maximally for a few days is hardly defensible in the light of the facts. See the case of a pregnant woman with total brain infarction whose cir-

Kant, in his philosophy of life in the *Critique of Pure Judgment*, remarks well that *the dynamic self-creation of the organism* through regeneration, growth, metabolism, and procreation is the most central one of the exclusive marks of a living being. But all or some of the basic marks of this "dynamic self-generation" are preserved in the brain dead patient.

Moreover, the traditional criteria of clinical death, namely the cessation of respiration and heart-beat, with the consequent destruction of the brain and all organs, recognized that as long as the oxygen transmission and blood-circulation are, by artificial means or spontaneously, intact, life of the organism as a whole, with its essential marks, is present.

Some argue, with N. Tonti-Filippini, that life must be rethought completely in terms of "dynamic auto-organization and integration of the whole living organism". Yet if this definition is correctly understood, it applies also to a brain dead being that grows, regenerates itself, etc. Is not in the brain dead patient some dynamic auto-organization and integration of the whole living organism still intact? What else would keep the countless substances contained in his body from disintegrating, what else would keep the body from rotting if not life? Moreover, the ability to maintain a body temperature, albeit with external support to replace the lack of adaptation of body temperature to the surroundings which is provided by the brain, and to run a fever indicate that very fundamental vital processes are still intact. And these vital processes are not only intact in one single organ that is taken outside of the whole body, but rather in the whole body, including the head.

The arguments (advanced by Pallis and others) from beheaded torsos that are "kept alive" and from "transplanted brains", and from more gruelling imaginations proposed by others, refer still largely to science fiction and show only possibly "undecidable casuistic problems". They do not constitute, however, decisive objections to the described phenomena involving life. To call brain death "physiological decapitation" (Pallis, 1983, p. 34) does not acknowledge the difference between an integrally preserved and a truncated body and the continuation of the fundamental vital functions in the brain dead "organism as a whole". The brain dead person may live for days or even for months (the longest survival period of a brain dead person on record known to me being 201 days: Parisi JE, et al., 1982), decapitated men will cease to move or

culuation was maintained for nine weeks in order to secure viability of her fetus described in Field DR, et al: "Maternal brain death during pregnancy: medical and ethical issues". JAMA 1988; 260:816-822. See also the description of another case of a brain dead person who was kept alive for 68 days in Parise JE, et al, 1982; 306:14-16. See likewise the case of somatic survival for 201 days of a whole-brain dead child described in Rowland TW, et al, 1983. The child showed no cortical or brain stem functions during the entire 201 days.

show signs of life almost immediately. In the decapitated man the whole brain and the other organic functions in the head and trunk will cease within a very short time, in him even the most rudimentary integrity of the body as a whole and as living organism is destroyed. None of this applies to the "brain dead" person. In addition, one cannot exclude with certainty that the decapitated man continues to live for the short time during which the life-processes in his body continue. One might object that experiments performed by Dr. Robert J. White on cephalic exchange transplantation in monkeys (whose isolated brains showed significant electroencephalic activity and "survived" for 1 1/2 hours) prove that the mentioned distinctions between decapitation and brain death are not significant.³⁴ Moreover, the result of these experiments might prove that the brain alone is decisive for the life of the monkey. Such an empirical argument, however, is open to many philosophical interpretations and can neither prove any philosophical thesis about brain death nor the alleged fact that the biological life in the isolated monkey brain continues to be seat of the monkey-identity.

But there are two very different biological arguments against identifying the irreversible cessation of brain function with death—arguments which are not touched by Dr. White's research. 1) Does not the baby exist before he gets his brain? Thus his identity cannot be situated in the brain. 2) Moreover, nobody has proven yet the biological impossibility in principle of implanting into a "live body" a new artificial or live brain which will then be used by the same person whose brain was destroyed? Cannot even now the same person, after brain lesion or even after the separation of one half of the brain, use the other half of the brain for the same function? The injection of fetal brain tissue from embryos is even now possible—without transfer of the person—in such a way that the person who receives the brain tissue uses it for *his* memory? While I condemn these operations, which use brains of aborted babies, from an ethical standpoint, do they not prove the difficulty of knowing whether the brain dead person could not regain *his* consciousness if the progress of science led to the possibility of more sophisticated brain-transplants and injection of brain-cell solutions? But if we must not exclude this for the future, we cannot exclude the presence of the same person in the brain dead man. Other harmless experiments conducted in the 90ies, showed for the first time that brain-cells can multiply in cultures. The facts show how difficult it is to ascertain where exactly in the body the mystery of incarnation and identity is "located". It is equally difficult to determine to which parts of the body the mind is related in such a way that the removal of that part of the

³⁴ See Robert J. White *et al*, 1971, 1972, 1963, 1964.

tissue means the transfer of the person. Maybe there is not even such a magic tissue; maybe the presence of the person in the body is to be conceived more wholly and holistically? But then the brain death thesis collapses.

It is clear that there is not enough philosophical and not even scientific reflection present in the foundation of this new definition of death to exclude all this. If the function of the brain is deemed to be so decisive for the life of the body that on it alone it shall depend whether a person is dead or alive, it seems that a small and very partial sphere of phenomena related to human life, brainstem or whole-brain functions, are taken as identical with the biological life of the whole organism.

This seems entirely unjustified in view of the nature of biological life. Even if it were a tenable hypothesis that a brain dead "living corpse", especially when his brain begins to liquify and to putrefy, would be nothing but an organ-bank, this hypothesis would be probable at best, and thus oblige us to treat this alleged "organ-bank" as *possibly* a living person, as Jonas points out. Moreover, this position fails to recognize that the brain is biologically a late result of embryonic life, is preceded by the living organism without a brain and must already for this reason of its late appearance not be regarded as the center of the unity of the organic life of the organism.

As we have seen, usually another reason is given for the designation of the total brain-infarction or irreversible loss of brain function (irreversible coma) as death (brain death). It is said that the brain has a singular significance because *conscious* life is associated with it. And this reason is certainly presupposed also by any other definition of brain death, at least negatively, i.e., as excluding the presence of consciousness in "brain dead" persons. For no sane man will call a man dead when he is proven to continue to have conscious experiences, even if his brain is totally cut off from the rest of the body and thus exercises no integrating function for organs whatsoever. If the irreversible cessation of consciousness is the reason for the new definition of death, however, it is certainly surprising that the primary emphasis is not laid on neocortical death (higher brain death), or on the irreversible loss of the function of the cerebral cortex, but rather on brainstem death or whole brain death. The only way to make sense of this would be to hold that brainstem death is the only infallible sign of the irreversible loss of all cerebral activity and not only of the contact of the brain with the rest of the body.³⁵ Yet if neither cortical death nor whole-brain death can be established with certainty (which is one of the arguments in favour of introducing brainstem death as criterion), how can

³⁵ See D. Lamb, 1985, pp. 41-50, which reports this discussion and reveals (perpetuates), unnoticed by the author, the whole array of equivocations and inconsistencies to be discussed.

brainstem death which replaces cortical death because it is easier to diagnose suddenly turn into a sufficient criterion for cortical death? Moreover, we have pointed at positive evidence that higher brain functions may persist in brain dead patients.

5. CRITIQUE OF OVERT OR COVERT ONTOLOGICAL "ACTUALISM" AND MATERIALISM AS ROOT OF MANY CEREBRAL DEFINITIONS OF DEATH

Yet let us even assume that "whole-brain death" is verified and that it becomes established beyond reasonable doubt that a complete and irremediable cessation of conscious life has taken place.

It would still not be justified to call the irremediably unconscious state of a patient "brain death". For such a designation implies that *he* and not only his brain is dead and presupposes a proof that the loss of the *actual state or at least capacity of conscious activity* carries with it a loss of the reality of the subject of (real or potential) *consciousness*. This cannot be demonstrated if it is acknowledged that even in the absence of the ability to perform conscious acts there can be objectively the person and his rational potencies and faculties. If there is a spiritual subject (soul) in man, which is distinct from its activation in consciousness, then this subject can really exist and be alive although the respective patient has irreversibly lost any capacity to recover his consciousness.

Moreover, if the brain is only *the extrinsic condition* of conscious actualizations, the mere irreversible loss of the ability of activating the brain as *the extrinsic physiological condition of exercising* such faculties does in no way imply that the *subject* of these faculties is not still present and existent.

To reject such a pure actualism, it is sufficient to refer to the recognition of a spiritual soul.³⁶ J. Crosby, criticizing the radical actualism of T. Engelhardt's defense of abortion, has offered a critique of actualism as well as of the materialism which frequently underlies it.³⁷

³⁶ See Josef Seifert, 1989 (1), ch. ix; Ludger Hölscher, 1986; see also J. Seifert, 1989² (2); and J. Seifert, 1973.

³⁷ See David Weissman, 1965. The author presents a modern defense (strongly influenced by J.N. Findlay, and by an analytical philosophical reading and critique of Wittgenstein's *Philosophical Investigations*) of Aristotle's insights into being and potentialities which are irreducible to actuality and at the same time presupposed by it. Weissman defends an interesting realist modern ontology of subjects and "real potentialities". This involves also the admission of "non-introspectable mental states" (p. 15) which possess a certain actuality in their own right and are irreducible to mere possibilities. (See *ibid.*, pp. 119 ff.; 159 ff.). Weissmann summarizes the result of his suggestive arguments thus: "Endurance and susceptibility to change are the last two characteristics of the six which have

Thus the view that death occurs as soon as the brain no longer functions is entirely unfounded. The pure actualism, and the consequent idea of brain death, will more often than not be based on a pure materialism which considers human consciousness as identical with brain functions or as epiphenomenon of the brain. Then it is quite logical to consider the irreversible breakdown of brain-functions as identical with death as well as to believe that brain-birth marks the beginning of personal human life.

If the existence of a spiritual personal human soul can be demonstrated philosophically with certainty, then the irreversible collapse of the whole cerebral activity or of brainstem activity could never be identified with death.

6. OBJECTIONS AGAINST BRAIN DEATH FROM THE CONSEQUENCES

The following arguments could convince someone for mere consequential reasons to reject the definition of death in terms of brain death. They can also

now been credited to potentiality. Being a condition for the production of change, being irreducible to actuality, and being specific while depending on actuality for this specificity are the other four".

Ibid., p. 192.

See also John F. Crosby, 1986, 215-232. See especially pp. 219-229. Crosby there shows the link (unnoticed by Weissman who tends to adopt a strong materialism: 1965, p. 15) between a materialist account of man and the negation of mental potentialities or "dispositional properties". He goes on to offer strong arguments against both sides of the actualist error. Finally (pp. 229 ff.) he shows the great ethical relevance of this ontological question concerning the relationship between subject, potencies, and actual consciousness.

He states:

"It always comes as a surprise to learn that not a few highly influential thinkers have, in analyzing human consciousness, failed to notice the personal self and have even denied that there is a personal self. They have thought that it is enough to recognize conscious acts and experiences, and of course interconnections among them,...—David Hume... Max Scheler... The idea that such philosophers failed to grasp that which is closest to each of them... may seem so unlikely as to make us wonder whether there really is a personal self, and... forces us to bring out as...—clearly as possible the evidence for it.

Let us be quite clear as to why this evidence is so important for vindicating the ethics of respect for human life. If there were nothing more to a fully actualized person than conscious acts and experiences..., then the person could really have no actuality apart from consciousness... then the person would begin to exist only with the dawning of personal consciousness, and it would be absurd to assume any being of the person which precedes consciousness..." (p. 221).

Crosby criticizes also Engelhardt's idea that the mind (person) is merely "the complete and higher significance... of certain very complex bodies" (p. 218). Of course, under such an assumption, brain death as the irreversible cessation of that activity with the "significance" or "appearance" of which the person would be identified would imply the annihilation of the person. Yet equally, as Engelhardt argues, it would follow that embryos are not persons. Thus the evidence that real potencies precede all actualizations, and that there are specifically mental potencies and subjects are two cornerstones of our argument against abortion and against the redefinition of death as brain death.

bring out—via the consequences—the philosophical falsity of the theory which leads to them. Yet they derive their main strength from the presupposed inner falsity of construing man's death as brain death only, adding additional evidence against the brain-redefinition of death.

6.1. *From Brain Death to Brain Birth*

As long as brain death is accepted, it is perfectly logical to accept also brain birth and to deny personhood to embryos and to anencephalic Children; for then “to be a human person” is totally inseparable from “having a (functioning) brain”. Of course, one could object and insist that in the embryo from the first moment of conception there is a dynamic unfolding of life that will give rise to the formation of a brain. In the brain dead person, on the contrary, there is no such potentiality and teleology (Löw 1992). Thus the comparison is rejected.

This rejection is valid if irreversibility as the mere “fact of the never possessing brain-activity again” is the reason for the declaration of brain death. However, if the reason for the new definition of death in terms of brain death lies in the idea that either only the brain constitutes the functional unity of the *human* organism or that exclusively neocortical activity is directly associated with conscious life—and this argument is advanced very frequently in the respective literature—then it is perfectly logical to say that as long as no brain operates, we have no personal human life. Then it would be consistent to say that also patients in the “vegetative” or “apallic” state are “brain dead”.

In May 1987 doctors at the University hospital Münster had transplanted successfully kidneys from anencephalic children to children and adults. Professor Fritz Beller justified this by a logical application of the criterion of cortical brain death, saying: “The anencephalic child is being developed, not born—for he does not live”. The irony is that these children precisely do have brainstems and brainstem activity—dysfunction of which constitutes in many legal systems today the criterion of brain death in adults.

Where lies the justification of such an assumption of the exits and enterings of the human personhood (soul) like a ghost in the machine, in accordance with brain death speculations and the calculations of some professors of medicine or of philosophy that fully live embryos are not human persons and not even *living*?!

6.2. *Gruelling Visions of Future Research and Contradictions*

Hans Jonas and other authors unfold before us the gruelling vision of what might—quite logically—follow from accepting the new definition of death: vivisection on brain dead patients, their use as organ-banks, research objects with infectious diseases, etc. Such “gruelling visions” are being seriously proposed now.³⁸ In addition, the contradiction in the very concept of

³⁸ See H. Jonas, 1974, pp. 136-138: “But, it might be asked, is not a definition of death made into law the simpler and more precise way than a definition of medical ethics (which is difficult to legislate) for sanctioning the same practical conclusion, while avoiding the twilight of value judgment and possible legal ambiguity? It would be, if it really sanctioned the same conclusion, and no more. But it sanctions indefinitely more: it opens the gate to a whole range of other possible conclusions, the extent of which cannot even be foreseen, but some of which are disquietingly close at hand. The point is, if the comatose patient is by definition dead, he is a patient no more but a corpse, with which can be done whatever law or custom or the deceased’s will or next of kin permit and sundry interests urge doing with a corpse. This includes—why not?—the protracting of the inbetween state, for which we must find a new name (‘simulated life’?) since that of ‘life’ has been preempted by the new definition of death, and extracting from it all the profit we can. There are many. So far the ‘re-definers’ speak of no more than keeping the respirator going until the transplant organ is to be removed, then turning it off, then beginning to cut into the ‘cadaver’, this being the end of it—which sounds innocent enough. But why must it be the end? Why turn the respirator off? Once we are assured that we are dealing with a cadaver, there are no logical reasons against (and strong pragmatic reasons for) going on with the artificial ‘animation’ and keeping the ‘deceased’s’ body on call, as a bank for life-fresh organs, possibly also as a plant for manufacturing hormones or other biochemical compounds in demand. I have no doubts that methods exist or can be perfected which allow the natural powers for the healing of surgical wounds by new tissue growth to stay ‘alive’ in such a body. Tempting also is the idea of a selfreplenishing blood bank. And that is not all. Let us not forget research. Why shouldn’t the most wonderful surgical and grafting experiments be conducted on the complaisant subject-nonsubject, with no limits set on daring? Why not immunological explorations, infection with diseases old and new, trying out of drugs? We have the active cooperation of a functional organism declared to be dead: we have, that is, the advantages of the living donor without the disadvantages imposed by his rights and interests (for a corpse has none). What a boon for medical instruction, for anatomical and physiological demonstration and practicing on so much better material than the inert cadavers otherwise serving in the dissection room! What a chance for the apprentice to learn *in vivo*, as it were, how to amputate a leg, without his mistakes mattering! And so on, into the wide open field. After all, what is advocated is ‘the full utilization of modern means to maximize the value of cadaver organs’. Well, this is it.

Come, come, the members of the profession will say, nobody is thinking of this kind of thing. Perhaps not; but I have just shown that one *can* think of them. And the point is that the proposed definition of death has removed any reasons not to think of them and, once thought of, not to do them when found desirable (and the next of kin are agreeable). We must remember that what the Harvard group offered was not a definition of irreversible coma as a rationale for breaking off sustaining action, but a definition of death by the criterion of irreversible coma as a rationale for conceptually transposing the patient’s body to the class of dead things, *regardless* of whether sustaining action is kept up or broken off”.

See likewise note 10, above.

See also Alister Browne’s and Christopher Pallis’ articles, 1983, pp. 9, 28-37.

“brain death” is partly revealed through the fact that certain surgical operations are excluded and legally forbidden, for example in Germany, in “merely brain dead” persons, as long as the body is warm and the biological life of the patient and of his organs continues.³⁹ One could also dissect and vivisect brain dead persons. All of these seem, however, brutal intrusions on human beings and until now are, as a matter of fact, legally forbidden, at least in Germany, and in other countries too.

These laws prove that even the law makers do not consider “brain dead” persons really dead. For if they were nothing but corpses, it would make no sense to forbid, for example, their being “dissected” which is not forbidden by the general verdict against dishonoring human corpses.

7. LINGUISTIC AND PHENOMENOLOGICAL-LOGICAL ARGUMENTS

One could also advance a linguistic argument. Perhaps, interpreted more deeply, the argument is a phenomenological and logical argument which shows that in the use of language and in various other legal and medical considerations even the adherents to the criterion of brain death still have a clear awareness that the human persons of whom they say that they are brain dead are still alive.

For example, if in the brain death discussion it is quite naturally asserted that the brain dead people should not be “artificially kept alive” or if it is even claimed that such an artificial keeping of them alive violates their fundamental human rights, one certainly presupposes that they are still living persons. For a dead man can no longer be the *subject* of rights. Those postmortal rights which refer to the worthy treatment of his corpse are rights the subjects of whom are considered the living relatives of that man. Or one could interpret postmortal “rights” as mere (legal and moral) *duties* of showing respect towards the corpse of a man. These duties could not be derived from rights of that corpse or of the person who once lived. Thus any argument advanced on behalf of the rights of brain dead people contains a contradiction.

The same applies when one argues that the brain dead persons are in such a state that their process of dying should not be unnecessarily prolonged. For it is quite clear that a process of dying can only occur in a living being. Such language contains a contradiction in terms and clearly presupposes what the users of such language seek to deny: namely that human persons also live when they are “brain dead”. Moreover, the very ground of the moral

³⁹ See Adolf Laufs, 1985, p. 400.

objection against keeping living corpses alive proves that one regards them as more than cell-cultures. People do not object against "kidneys being kept alive" too long, etc. Such a complaint presupposes that a human being and not an anonymous cell-culture is still alive.

All these linguistic and the deeper underlying philosophical problems came to the fore quite clearly in a case in Germany, which arose over the question of whether the vital functions of a brain dead woman should be maintained who expected a healthy embryo. The defenders of the baby had proposed to preserve the mother's life in order to save the life of the *nasciturus* until the point at which cesarean section would become possible and the embryo was viable.⁴⁰ Yet the brain dead woman was in a legal sense dead, and the German law prescribes that brain dead persons must not be "kept alive".⁴¹ It was decided by the courts that the involved doctors and relatives are entitled to care for the developing life *in utero* more than being bound by the postmortal respect for a corpse. (One fails to see how the preserving of organs of a "deceased" mother in order to save her child would violate any rights or duties pertaining to postmortal respect). The primary duty of the doctor was declared to exist towards the *nasciturus*; the "post-mortal interests" of the mother were regarded as less significant.

In the discussion, at least some of the legal arguments on both sides clearly implied and presupposed the personhood of the mother and rightly discussed the problem of whether or not her rights would be violated. (Incidentally, we agree with the judges that this was not actually the case and that under such circumstances there is a duty to attempt the saving of the life of the baby, and no overriding or absolute duty to let the mother die before the baby is born.)

8. EVEN IF BRAIN DEATH ADVOCATES WERE RIGHT THEY ARE WRONG: ON THE MORAL WRONGNESS OF ACTING ON THE ASSUMPTION THAT BRAIN DEATH IS ACTUAL DEATH—DEFENSE OF A MODEST "TUTORISM"

A very different set of arguments refers to the question of actual and possible verification. If it turns out impossible to reach moral certainty about the

⁴⁰ See Hiersche, 1984, pp. 45 ff. See also Field DR, *et al*, Parise JE, *et al*, 1982. See likewise Rowland TW, *et al*, 1983.

⁴¹ The reason it offers for this is reference to the post-mortal protection of persons. See Nikoletopoulos, 1984.

death of “brain dead” individuals, a minimal ethical tutiorism demands not to take actions which risk killing a human person.

8.1. *Doubts Concerning Correct Diagnoses of “Brain Death”*

Another argument proves how uncertain the concrete diagnosis of brain death is. Widely discussed incidents of patients who awoke from “brain death” have for a time led to a virtual standstill of organ-transplants.

A friend of a close friend of mine had been declared brain dead and his heart was destined for explantation. Spared by the arrival of a younger donor, the patient regained consciousness for several days. Similar cases are well documented (P.D.G. Skegg, 1984, p. 195, and note 52; Edward Byrne, 1984, 1986, p. 50). David Lamb reports on incidents of mis-diagnosis of brain death (David Lamb, 1985, pp. 65-66). Errors of diagnosis occur in connection with “anencephalism” - even in spite of the use of CAT tests - as the case of Leah Marie Church proves.⁴²

8.2. *Four Roots of False Diagnoses of “Brain Death”*

Failure in verifying brain death correctly in concrete cases can have at least four different causes:

8.2.1. Philosophical and theoretical errors

As long as the definition of the medical state of “brain death” is unclear, one cannot devise any adequate method to confirm “brain death”. Moreover, even if the medical condition of “brain death” were clearly defined—in terms of irreversible damage of the whole brain or of irreversible dysfunction of the cortex, etc.—and if the presence of this state in the concrete case were established beyond the shadow of a doubt, the actual death of a man because of this condition would not have been verified concretely. For the reasons for affirming the death of a human being in virtue of total or partial brain infarction are unacceptable for the theoretical reasons expounded above. As a simple consequence of this, the relevant sense of brain death (death of the patient because of brain infarction) cannot be verified concretely.

8.2.2. Difficulty of verifying physiological brain states

It is doubtful when the *complete* cessation of all cortical activity or of all brain stem activity can be proven as long as the human organism as a whole

⁴² See H. Jonas’ comments on this quoted in the preceding notes. See also note 10, above.

lives. It is even more doubtful whether the *irreversible* cessation of all cortical activity can be secured with moral certainty sufficient not to risk committing man-slaughter by killing the "living corpse" of a "brain dead" human being.

This is most doubtful not only for the reason pointed out by most defenders of the brainstem definition of death—because of the approximately ten billions of cerebral neurons and because of the even larger and more hidden number of cell-combinations and of modules of neurons and neuronal-synaptic events, all of which can hardly be observed in an otherwise "living body".

How do we know that in all these synapses, neurons, and brain-modules patterns of brain-activity have irreversibly stopped? Even when this is knowable, for example indirectly by knowing for certain how long the oxygen-flow had been arrested, the tests presently required by the law in Australia, England, and other countries, merely refer, as far as I can see and as authorities claim, to the total absence of reflexes and life-signs which are not even located in the neocortex. Moreover, prominent doctors and defenders of lower brain death definitions admit cortical functions in some brain stem dead persons, and extend their tests only to the brainstem, which mainly controls the *connection* of the brain with the rest of the body, not neocortical activity itself.

Thus all the refined, revised and corrected criteria proposed in Australia and many other countries *do not even prove* the actual and irreversible cessation of brain-activity in all those modules and neurons the activity of which is directly associated with consciousness—and hence do not prove total brain death.

8.2.3. Lack of a properly trained medical staff

Recent findings (Youngner *et al.* 1989, p. 2208, Jose Luis Castillo *et al.*, 1991) show that "only 35% (63.1% according to the 1991 study) of the surveyed neurologists and neurosurgeons responsible for identifying 'brain dead' patients and declaring them dead both knew the whole-brain criterion of death and were able to apply it correctly to identify the legal status of patients A and B". This means that more than 60% (and at least 36.9%) of all examiners of "brain death" neither know the criteria well nor apply them correctly. Even if there were no other and more fundamental reasons against identifying a condition of "brain death" with death, this reason alone should suffice to put a halt on using brain death criteria, because it will lead inevitably to a large factual error margin.

8.2.4. Falsifying pragmatic interests

A strong pragmatic interest may not only be seen at work in the definition but also leads easily to an incorrect concrete diagnosis of brain death. It is

clear, and recognized in many publications on brain death, that doctors who are interested in transplantations may be easily influenced in their diagnosis of brain death in concrete cases, by their practical purpose. Thus it may occur that the decision is taken that “irreversible brain death” has occurred when it actually has not occurred. As long as the easy falsification of the judgment in concrete cases is recognized and avoided, this danger alone does not provide any cogent reasons against the definition of brain death, since similar pragmatic falsifications of diagnosis may happen in other situations.

8.2.5. Conclusion: A suspension of the use of brain death definitions

The reliability of the diagnosis of actual brain death thus is called into question 1) by the statistically verified fact that less than 35% of the USA doctors in charge of examining whole-brain death (and less than 62% of Chilean neurologists and neurosurgeons) are presently able to understand and to apply the criteria of brain death correctly, 2) by a consideration of other, partly invincible, reasons for the uncertainty of “brain death” diagnoses, and 3) by a consideration of the danger of pragmatically influenced incorrect diagnoses.

Engelhardt (1986, p. 207 ff.) speaks—in what appears to be an irresponsibly light tone—of “living and dying with less than absolute certainty”, belittling the tremendous negative importance of the fact of false concrete diagnoses of brain death—on proportionalist grounds of weighing chances of positive and negative errors of diagnosis. When one considers seriously the manifold and partly invincible, partly unconquered obstacles to a correct diagnosis of concrete cases of “brain death”, however, one should consider this argument alone sufficient to stop taking the risk of killing human persons.

8.3. *The Death of “Brain dead” Humans can neither be Confirmed with Metaphysical/Mathematical nor with Moral Certainty*

It is clear that in our moral life we do not need an absolute mathematical or metaphysical evidence and certitude in order to act. It is enough that we are “morally certain” about certain morally relevant facts (such as the life or death of someone) or about the moral permissibility of our act.

This so-called “moral certainty” can be purely subjective: our own “feeling certain”—for good or bad reasons—that we are allowed to commit an act or that the objective morally relevant factors are such and such. This subjective moral certainty can at the most—when it is the fruit of a sincere search for the truth—provide a purely subjective consciential justification for an act. Of course, someone may be morally certain in this sense that “brain death” is actual death and that organ-explantations from “brain dead” persons are per-

mitted. The existence of such subjective moral certainty does nothing but justify or excuse an act subjectively. It can exist even with respect to obviously morally wrong acts such as murder.

"Moral certainty" can also refer to an objectively well-founded conviction which provides an objective *moral* justification for a certain action even if the conviction is false. If this moral certainty does not exist, an action (such as shooting on a moving object which might be a man) may be morally wrong even if the conviction itself is correct.

This objective "moral certainty",—in contradistinction to the purely subjective and ill-founded one—is required for the objective moral justification of an action (e.g., through the ethicist). From the preceding analysis it follows that there is no objective moral certainty that the "brain dead" person is actually dead.

Recognizing the distinction between mathematical-metaphysical certainty and moral certainty, we must say: We do not possess any moral certainty, not even a moral probability, that brain death is actually death. As a matter of fact, both theoretical philosophical arguments and probabilities discussed before—especially those inspired by the Thomistic teaching on the soul as the only "form" of the human body and its integration in the dogmatic teaching of the Church—and practical matters of diagnosis of "brain death" prove that no well-founded moral certainty about the actual death of "brain dead" individuals is available. But uncertain philosophical opinions about the only relevant meaning of brain death—namely: actual death of a human being in virtue of irreversible breakdown of brain-function—can never justify morally actions which either are based on the morally certain conviction that a man is actually dead or constitute manslaughter.

Father Olms stated in his paper presented to the Pontifical Academy of the Sciences (Oct. 13, 1989) that "only the proof that the body possesses no organisation whatsoever in brain dead human beings" can make it compatible with Thomistic philosophy and with the teaching of the Church to accept brain death as actual death. Such a proof does not exist, however. We found various sources of moral (and metaphysical) uncertainty about the actual death of "brain dead" individuals.

In addition, different kinds of action demand different degrees of moral certainty. In order to take an action which might save a life, even a low probability of success can suffice for action. An action which might bring light harm to a person—as antibiotics—demands a higher but still a relatively low degree of moral certainty that the negative effect will not occur, as long as the proportionality between good and bad foreseen effects is safeguarded. To commit an action which risks killing a person, however, takes the highest

degree of moral certainty. And such a certainty is not only completely absent in the case of brain death but all the evidences point in the opposite direction, at least with highest probability.

Therefore one cannot justify explantation of organs from "brain dead" persons on the basis of "moral certainty". On the contrary, one has enough objective moral evidence and certainty to the contrary to say: even if the defenders of the brain death definitions were theoretically right, they would be morally wrong. For they would commit an action which is potential manslaughter without the required moral certainty. In fact, there exists moral certainty that their action is objectively morally wrong.

8.4. *The Moment of Death is not a Calculable Problem*

We must also remind of an empirical proof of the uncertainty of the time when objective death (as separation of soul and body) actually has occurred. Think of the "life after life" experiences of people who were declared clinically dead and still had all sorts of experiences associated with their body.⁴³ Of course, these patients were not brain dead. But could not brain-dead persons also be in a similar state prior to the occurrence of actual death? Moreover, persons who were clinically dead are sometimes revived and thus proven not to have been dead. Could not a similar continued presence of the person in the body follow the occurrence of "brain death"? Should one not infer from this that we should refrain from dogmatic assumptions that "brain dead" patients are actually dead? Alleging such evidence that warm bodies are already dead contradicts an enormous number of concrete experiences the authenticity of which no person of good faith can deny.

9. THE MOMENT OF DEATH - "CALCULABLE PROBLEM" OR MYSTERY?

Brain death fulfills a set of biological and medical criteria which, as soon as they are established, lead the medical doctor to the assumption of death. They also permit the consecutive performance of all kinds of operations, explantations, etc. Such actions presuppose that regarding the mysterious moment of death it can at least be known with certainty at which exact point in time someone is definitively dead although he still appears to be alive.

⁴³ To add a personal witness to the immense literature on serious "life after life" experiences: See the completely reliable report on such experiences by an author whom I know very well: Hellmut Laun, 1983.

The moment of death being a *mystère*, to use Gabriel Marcel's terminology, instead of being a *problem*, is another reason to reject the definition of brain death. We shall see the wrongness of this position in the light of our preceding deeper metaphysical consideration of death.

The nature and exact moment of death lie in principle beyond scientific medical criteria or definitions of death. The actions of organ-harvesting, however, are based on the assumption that at least the certain event of death of man can be determined by the medical profession prior to the natural arch-phenomenon of death with all its obvious features. Death in this classical sense does not just involve irreversible cardio-pulmonary arrest but is accompanied by many other well-nigh indubitable signs: from the cessation of all vital functions to the *frigor* (coldness) of death to the *rigor mortis* of the corpse to the actual decomposition of the body. Even when faced with the "whole-body death", one should wait for some time after actual death sets in before one dissects a corpse.

To declare death when the first undoubted marks of death set in, is not presumptuous. Yet to act or to dissect a corpse on the first declaration of death is presumptuous. It is much more pretentious, however, to determine the occurrence of death by means of a mere set of scientific facts and theories about the portion of body-tissue which contains the person, while the body as a whole still lives. To act in this way presupposes that death and the incarnational elements of the body are a calculable problem. If this is not the case, explantations of organs in view of confirmation of brain death are morally wrong even if it were theoretically correct that a "brain dead" man is actually dead. Since we cannot know this with sufficient moral certainty, any action based on such an uncertain conviction is morally wrong and presumptuous.

If death, by its own objective essence as human death, is constituted by the soul leaving the body, if it consists in the mystery of the end of that union of life, soul, and body which constitutes personal *human* life, then it becomes quite impossible and ludicrous to identify, in terms of various brain death criteria of external and philosophically irrelevant nature, the actual occurrence of death in a human being who is alive biologically.

In the past, even after a person was declared clinically dead, it was customary not to bury him nor to dissect him immediately, for the reason that—in view of the mystery concerning the exact moment of death—there is a certain risk of taking apparent death for real death. There was likewise the custom of the Catholic Church to allow the last *rites*, which are permitted for living persons only (i.e., the dying), for some minutes after the first signs of "clinical death". This was done undoubtedly for the reason that it is not

immediately clear whether the mystery of death itself takes place in the very second in which the symptoms of clinical death occur.

In the light of such reverence in front of death and in the light of such traditions which confess man's not knowing the exact moment of death, the situation in which a transplantation team jumps on the biologically live "warm corpse" which is declared "brain dead", must strike any civilized man as an incredible barbarism and presumption. It treats what no man can know, the exact moment of death, as a calculable problem—and this before the actual biological death which is such a clear and overwhelming event that every normal person can verify or diagnose it with some degree of certainty. What would be presumptuous even in the face of natural death—to dissect the corpse in the very moment in which one notes the occurrence of physical death, without knowing that the objective (metaphysical) death happens in exactly the same moment—becomes much more presumptuous in the case of heart-transplantation after the diagnosis of brain death. For the terribly complicated phenomena of brain death which over sixty percent of doctors in the medically most educated nation do not understand and apply correctly can certainly not guarantee their coincidence with the occurrence of real death. And yet only this knowledge in the form of a solid practical certitude does allow us to bury a corpse, or to dissect it or to harvest organs from it.

10. CONCLUSION: AGAINST BRAIN DEATH ABANDONING THE REDEFINITION OF DEATH

10.1. *The error of Defining Death in Terms of Brain Death*

Thus we are led to the conclusion that this new definition of death ought to be rejected by any legal and medical code and that its introduction by many states, and even by the Pontifical Academy of Sciences, had no sufficient philosophical basis. In the light of philosophical considerations about life and death, on the contrary, the criterion of brain death must be dismissed as an aberrant new definition of death.

Thus I propose strongly a return to the metaphysical notion of death as expression of an important objective side of the essence of death. This notion of death has to guide our action in that any reasonable doubt as to its occurrence must forbid operations which might bring it about. On the other hand, as to the medical concept of death or of its basic signs, I defend the notion that death has occurred when "a complete and irreversible cessation of all central vital signs (including cardiorespiratory activity and total brain infarction)"

have taken place. I argue not in favor of conceivably limited and outdated notions of clinical death (from which awakening is possible) but defend just the arch-datum of death which begins with irreversible cardiac-pulmonary arrest and is often designated as "clinical death". This notion of an "irreversible clinical death" corresponds to the classical medical criteria of death which prior to 1968 were universally in practice.

Every layperson knows the main signs and consequences of this death.

While we can no longer simply share the simplicity with which the classic German jurist Friedrich Carl von Savigny wrote in 1840: "Death, as the end of the natural capacity of being the subject of rights, is such a simple natural event that, as birth, it does not require an exact determination of its elements". Nonetheless, we argue for a critical return to the datum of this "simple natural event" of death, of which Savigny spoke, and against the sophistry of dissolving the unity of personal and biological human life and the "simple" notion of death or of reducing it to partial aspects. Allow me to quote from a fresh and non-scholarly published commentary. J.R. Stanton, M.D., asserts: "I reflect that in 40 years of medical practice as physician, I was never called by a non-medical person with the message, 'Come quickly, I think X has died', and arrived and found X alive. Also non-medical persons can recognize dying ... Death in a dead person is easy to recognize. The great paradox is to declare death in one with beating heart, functioning kidneys and lungs, sweating, capable of running fever, etc". (From a written commentary on an earlier version of my paper from September 21, 1987). The question "what is death?" is, moreover, not a matter of "normative convention" but of finding what it truly is. As A.M. Capron, professor of law, medicine and public policy at USCA in Los Angeles says: "Calling a person dead does not make him dead". (*American Medical News* April 17, 1987, p. 1). I can certainly not decree that the end of the function of the eyes or kidneys, for example, is death. Similarly, I cannot arbitrarily decree that the "loss of consciousness and spontaneous breathing", etc. is death. I must receive and discover the nature of man and of his biological and personal life and being. Only from this perspective of the truth about man and human life can I determine the objective nature of death and the criteria by means of which death can be ascertained.

10.2. *Biological Human Life* *as the Only Acceptable Criterion for Personal Human Life*

The only acceptable medical criterion for personal human life, we had to conclude, is biological human life - i.e. life of a human organism, as it exists from conception on. Accordingly, the only acceptable criteria for death are the

irreversible end of the biological vital functions of the "organism as a whole" and the phenomena following upon them.

If biological human life (i.e., life of a fundamentally whole body, not of organs or cell-cultures only) is accepted as the only viable criterion of personal human life, such an acceptance has of course tremendous consequences for medicine in forbidding the use of the criterion of brain death (not for justifying the termination of artificial life support, which the irreversible cessation of brain-function can very well do, but) for the justification of organ donation and transplantation, where such a procedure demands the taking of organs from persons who are only brain dead but "not really (biologically) dead".

Organ transplantation as such becomes suspect, and indeed morally and legally indefensible, except when actually dead persons come into question as organ donors.

However, we have to introduce, in view of the possibility of preserving organs outside of the organism (for example hearts under a heart-machine) a more precise formulation of "biological life": Life and clinical death must refer to the biological life of the organism as a whole, not just to the life processes or death of cells or organs which are severed from the integral whole of the human body.

Where there is doubt of whether a man still lives, one should always opt for the more cautious solution.

With these restrictions or additions, the customary criterion of clinical death, or better, of irreversible clinical death or of the "natural event of death" (which withstands all reasonable attempts at resuscitation, where they are required and as long as they are reasonable), should be the criterion chosen for death. "The natural event of death" includes, of course, as a central and possibly the most central, element "brain death", i.e., whole-brain death and not only the dysfunction of parts of the brain, such as brainstem, neocortex, liaison-brain, cerebrum, cerebellum, etc. "Brain death" is introduced and defended here, moreover, in its radical sense - i.e., not only as the lack of accomplishing certain ends and functions of a brain in which still innumerable biological functions occur, but as end of the biological life and anthropological function of the whole brain. Also merely apparent death should be excluded by reasonable methods.

What are the reasons for this proposal?

10.2.1. Biological life and death of the human organism as a whole is the only non-arbitrary, easily recognizable and unambiguous medical criterion of the life and death of man capable of consensus.

In the first place, all the other definitions and criteria of personal human

life are *arbitrary* and disputable. Consider this first with respect to the beginnings of life. Whether we draw the line for personal human life at the moment of "singamy" (24 hours after conception), at the end of possible twinning (after 2 weeks), i.e., at the moment of implantation, of brain-development (after 6 weeks), of viability (22-25 weeks), of birth, etc. - all these criteria are quite arbitrary and without any clear logical or anthropological foundation. Similarly, it is highly arbitrary to identify the end of human life with the destruction of the neocortex, with the irreversible nonfunction of the brainstem, of the midbrain, of the whole brain, while other vital organs are still alive.

Biological human life of the human organism, however, is a natural and in no way arbitrarily determined beginning; and the natural death of the organism as a whole is a clearly and unambiguously marked end of human life. Everybody will agree that a human organism as such, its unique genetic code, etc. begins with conception. Even abortionists agree on that and there is no doubt of it in the light of modern biology. Likewise, nobody will hold that there is human life before this point. Similarly, everyone will agree that after the end of the biological life of the human organism as a whole there is no human life present. Thus a complete consensus is possible with regard to no human life being present before the beginning or after the end of biological life of the human organism. No similar consensus can be achieved with respect to any other limit. Therefore, this most natural, unambiguous definition and criterion of human life—which has full consensus in the sense described—is preferable to any other criterion or definition of life or death.

10.2.2. Biological life and death are the only morally safe definitions and criteria of man's life and death: the argument from the required minimal ethical tutorialism.

Secondly, any other criterion is unsafe because as long as the human organism lives - personal human life at least *could* in principle, and does with great probability, exist. Since there are many reasons for, and at any rate no clear reasons against, the assumption that human life and personal human life begin together and that the human person (soul) is present in man from conception until death, an assumption for which modern biology provides indirect corroboration, one might at least possibly kill a human person when one kills a biologically living human being, even in the earliest stages of embryonic development and in the latest phases of human life. Whereas irreversible collapse of brain-activity may be and is in most cases a perfectly sound reason to disconnect patients from artificial lungs (ventilators) or other life-saving machines, heart pumps or extraordinary means of life-support, the irreversible cessation of central cerebral or of brainstem activity, but even

irreversible dysfunction of the whole brain, is no valid reason that would allow us to kill a biologically living human being. For this biologically living man - in whom we find the essential characteristics of life (the dynamic organization and integration of vital functions, nutrition, regeneration, organ activity, circulatory functions and breathing—albeit non-spontaneous—and therefore the maintenance of the order and stability of the whole human organism, the prevention of its rotting and collapsing, etc.) could at least be and is with great probability, a human person and not just a “living corpse”. Therefore it is at least “unsafe” to take the organs from a “brain dead” but otherwise biologically living being.⁴⁴

It is at least quite possible that in so doing one kills a living person.

The main point to be made here is that the mere probability of a human person being present suffices to make it morally and legally wrong to kill him.

As mentioned before, there are many laws which forbid absolutely to kill a being of which we have good reasons to assume that it is a human being and where we have at least no criterion to exclude the suspicion that he might be a living human being. All these laws show that the mere probability and plausibility of there being a human person present is sufficient to forbid absolutely morally and legally to kill such a being.

We propose to apply the principle underlying these laws to the issue of brain dead persons who are biologically alive.

10.2.3. Death as “complete and irreversible cessation of all central vital functions,” is the best medical definition and criterion of death.

The criterion of biological human life as indicator of personal human life is, moreover, the *best founded* criterion for the presence of *personal human life*

⁴⁴ This same argument from the uncertainty is defended in President R. Reagan’s book against abortion and by H. Jonas, 1974, p. 138:

“Now my point is a very simple one. It is this. We do not know with certainty the borderline between life and death, and a definition cannot substitute for knowledge. Moreover, we have sufficient grounds for suspecting that the artificially supported condition of the comatose patient may still be one of life, however reduced—i.e., for doubting that, even with the brain function gone, he is completely dead. In this state of marginal ignorance and doubt the only course to take is to lean over backward toward the side of possible life. It follows that interventions as I described should be regarded on a par with vivisection and on no account be performed on a human body in that equivocal or threshold condition. And the definition that allows them, by stamping as unequivocal what at best is equivocal, must be rejected. But mere rejection in discourse is not enough. Given the pressure of the—very real and very worthy—medical interests, it can be predicted that the permission it implies in theory will be irresistible in practice, once the definition is installed in official authority. Its becoming so installed must therefore be resisted at all cost”.

— in view of the unity of body and soul and of the human being as a whole, as well as in view of other reasons.⁴⁵

Concurring with Fr. Mc Dermott's presentation to this Pontifical Academy, I think that the Church needs to take a stance on the issue of brain death. But this stance should not be taken prematurely. In order to take a well-founded decision on this matter, one has first to cease regarding this matter as an issue to be resolved by medical scientists primarily. It is decisive that it be recognized that the key issue at stake in the brain death discussion is purely philosophical, not medical. Persons who agree on all medical facts and evidences disagree on this issue for purely philosophical or theological reasons. For these reasons, I propose a further in-depth-investigation of this question by philosophers and theologians who dialogue with scientists.

Given the immense practical pressure (from the established centers of organ-transplant medicine) on the Church regarding this matter, and given its holy duty towards the truth, the Church must certainly refuse to adapt to prevailing modern opinion on death simply because it possesses intersubjective consensus. It must resist the temptation to adjust its teaching on any issue in accordance with social expectations and desires of Catholic and secular hospitals. Rather, standing up as the veritable pillar of truth in accordance with the word of the Apostles, it has the task to speak out on the truth impertune—opportune, while undertaking every effort to make the truth understood and accepted by men.

In the light of the preceding reflections, I can only recommend that the Church explicitly reject the identification of death with brain death—for good reasons, both theoretical and practical-tutoristic in nature. May the light of human wisdom and knowledge and of the Holy Spirit guide the Church in this difficult and important decision.

⁴⁵ See J. Seifert, 1973; 1989.

REFERENCES

- Ad Hoc Committee of the Harvard Medical School to Examine the Definition of Brain Death: 1968, "Report of the Ad hoc committee of Harvard Medical School to examine the definition of brain death", in *Journal of the American Medical Association*, 209, pp. 337-43.
- BEECHER H.K.: 1976, "Diagnosis of brain death", *The Lancet*, Nov. 13, pp. 1068-1071.
- BEECHER, H.K.: 1969, "Diagnosis of brain death", *New Engl. J. Med.*, 281, p. 1070.
- BELLER, F. and J. REEVE: 1989, "Brain life and brain death—the anencephalic as an explanatory example. A contribution to transplantation", *The Journal of Medicine and Philosophy*, 14, pp. 5-23.
- BROWNE A.: 1983, "Whole-brain death reconsidered", *Journal of medical Ethics*, 9, pp. 28-37.
- BYRNE, E.: 1984, 1986, "The medical determination of brain death", in J. N. Santamaria *et al.* (ed.), *Proceedings of the 1984 Conference on Bioethics*, Melbourne, pp. 47-54.
- BYRNE, P. E., *et al.*: 1982/83, "Brain Death", *Gonzaga Law Review*, 18, 3, pp. 429-516.
- CAFFARRA C.: May 1981, "Die Unmoral der Empfängnisverhütung", *Theologisches* 133, pp. 4078-4088.
- CAPRON A.M.: 1987, "Anencephalic donors: separate the dead from the dying", *Hastings Center Report* 17 (1), pp. 5-9.
- CASTILLO, J. L., M. LAVADOS, *et al.*: "Aspectos clínicos y legales de los criterios de muerte cerebral: evaluación de su grado de conocimiento por neurólogos y neurocirujanos", *Rev. Méd Chile* 1991: 119: 908-912.
- CEFALO, R.C. and H. T. ENGELHARDT, JR.: 1989, "The use of fetal and anencephalic tissue for transplantation", *The Journal of Medicine and Philosophy*, 14, pp. 25-43.
- CHAGAS, C., ed., see "Working Group".
- GRAMOND, T.: 1988, "Making resuscitation decisions", *Proceedings of the 1987 Conference on Bioethics*, Melbourne.
- CROSBY, J.F.: 1986, "Are some human beings not Persons?", *Anthropos* 2, pp. 215-232.
- FIELD D.R., *et al.*: 1988, "Maternal brain death during pregnancy: medical and ethical issues", *JAMA*, 260, pp. 816-822.
- HOLZGREVE, W. *et al.*: 1987, "Kidney Transplantation from anencephalic Donors", *New Engl. J. Med.*, 316, pp. 1069-1070.
- INGVAR, D.H.: 1986, "The Concept of Death: comments on an official Inquiry in Sweden", in *Working Group on: The artificial Prolongation of Life and the Determination of the exact Moment of Death* (abbr. WGAP), pp. 65-74.

- JONAS, H.: 1985, "Gehirntod und menschliche Organbank: Zur pragmatischen Umdefinierung des Todes" (abbr. "Gehirntod"), in JONAS, H.: *Technik, Medizin und Ethik. Zur Praxis des Prinzips Verantwortung*, Insel Verlag, Frankfurt a.M., pp. 219-241.
- JONAS, H.: 1974, "Against the Stream: Comments on the Definition and Redefinition of Death", *Philosophical Essays: From Ancient Creed to Technological Man*, Prentice-Hall, Englewood Cliffs, N.J., pp. 132-140.
- LAUFS, A.: 1985, "Juristische Probleme des Hirntodes", *Der Nervenarzt* (1985) 56, pp. 399-403.
- LAUN A.: 1978, "Teleologische Normenbegründung in der moraltheologischen Diskussion. Ein kritischer Bericht", *Theologisch-praktische Quartalschrift*, 126. Jg. H2, pp. 167 ff.
- NOLAN-HALEY, J.M. et al.: 1987, "On rationalizing Death", *The Human Life Review* XIII, 2, pp. 100-110.
- PALLIS, C.: 1983, "Whole brain death reconsidered - physiological facts and philosophy", *Journal of Medical Ethics* 9, pp. 32-37.
- PARISI J.E., et al.: 1982, "Brain death with prolonged somatic survival", *N. Engl. J. Med.* 306, pp. 14-16.
- PIA, H.W.: 1985, "Primary and secondary hypothalamus and brainstem lesions, *Advances in Neurosurgery* 13, Springer, Heidelberg, pp. 217-253.
- PIA, H.W.: 1986, "Cerebral Death", *Working Group on: The artificial Prolongation of Life and the Determination of the exact Moment of Death* (abbr. WGAP), ed. C. Chagas, Vat. City, pp. 1-11.
- Pontificia Academia Scientiarum: 1989, *Allogolo*, 1.
- ROWLAND T.W., et al.: 1983, "Brain death in the pediatric intensive care unit: a clinical definition", *Am J Dis Child*, 137, pp. 547-550.
- SASS, H.-M.: 1989, "Brain life and brain death: a proposal for a normative agreement", *The Journal for Medicine and Philosophy*, 14, 45-59.
- SEIFERT, J., 1987, (2) "Abortion and Euthanasia as Legal and as Moral Issues: Some Reflections on the Relationship between Morality, Church and State", in *Bioethics Update, Proceedings of 1987 Annual Conference on Bioethics*, ed. N. Tonti-Filippini, St. Vincents Bioethics Centre, Melbourne, pp. 162-212.
- SEIFERT, J.: 1985 (1), "Absolute moral Obligations towards finite Goods, as Foundation of Intrinsically right and wrong Actions", *Anthropos* I, 1, May 1988, pp. 57-94.
- SEIFERT, J.: 1985 (2), "Gott und die Sittlichkeit innerweltlichen Handelns", *Forum katholische Theologie*, 1. Jg., Heft 1/1985.
- SEIFERT, J.: 1988, "Hirntod: Ein Beitrag zur Kritik der philosophischen Korruption der medizinischen Technik", in *Ethik und Technik*, M&T edition, Zürich.
- SHEWMON, D.A.: 1985, "The Metaphysics of Brain Death, Persistent Vegetative State, and Dementia", *The Thomist* 49, 1, (Jan. 1985), pp. 24-80.
- SHEWMON, D. A.: 1987, "Ethics and Brain Death: A Response", *The New Scholasticism* 61, pp. 321-344.

- SPAEMANN, R.: 1981, "Über die Unmöglichkeit einer rein teleologischen Begründung der Ethik", *Philosophisches Jahrbuch*, 88. Jg., I. Halbband, pp. 70-89.
- STANTON J.R.: 1985, "The new Untermenschen", *The Human Life Review* XI, 4, pp. 77-85
- Statement issued by the Honorary Secretary of the Conference of Medical Royal Colleges and their Faculties in the United Kingdom on October 11, 1976: Nov. 1976, "Diagnosis of brain death", *Brit. Med. J.*, 13, pp. 1186-1189.
- STYCZEN, T.: 1981, "Zur Unabhängigkeit der Ethik", in K. WOJTYŁA *et al.*, *Der Streit um den Menschen*, Butson u. Becker, Kevelaer.
- WHITE, R.J. *et al.*: 1971, "Cephalic Exchange Transplantation in the Monkey", *Surgery*, 70, pp. 135-139.
- WHITE, R.J. *et al.*: 1963, "Isolation of the Monkey Brain: In vitro Preparation and Maintenance," *Science*, 141, pp. 1060-1061.
- WHITE, R.J. *et al.*: 1964, "Preservation of Viability in the Isolated Monkey Brain Utilizing a Mechanical Extracorporeal Circulation", *Nature*, 202, pp. 1082-1083.
- WHITE, R.J. *et al.*: 1972, "The Scientific Limitation of Brain Death", *Hospital Progress*, pp. 48-51.
- WIKLER D. *et al.*: 1989, "Editorial", *Journal of the American Medical Association* Vol 261, No. 15, p. 2246.
- YOUNGNER *et al.*: 1989, "Brain Death" and Organ Retrieval. A Cross-sectional Survey of Knowledge and Concepts among Health Professionals", *JAMA*, pp. 2205-2210.

BOOKS

- ENGELHARDT, H.T., JR.: 1986, *The Foundation of Bioethics*, Oxford University Press, New York/Oxford.
- HILDEBRAND, D.V.: 1960, *What is Philosophy?*, Milwaukee: Bruce.
- HILDEBRAND, D.V., 1989², *Ueber den Tod. Nachgelassene Schrift*, EOS Verlag, Erzabtei St. Ottilien.
- HÖLSCHER, L.: 1986, *The Reality of the Mind: St. Augustine's philosophical Arguments for the human soul as a spiritual substance*, Routledge & Kegan Paul Press, London/Boston.
- JONAS H.: 1974, *Philosophical Essays: From Ancient Creed to Technological Man*, The University of Chicago Press, Chicago and London.
- JONAS, H.: 1985, *Technik, Medizin und Ethik*, Insel Verlag, Frankfurt am Main.
- LAMB, D.: 1985, *Death, Brain Death and Ethics*, Croom Helm, London & Sydney.
- LAUFS A.: 1984³, *Arztrecht*, Beck, München.
- LAUN, H.: 1983, *How I met God: An unusual Conversion*, trans. D. Smith, Franciscan Herald, Chicago.

- LÖW, R.: 1985, *Leben aus dem Labor: Gentechnologie und Verantwortung—Biologie und Moral*, C. Bertelsmann, München.
- Pontifical Academy of Sciences, "The Artificial Prolongation of Life, *Origins*, 25.
- REINACH, J.: 1989, *Sämtliche Werke. Kritische Ausgabe mit Kommentar*, Bd. I: *Die Werke*, Teil I: *Kritische Neuauflage* (1905-1914), Teil II: *Nachgelassene Texte* (1906-1917); Bd. II: *Kommentar und Textkritik*, hrsg.v. Barry Smith und Karl Schuhmann, München und Wien: Philosophia Verlag.
- Report of the Swedish Committee on Defining Death: 1984, *The Concept of Death. Summary*, The Swedish Ministry of Health and Social Affairs, Stockholm.
- SEIFERT J.: 1987, *Back to Things in Themselves. A. Phenomenological Foundation for Classical Realism*, Routledge, London.
- SEIFERT, J.: 1976², *Erkenntnis objektiver Wahrheit. Die Transzendenz des Menschen in der Erkenntnis*, A. Pustet, Salzburg.
- SEIFERT, J.: 1989 (1), *Essere e Persona. Verso una Fondazione fenomenologica di una Metafisica classica e personalistica*, Vita e Pensiero, Milan.
- SEIFERT J.: 1973, *Leib und Seele. Ein Beitrag zur philosophischen Anthropologie*, Universitätsverlag A. Pustet, Salzburg.
- SEIFERT, J.: 1989² (2), *Das Leib-Seele-Problem und die gegenwärtige philosophische Diskussion: Eine systematisch-kritische Analyse*, Wissenschaftliche Buchgesellschaft, Darmstadt.
- SKEGG, P.D.G.: 1984, *Law Ethics and Medicine: Studies in Medical Law*, Clarendon Press, Oxford.
- WGAP (abbr.): 1986, Chagas C. (ed.), *Working Group on: The artificial Prolongation of Life and the Determination of the exact Moment of Death*, Vatican City.
- WEISSMAN D.: 1965, *Dispositional Properties*, Southern Illinois University Press, Carbondale and Edwardsville.

ASSERTIONS DOGMATIQUES QUE DOIT PRENDRE EN COMPTE LA REFLEXION SUR LA TRANSPLANTATION D'ORGANES ¹

DANIEL OLS, O.P.

I

A première vue, le problème qui nous occupe regarde beaucoup plus la théologie morale (puisqu'il s'agit de déterminer ce qu'on peut faire et ce qu'on ne peut pas faire, ce qu'on doit faire et ce qu'on ne doit pas faire) que la théologie dogmatique, dont le lieu propre n'est pas la réflexion sur l'action de l'homme, mais la contemplation, l'explicitation et l'approfondissement des vérités contenues dans la Révélation comme l'Eglise la propose et l'interprète. Il n'en reste pas moins que le dogmaticien doit rappeler un certain nombre de données de foi ou impliquées par la foi dont le moraliste (et le chrétien en général) doit tenir compte. C'est ce que je voudrais essayer de faire dans cette communication. Je me propose, non pas d'y développer mes vues personnelles, mais d'y exposer de la façon la plus objective possible, les données doctrinales dont on doit nécessairement tenir compte et d'indiquer leurs implications pour les problèmes qui nous occupent.

II

Pour ce qui regarde la transplantation des organes, considérée en elle-même, le seul vrai problème que celle-ci pose *directement* au dogmaticien est la question du sort des organes transplantés à la résurrection des morts, ce qui n'est, en somme, qu'un avatar du problème classique des hommes mangés... Mais je ne pense pas que cette question doive nous retenir au cours de cette table ronde dont l'orientation est essentiellement pratique (morale).²

¹ Principales abréviations bibliographiques utilisées: ASS = *Acta Sanctae Sedis*, Romae, 1865-1908; COD = *Conciliarum oecumenicorum decreta*, curantibus JOSEPHO ALBERICO, Josepho A. DOSSETTI, Perikle-P. JOANNOU, CLAUDIO LEONARDI, PAULO PRODI, consultante HUBERTO JEDIN, Bologna, Istituto per le Scienze religiose, 1973³; DS = *Enchiridion Symbolorum Definitionum et Declarationum de rebus fidei et morum*, quod primum edidit HENRICUS DENZINGER et quod funditus retractavit auxit notulis ornavit ADOLPHUS SCHÖNMETZER, Barcinone-Friburgi-Brisgoviae-Romae-Neo-Eboraci, Herder, 1963³²; EV = *Enchiridion Vaticanum*, Bologna, Edizioni Dehoniane, 1967 ss.

² On peut voir sur le sujet une bonne présentation des diverses opinions en présence (avec bibliographie) dans CÂNDIDO POZO, *Teologia dell'aldilà*, Roma, Ed. Paoline (« Testi di Teologia, 3 »), 1983, pp, 348-351.

Ce qui importe, au contraire, c'est de rappeler les éléments suivants qui ont des implications pratiques et qui concernent le point central de nos discussions: le problème (ou plutôt le mystère)³ de la mort et, plus précisément la détermination du moment de celle-ci.⁴

1. L'homme est composé d'une âme et d'un corps.⁵ La mort consiste dans la séparation de ces deux éléments dont l'un, l'âme, subsiste.⁶

³ Cf. *Gaudium et spes*, 18.

⁴ On pourrait cependant objecter à ce que j'affirme ces paroles de Pie XII: Il appartient au médecin, et particulièrement à l'anesthésiologue, de donner une définition claire et précise de la « mort » et du « moment de la mort » d'un patient qui décède en état d'inconscience. (PIE XII, *Risposte ad importanti quesiti sulla « rianimazione »*, 24 novembre 1957 [*Discorsi e radiomessaggi di S. S. Pio XII*, t. 19, pp. 613-621 (pp. 618-619)]).

Cette affirmation a certainement quelque chose d'un peu maladroit, mais elle a reçu une juste interprétation dans le document sur *Quelques questions d'éthique relatives aux grands malades et aux mourants* publié le 27 juin 1981 par le Conseil pontifical « *Cor unum* », qui, après l'avoir citée, précise les limites de ce rôle du médecin: Sans doute on ne saurait attendre de la science médicale plus qu'une description de critères permettant d'établir que la mort est survenue, mais ce que le pape entend dire c'est que ce jugement appartient à la médecine et non à la compétence de l'Église. (EV 7, 1261).

Autrement dit, il n'appartient pas au médecin en tant que tel de donner une définition réelle (c'est-à-dire métaphysique) de la mort, mais il lui appartient de déterminer les signes qui permettent d'affirmer la présence de la mort ainsi définie. C'est le philosophe ou le théologien qui affirmera, à la suite d'Aristote et de saint Thomas, que l'âme est l'acte d'un corps organisé, et donc que, lorsque l'organisation du corps a disparu, l'âme n'est plus là et le patient est mort, mais bien évidemment c'est le médecin qui déterminera les signes permettant de dire qu'un corps a perdu son organisation et qui vérifiera leur présence dans chaque cas particulier.

⁵ Quoi qu'on en dise, cette doctrine n'est pas une invention grecque (et le fût-elle que cela ne suffirait pas à prouver qu'elle est fausse!), mais une donnée de la Révélation, donnée présente dans l'Écriture dès ses strates les plus anciennes (épisode de l'évocation de Samuel par la sorcière d'Endor: *1 Sm* 28,8-20). Évidemment, ce n'est que progressivement que se préciseront et s'approfondiront les implications de cette perception fondamentale (commune, semble-t-il, à l'ensemble des cultures): voir, à ce propos, JEAN DE LA CROIX KAELIN. « A quand la résurrection? », *Nova et Vetera*, 51 (1981), pp. 186-194 (spéc. pp. 187-190).

⁶ Sur tout cela, voir la lettre *Recentiores episcoporum synodi* émanée par la Sacrée Congrégation pour la Doctrine de la Foi le 17 mai 1979 (EV 6, 1528-1549 (en part. 1539)). — Au cours de la session de travail sur *The artificial prolongation of the life and the determination of the exact moment of death*, organisée par cette même Académie pontificale des Sciences qui nous réunit aujourd'hui, on a exprimé l'opinion que: Death being the "irrevocable separation of the soul from the body", was rejected since there is a general agreement that the "soul" cannot be described in sufficiently exact terms to provide a basis for clinical and legal decisions. (DAVID H. INGVAR, "The concept of Death. Comment on an official Inquiry in Sweden", in *Working Group on The artificial Prolongation of Life and the Determination of the exact Moment of Death*, edited by Carlos CHAGAS, Città del Vaticano, Pont. Academia Scientiarum (« Pont. Academiae Scientiarum scripta varia, 60 »), 1986, pp. 65-74 (p. 66)).

Une telle affirmation ne laisse pas d'étonner. Personne n'a jamais prétendu que l'on pouvait assister au « départ » de l'âme comme telle: notre connaissance, ici-bas, vient tout entière des sens et

2. Puisqu'il est absolument interdit de tuer⁷ ou de mutiler⁸ un homme et que la transplantation semble pouvoir impliquer que l'on mette fin à la vie du donneur ou qu'on le mute alors qu'il est encore en vie, il faut préciser ce que la foi nous enseigne sur cette union et, par voie de conséquence, sur cette séparation. Le concile de Vienne (1312) a défini que l'âme rationnelle (ou intellectuelle) est essentiellement et par soi forme du corps humain,⁹ ce qui veut dire que l'âme n'est pas une réalité complète en soi qui se trouverait emprisonnée dans un corps, qu'elle n'est pas tout l'homme, mais qu'elle est une partie de l'homme, essentiellement relative à l'autre partie qui est le corps, auquel elle communique l'être (comme le fait toute forme substantielle à l'égard de sa matière). On doit donc dire, avec Pie IX, — et cela nous intéresse directement — que l'âme rationnelle est l'unique principe vital de l'homme, dont le corps reçoit mouvement, vie et sensibilité.¹⁰

Il semblerait donc qu'il faille en conclure que tant que le corps vit (même si c'est d'une façon diminuée) l'âme rationnelle est présente et donc on a bien

l'âme n'est pas une substance sensible! Mais nous pouvons prouver son existence à partir de ses opérations et constater son absence quand elle ne produit plus son effet propre qui est de soutenir le corps dans l'être. Le problème est donc de déterminer les signes certains de ce départ de l'âme, et là, c'est le corps qui est en cause! Il est curieux de noter que le pape Pie XII, traitant ce sujet, soulignait, non l'imprécision du concept d'âme, mais bien « l'imprécision des termes de "corps" et de "séparation" » (PIE XII, *Risposte ad importanti quesiti sulla « rianimazione »*, 24 novembre 1957 (*Discorsi e radiomessaggi di S. S. Pio XII*, t. 19, pp. 613-621 (p. 619))].

⁷ A l'exception de la guerre et de la peine de mort: v. S. Congrégation pour la Doctrine de la Foi, Déclaration *Iura et bona*, 5 mai 1980 (EV 7, 351, note 4).

⁸ Sauf, évidemment, si cette mutilation a pour fin de soigner celui qui la subit ou s'il s'agit d'une peine légitimement infligée (v., ad es., S. THOMAS D'AQUIN, *Summa Theologiae*, II^a II^{ae}, q. 65, a. 1) ou encore si le patient la subit volontairement pour donner l'un de ses organes à qui en a besoin.

⁹ « Porro doctrinam omnem seu positionem temere asserentem, aut vertentem in dubium, quod substantia animae rationalis seu intellectivae vere ac per se humani corporis non sit forma, velut erroneam ac veritati catholicae inimicam fidei, praedicto sacro approbante Concilio reprobamus: *definites*, ut cunctis nota sit fidei sinceræ veritas ac praecludatur universis erroribus aditus, ne subintrent, quod quisquis deinceps asserere, defendere seu tenere pertinaciter praesumpserit, quod anima rationalis seu intellectiva non sit forma corporis humani per se et essentialiter, *tamquam haereticus sit censendus* » (DS 902).

¹⁰ « Notatum..., est, Baltzerium [i. e. Iohannes Baltzer, canonicus Vratislaviensis]..., cum omnem controversiam ad hoc revocasset, sitne corpori vitae principium proprium, ab anima rationali re ipsa discretum, eo temeritatis progressum esse, ut oppositam sententiam et appellaret haereticam et pro tali habendam esse multis verbis argueret. Quod quidem non possumus non vehementer improbare, considerantes hanc sententiam, quae *unum in homine ponit vitae principium, animam scilicet rationalem*, a qua corpus quoque et motum et vitam omnem et sensum accipiat, in Dei Ecclesia esse communissimam atque Doctoribus plerisque, et probatissimis quidem maxime, cum Ecclesiae dogmate ita videri coniunctam, ut huius sit legitima solaque vera interpretatio, *nec prouide sine errore in fide possit negari* » (PIE IX, Lettre apostolique *Dolore haud mediocri* à l'évêque de Bratislava, 30 avril 1860 [DS 2833. — C'est nous qui soulignons]).

affaire à un homme qu'il est criminel de tuer ou de mutiler. Or, il semble que tant que la circulation sanguine persiste, le corps à proprement parler (c'est-à-dire non pas une simple juxtaposition d'organes, mais une unité organique, ayant en soi-même le principe de son mouvement) subsiste, même si sa vie n'est plus qu'une vie purement végétative.

Peut-être, toutefois, une telle conclusion, qui conduirait à exclure toute transplantation exigeant que l'on mette fin à la vie « végétative » du donneur, est-elle trop hâtive, car, s'arrêtant à quelques textes, sans aucun doute fort importants, du Magistère, elle néglige de prendre en compte une autre donnée du problème.

3. Le XIII^e siècle a été violemment agité par le problème de l'unicité de la forme dans l'homme. Une vue « platonicienne » des choses¹¹ inclinait à considérer l'âme rationnelle comme une réalité se suffisant à elle-même, comme une personne,¹² habitant dans un corps et le mouvant non pas directement, mais par l'intermédiaire d'une forme (ou âme) végétative et d'une forme (ou âme) sensitive (ou d'une forme végétativo-sensitive). Saint Thomas, au contraire, défendit vigoureusement l'unicité de la forme humaine (celle-ci étant, évidemment l'âme rationnelle).¹³ Il semble que la position thomiste se soit largement imposée même si l'on ne peut peut-être pas dire à coup sûr qu'elle appartienne au patrimoine de la foi.¹⁴

¹¹ Cf. *Phédon*, 253c-254c.

¹² Saint Augustin répétait: « ego animus » (p. ex., *Conf.*, 1. 10, cc. 6, 7, 16, etc.); saint Thomas proclamera: « anima mea non est ego » (*Super I ad Cor.*, c. 15, 1. 2 [Marietti, n. 924]; cf. *Super 3^e Sent.*, d. 5, q. 3, a. 2; I^o, q. 29, a. 1, ad 5^m; I^o, q. 75, a. 4, c. et ad 2^m; II^o II^o, q. 83, a. 11, etc.)

¹³ V., p. ex., 2 CG 58; *Quodl.* 11, a. 5; I^o, q. 76, aa. 3 et 4; etc.

¹⁴ Le IV^e^m Concile de Constantinople (869-870) a bien porté un canon (le canon 11, selon la numérotation du texte latin, canon partiellement conservé aussi en grec) qui semble régler le problème: Veteri et novo testamento unam animam rationabilem et intellectualem habere hominem docente, et omnibus deiloquis patribus et magistris ecclesiae eandem opinionem asseverantibus, in tantum impietatis quidem, malorum inventionibus dantes operam, devenerunt, ut duas eum habere animas impudenter dogmatizare, et quibusdam irrationalibus conatibus per sapientiam quae stulta facta est [cf. *1 Co* 1, 20], propriam haeresim confirmare perterrent.

Itaque sancta haec et universalis synodus, veluti quoddam pessimum zizanium, nunc germinantem nequam opinionem, evellere festinans; imo vero *ventilabrum in manu* [Mt 3, 12; Lc 3, 17] veritatis portans, et igni inextinguibili transmittere omnem paleam, et aream Christi mundam exhibere [cf. Mt 3, 12; Lc 3, 17] volens, talis impietatis inventores et patratores, et his similia sentientes, magna voce anathematizat, et definit, atque promulgat, neminem prorsus habere, vel servare quoquo modo statuta huius impietatis auctorum. Si autem quis contraria gerere praesumpserit huic sanctae et magnae synodo, anathema sit, et a fide atque cultura christianorum alienus. (COD p. 175; cf. DS 657-658). Mais il faut ajouter que non seulement certains doutent de l'oecuménicité de ce concile et de la valeur canonique de ses décisions, mais surtout que l'on ne connaît pas précisément l'erreur que le concile entend condamner, ce qui rend difficile de préciser le sens de la définition. On ne sait pas si le concile veut dire: il n'y a en chaque homme qu'une âme rationnelle (et non pas deux, comme semble

Mais il faut ajouter que saint Thomas, lui-même, professait que cette âme rationnelle, unique forme de l'homme, n'était pas présente dès le début de la vie de l'embryon, mais que se succédaient en ce dernier d'abord une âme végétative, puis une âme sensitive et enfin l'âme ration-

l'avoit imaginé Photius, qui est probablement visé ici), ou bien: il n'y a en chaque homme que la seule âme rationnelle (et donc pas d'âme sensitive-végétative). La première interprétation semble plus vraisemblable, mais de toute façon l'incertitude où l'on est interdit de tirer de ce texte une conclusion définitive.

Quelques documents plus récents, cependant, semblent bien montrer la faveur avec laquelle l'Église considère la doctrine de l'unicité de la forme dans l'homme. Le Concile de Vienne (1311-1312), que nous avons déjà cité, affirmant, contre Pierre Jean Olieu (Petrus Iohannis Olivi) que l'âme rationnelle est *per se et essentialiter* forme du corps (DS 902), n'a pas voulu, semble-t-il, condamner la doctrine de la pluralité des formes. Il n'en reste pas moins qu'il la rend difficilement soutenable. L'enseignement du Concile de Vienne a été repris explicitement par le cinquième Concile du Latran (1512-1517) dans sa condamnation des positions attribuées à Pomponazzi (DS 1440).

Pie IX, dans un texte que nous avons déjà cité, affirme que nier la sentence suivant laquelle il y a dans l'homme un seul principe vital, qui est l'âme rationnelle ne va pas sans erreur dans la foi (DS 2834). Certes, ce document n'entend pas proposer une définition dogmatique, mais il n'en reste pas moins que la qualification utilisée doit donner à réfléchir! Dans une lettre à Alfonso Travaglini, fondateur de la Société philosophico-médicale, le même pape écrivait: *Libentius etiam videmus, vos proposito vostro fideles, eos tantum sodales vobis adsciscere constituisse, qui teneant et propugnaturi sint doctrinas a sacris Conciliis et hac sancta Sede propositas, ac nominatim Angelici Doctoris principia de animae intellectivae unione cum corpore humano, deque substantiali forma et materia prima.* (Lettre *Dum praeterito mense*, 23 juillet 1874 [ASS 8 (1874-1875), pp. 496-497 (p. 496)]).

Il est vrai que ces prises de position suscitérent des réactions inquiètes dans certains milieux et que le pape chargea le Secrétaire de la Congrégation pour les Affaires ecclésiastiques extraordinaires de préciser en son nom, dans une lettre adressée au recteur de l'Université catholique de Lille, les points suivants:

1. Graviter abuti litteris a Sanctitate sua die 23 Iulii 1874 ad Doctorem Travaglini datis, quibus opus ab eo susceptum commendatur, eos omnes qui exinde contendunt, Sanctitatem suam voluisse per eam commendationem improbare systemata quaedam philosophica illi opposita, quod de materia prima et substantiali forma corporum Idem Doctor eiusque socii adoptarunt; si quidem haec alia systemata, non secus atque illud, non modo pluribus catholicis doctisque viris probantur sed etiam in hac ipsa Urbe principe catholici orbis in praecipuis Athaeneis Pontificiis usu recepta sunt.

2. Ad systemata Ista alia scholarum catholicarum Improbanda merito proferri nequaquam posse litteras a Summo Pontifice datas ad Eminentissimum Card. Archiepiscopum Coloniensem, vel ad Reverendissimum Episcopum Vratislaviensem, aliave Ecclesiae decreta et definitiones; ea namque documenta pertinent tantummodo ad docendam « unitatem substantialem humanae naturae » quae duabus constat substantiis partialibus, corpore nempe et anima rationali, adeoque haec eadem documenta spectant ad doctrinam theologiam dum eae controversiae, quae non ita pridem resuscitatae sunt et a viro erudito [unus, scilicet, ex Doctoribus in Universitate catholica Insulensis] in suis ad Summum Pontificem litteris commemorantur, doctrinas mere philosophicas respiciunt, super quibus catholicae scholae diversas sententias sequuntur ac sequi possunt; quoniam suprema Ecclesia auctoritas numquam pro altera iudicium tulit, quod alteram excluderet. (*Litterae iussu Sanctissimi Patris Pii Papae IX datae ad D. Eduardum Hautcoeur, Praesulem Domesticum Sanctissimi D. N. Pii Papae IX, Rectorem Universitatis Catholicae Insulensis*, 5 iunii 1877 [ASS 10 (1877-1878), pp. 257-259 (p. 258)]).

nelle.¹⁵ Même si cette position semble assez généralement abandonnée aujourd'hui,¹⁶ elle n'a jamais été, que je sache, objet d'aucune censure. On pourrait alors se demander s'il ne serait pas possible de considérer la mort, au moins dans les cas de « mort cérébrale », comme le processus symétrique de celui que saint Thomas voyait dans la génération: « départ » de l'âme rationnelle¹⁷ qui se verrait remplacée par une âme sensitive, puis par une âme végétative. Le patient arrivé à ce stade n'aurait, par conséquent, plus droit, *stricto sensu*, au nom d'homme et l'on peut donc penser qu'on serait alors autorisé à le tuer ou à le mutiler. Cette hypothèse est la seule, me semble-t-il, qui permettrait de légitimer, du point de vue de la foi catholique, la transplantation à partir d'un donneur en état de « mort cérébrale ».

On doit toutefois souligner que tant que cette hypothèse reste telle, on doit appliquer à son égard les règles du tutorisme, comme le fait l'Église elle-même, qui refuse que l'on donne les sacrements aux morts, mais qui demande que l'on donne le sacrement des malades à ceux qui n'apparaissent plus conscients.¹⁸

Il est inutile de s'arrêter longtemps à montrer le caractère extrêmement curieux de ce document. Non seulement le Pape, qui avait signé lui-même les lettres à l'archevêque de Cologne, à l'évêque de Bratislava et au docteur Travaglini, fait écrire cette lettre interprétative par un prélat relativement subalterne, mais surtout le texte lui-même montre l'embarras où l'on se trouve, puisqu'il réaffirme cela même qu'il prétend relativiser, c'est-à-dire l'unicité de l'âme rationnelle (« [...] humanae naturae quae *duabus constat substantiis particularibus, corpore nempe et anima rationalis* »). La distinction qui est faite ensuite entre théologie et philosophie est particulièrement maladroite et contraire à ce que maintes fois le même pape a enseigné (entre autres, dans sa lettre au docteur Travaglini!). La conclusion à tirer de tout cela est, me semble-t-il, la suivante: le Pape est bien convaincu que la doctrine de l'unicité de l'âme est partie du dépôt de la foi (puisqu'il qualifie sa négation par la note « error in fide » [DS 2833, cf. supra]); il ne veut cependant pas imposer cette doctrine.

Le premier Concile du Vatican (DS 3002) reprend l'enseignement du quatrième Concile du Latran (1215) selon lequel Dieu a créé « humanam [sc. creaturam], quasi communem ex spiritu et corpore constitutam » (DS 800). Le second Concile du Vatican se borne à enseigner que l'homme est « corpore et anima unus », doté d'une âme spirituelle et immortelle (*Gaudium et spes* 14).

¹⁵ « [...] anima praeexistit in embryone a principio quidem nutritiva, postmodum autem sensitiva, et tandem intellectiva » (I^e, q. 118, a. 2, ad 2^m).

¹⁶ Le motif qu'en donnait saint Thomas est celui-ci, emprunté à Aristote: « anima est actus corporis organici » (2 CG 89 [cf. ARISTOTE, 2 *De anima* 1, 6 (412b)]). « Non est igitur ante organizationem corporis » (*ibid.*): tant que le corps n'est pas organisé de façon à pouvoir penser, il n'y a pas d'âme rationnelle. Ceux qui encore aujourd'hui soutiennent cette opinion le font, en général, parce qu'il y voit la seule façon de rendre compte du cas des jumeaux homozygotes.

¹⁷ Lequel « départ » serait manifesté par la cessation du fonctionnement de l'organe propre de l'intelligence: le cerveau.

¹⁸ « Infirmis qui, cum suae mentis compotes essent, hoc sacramentum [sc. unctio infirmorum] implicite saltem petierint, conferatur » (Can. 1006).

De tout ce que nous venons de dire il ressort donc, me semble-t-il, que la seule chose qui pourrait rendre la transplantation à partir de donneurs en état de « mort cérébrale » réalisable *tuta conscientia*, serait que l'on prouve que le corps des patients en question n'est plus en rien un corps « organisé »: une telle éventualité paraît bien peu probable, puisque les médecins eux-mêmes parlent à son endroit de « vie végétative »; or une vie végétative est toujours une vie...

Ces propos que je viens de tenir pourront sembler à beaucoup bien décevants. Il m'apparaît cependant que ce sont ceux que la fidélité à l'enseignement de l'Église oblige à tenir. *Salvo meliore iudicio.*

CATHOLIC DOCTRINE ON DEATH

JOHN M. McDERMOTT, S.J.

In the Catholic dogmatic tradition death is much more than a mere cessation of biological functions. So Fr. Ols and I were asked to indicate some of the wider implications of death that Catholic teaching involves. Between us we divided the matter into various points that seem in one way or another relevant to the present discussion about brain death. Father Ols has clearly explained the difference between dogmatic and moral theology and defined the Catholic understanding of man in terms of the unity of soul and body. He defended and justified the traditional Thomistic understanding of the body-soul unity. There are, however, other legitimate ways of interpreting that relationship, and before launching out to explore other problems, I would add a few words about my own position, which follows somewhat the lead of St. Maximus the Confessor and differs a bit from the Thomistic position. Surely man constitutes a body-soul unity, but one of subordinate parts, which can be recognized in turn as relative wholes. For on many levels a duality is preserved in a higher synthetic unity. The over-all formal unity does not destroy the subordinate duality but preserves it, just as the higher sciences do not deny the results of the lower but employ of them in a wider context. For the vital whole is always greater than the sum of its parts. Such a unity is not static, but represents a dynamic oscillation between individuality and concrete universality.¹ Such a philosophical understanding of man's body-soul unity as a synthesis of subordinate wholes would make it easier to explain the still vital unities that remains after total brain infarction, especially those "live organs", like kidneys,

¹ J. McDERMOTT, S.J., "A New Approach to God's Existence", *The Thomist* 44 (1980), 219-250, slightly revised in "Proof for Existence of God", *The New Dictionary of Theology*, ed. J. Komonchak (Wilmington: Glazier, 1987) 804-808. Maximus notion of higher syntheses preserving lower unities is found in H. VON BALTHASAR, *Kosmische Liturgie*, 2nd ed. (Einsiedeln: Johannes, 1961), pp. 58-62, 150-175. Maximus did not explicitly apply the synthetic whole-subordinate unities schema to the members of the body, but his thought easily allows such application.

that can be employed for organ transplants. This position, however, in no way implies the hypothesis of a temporal succession of forms. The human exits from fertilization with a unique form, or soul, that finds its physical reflection in DNA. There is a finality in the human fetus from the very beginning. And in traditional Catholic thought the soul is what is ultimately responsible not only for the present unity of the body but also for its finality, or teleology. Paradoxically man is the being who becomes what he is.²

If the body-soul synthesis is threatened by death, death involves more than biological demise. Three other perspectives on death are worth while

² The hypothesis of a succession of new forms is scientifically inconclusive and philosophically indefensible. On the one hand there can be no scientific proof for a progression from vegetal to animal to human forms, or souls; for there is not possible way of measuring quantitatively what is basically a qualitative unity. Indeed as principle of life and unity the soul constitutes the unity that is more than the sum, or conglomeration, of material parts. The simple comparison between a live dog and one just dead reveals that both have the same material parts. "The spiritual bond is lacking", as Goethe's Faust said. Hence the soul as such cannot be reduced to a measurable part. On the other hand, the necessary philosophical correspondence between final and formal causes demands that the human soul be present from fertilization. For a form supplies a nature with its principle of activity, unifying and informing ever more the matter to which it is united. Implied in this natural activity of unification, therefore, is a goal, or end. Inversely, a final cause, or goal, causes by way of attraction, and as the reality attracted approaches ever more closely its goal, it is ever more assimilated to its goal. Even to exercise an initial attraction the goal presupposes or creates a similarity, however incipient, between itself and the reality attracted. Hence to speak of a progression of forms as introduced into a living being form without is philosophical nonsense—the new forms would involve a destruction of the old nature and the creation of a new nature. Yet to imagine one form as educed from another by immanent development is to grant our presupposition, viz., that the human form is already present from the beginning, even if not experientially manifest, to guide the whole process. (Cf. also von Balthasar, pp. 172f. Any alleged cases of "twinning" after fertilization do not argue to the contrary. Twinning is observed by scientists at a certain temporal point; to say, however, that the twinning just occurred at that delayed instant is to posit a *creatio ex nihilo* which does not accord very well with scientific methodology. If what happens does not have a proximate cause, science's explanations are invalid. Hence, for science the twinning must have a previous cause; otherwise it would not occur. The fact that science has not—and maybe, due to the limitations of finite knowing, cannot—identified that cause does not allow anyone to affirm that a true novelty has occurred with twinning. Insofar as an egg that will twin is different from an egg that will not twin, the previous egg must contain an inherent principle of substantial division and therefore two forms).

The same unity of soul and body and the same correspondence between final and formal causes does not apply in instances of decomposition, the breaking down of the formal unity assured by the highest form. Then the parts—which even as parts imply some subsidiary unity, however transient—may preserve some vital functions less than human.

In difficult cases of children born without a full brain, the material conditions may prevent the human form from expressing itself in explicitly rational activity. But this lack of expression in no way implies the absence of human form nor of a human person. Neither soul nor free act *qua* free are measurable. Instead the principle that what is born of a species is of the same species must be maintained; this principle is already in the linguistic derivation of the word nature (*natura* from *natus*: having been born, as φύσις from φέσθαι) and was applied theologically against Arianism to argue to

studying: its relation to sin, the meaning of the resurrection, and the relation of death and freedom. Since the first perspective is most fundamental and most developed in the Catholic tradition, we shall first attend to it carefully in some detail before moving on to the other perspectives.

A. DEATH AND SIN

a) *Scripture*

In the Jewish-Christian tradition the link between death and sin is clear from the second and third chapters of Genesis. Death is the punishment promised and delivered for the disobedience of Adam and Eve in Paradise. St. Paul, of course, developed this theme, contrasting the first Adam, whose sin brought death to all, with Christ, the second Adam, whose death and resurrection bestow a superabundance of grace, life, and righteousness to all believers.

Therefore as sin came into the world through one man and death through sin, and so death spread to all men in that all wen sinned... If because of one man's trespass, death reigned through that one man, much more will those who receive the abundance of grace and the free gift of righteousness reign in life through the one man Jesus Christ". (*Rom* 5:12, 17; cf. 5:12-21; 7:5, 8-24; *1 Cor* 15:20-28, 42-57).

So also in St. John's Gospel Jesus called the devil "a murderer from the beginning" as well as "a liar and the father of lies" (8:44), phrases which obviously refer to the Genesis story. Finally all the New Testament texts about the necessity of baptism for salvation, which involve a dying to sin and a rebirth to justification that results in adoptive sonship through the Spirit, argue likewise that sin causes spiritual death (*Mk* 16:15f.; *Jn* 3:3-8; *Acts* 2:38; 16:30-33; *Rom* 6:8-11; *Gal* 3:26-4:7; *Col* 2:12; *Tit* 3:4-7).³

The very juxtaposition of those texts must raise further questions. Do they refer to the death of the body or the death of the soul? Surely the latter series of texts seem to refer to spiritual rebirth rather than physical death and resurrection. Then there is a second question intimately linked to the previous. Is death natural to man or contrary to his nature? On the first question Genesis seems to refer in the first place to corporeal death, though sin also

the Son's consubstantiality, or "connaturality", with the Father precisely because the Son was born of or engendered by the Father. (Cf. J. McDERMOTT, S.J., "Hilary of Poitiers: The Infinite Nature of God", *Vigiliae Christianae* 27 (1973), 172-202.)

³ Cf. A.-M. DUBARLE, O.P., *Le Pêché originel dans l'écriture* (Paris: Cerf: 1958), pp. 105-119, for further "suggestions" of original sin in the Gospels.

placed man in a state of enmity with God. For not only were Adam and Eve expelled from Paradise, they also had to suffer the condemnation to the pains of childbearing, the wife's submission to her husband, and the laborious toil for food (3:16-19, 22-24). In St. Paul's texts both deaths, corporeal and spiritual, are not adequately distinguished, but both seem to be intended. Indeed the contrast of death with grace and righteousness is only intensified in 5:18: "As one man's trespass led to condemnation for all men, so one man's act of righteousness leads to acquittal and life for all men". The link of that verse to the preceding verses led C. H. GIBLIN to conclude, "The condemnation suffered by all as the result of Adam's sin was death — not only in the physical sense — but in the sense in which it has been offset by the effective verdict granting life".⁴

The second question is much more complex. Often in the Bible it seems that mortality is man's normal lot and is to be accepted docilely as such (*Jos* 23:14; 2 *Sam* 14:14; 1 *Kings* 2:2; *Ps* 90:10; 103:15f; *Sir* 14:11-19; 41:3f; *Wis* 7:1; 9:15). At other times death weighs heavily upon him and is traced to sin, an interpretative tendency that grew ever stronger in the later Jewish tradition (*Ps* 39; *Ecc* 2:15-17; 3:19-21; 11:7-12:8; *Gen* 3; *Sir* 25:24).⁵ This later Jewish tradition was nourished upon the lost Paradise account of *Gen* 2-3. Although this account long went unnoticed or at least uncommented upon in the previous Jewish tradition, both *Ecc* 25:24 and *Wis* 10:1f.; 7:1 showed a clear dependence upon it. Indeed the vast majority of so-called "intertestamental writings", both canonical and noncanonical, reflected the belief that the first

⁴ C.H. GIBLIN, S.J., *In Hope of God's Glory* (New York: Herder and Herder, 1970), pp. 376, 370-373, 375f.; C. H. DODD, *The Epistle of Paul to the Romans* (1959; rpt. London: Collins, 1959), pp. 101f.; 5. LYONNET, *De Peccato Originali* (Romae: P.L.B., 1960), pp. 72-84; O. KUSS, *Der Römerbrief* (Regensburg: Pustet, 1957), I, pp. 228, 231, 237, 249-254; Dubarle, pp. 150-158 (referring to I Cor. 15 and citing other authors of the same opinion). Protestant authors in the Continental tradition generally ignore the question about the distinction between spiritual and corporeal death. Since they have no concern with the natural man except insofar as he is the real man under sin, they tend to see death simply as the result and manifestation of sin. Cf. O. MICHEL, *Der Brief an die Römer*, 4th ed. (Göttingen: Vandenhoeck & Ruprecht, 1963), pp. 137-147; K. BARTH, *The Epistle to the Romans*, tr. E. Hoskyns (rpt.; London: Oxford U., 1968) pp. 169f.; E. KÄSEMANN, *An die Römer*, — 2nd ed. (Tübingen: Mohr, 1974), pp. 131-149; R. BULTMANN, "Θάνατος", *Theologisches Wörterbuch zum Neuen Testament* [henceforth: *TWNT*], ed. G. KITTEL, III (Stuttgart: Kohlhammer, 1938), 14-16.

⁵ Cf. Dubarle, pp. 10-14, 154f.; E. SCHMITT, "Death", *Sacramentum Verbi*, ed. J. Bauer (New York: Herder and Herder, 1970), p. 181f.; P. HOFFMANN, "Tod", *Handbuch Theologischer Grundbegriffe*, ed. H. Fries, II (München: Kosel, 1963), 662f. The Protestant close linking of death and sin even affected G. von Rad, "ζάω", *TWNT*, II, 848f.: never was death seen as a natural or normal event.

parents of humanity “had immortality as their lot” and lost it by their sin.⁶ Against such a background the Book of Wisdom, composed probably in the latter half of the first century B.C., enunciated this judgment upon man’s fate:

God created man for incorruption and made him in the image of His own eternity, but through the devil’s envy death entered the world, and those who belong to his part experience it (2:23f.; cf. also 1:13f).

At first glance it appears that Wisdom is interpreting Genesis 3 in terms of a lost immortality. S. Lyonnet easily referred the term “incorruption” of Wis. 2:23 to “the privilege of corporeal immortality conceded to Adam according to the common Jewish interpretation of Genesis 2-3”.⁷ Similarly A.-M. Dubarle wrote at greater length:

Incorruptibility or rather the destination for it would be man’s distinctive characteristic in relation to the other earthly creatures and the result of his dignity as image of God, if one considers that the parallel [half-]verses of v. 23 explain each other. That incorruptibility would appear not as a gift possessed from the beginning and lost by sin but as a possibility always open or, still better, as a possession already begun, yet precarious, which the observation of the laws affirms.⁸

That interpretation, however, need not be exclusive nor compelling. For Wisdom certainly did not limit man’s life to this earth; indeed the strongest affirmation of human immortality followed immediately after the two verses cited above:

But the souls of the righteous are in the hand of God, and no torment will ever touch them. In the eyes of the foolish they seemed to have died, and their departure was thought to be an affliction, and their going from us to be their destruction; but they are at peace. For though in the sight of men they were punished, their hope is full of immortality (3:1-4; cf. 5:15).

The immortality apparently lost by Adam’s sin is now given to the just man. Hence the “incorruption” of Wis. 2:23 might very well refer to a spiri-

⁶ J.-B. FREY, “L’Etat Originel et la Chute de l’Homme D’après les conceptions juives au temps de J.-C.”, *Revue des Sciences Philosophiques et Théologiques* 5 (1911), 541; cf. also 510, 522-524, 526, 535, 542; A. GAUDEL, “Perché originel”, *Dictionnaire de Théologie Catholique*, ed. A. Vacant et alii, 12/1 (Paris: Letouzey, 1933), 288-305; Michel, p. 147; R. BULTMANN, ζάω, *TWNT*, II (1935), 857f. Cf. P. BILLERBECK, *Kommentar zum Neuen Testament*, III (München: Beck 1954), pp. 227-229, for the later rabbinic tradition which ambivalently saw death as the result of our first parents’ sin and/or of our personal sins.

⁷ Lyonnet, p. 89. In pp. 84-95 Lyonnet was concerned to show that Paul might have been influenced by Wis. 2:23 in understanding death as both a spiritual and a corporeal reality.

⁸ Dubarle, p. 88. Dubarle translated as “incorruptibility” what the RSV translates as “incorruption”. He also preferred the alternate reading “nature” to “eternity” in text of Wis. 2:23: ἰσιότης instead of ἀϊσιότης—a difference of just one letter.

tual death, what the Apocalypse will call “the second death” (2:11; 21:8), the loss, due to sin, of a felicitous life after physical death. That spiritual death the devil’s party experiences (*Wis* 2:24). Given the whole contrast in Wisdom between malicious sinners and those following God’s will in a universe where “righteousness is immortal”, (1:15) many exegetes favored the spiritual death interpretation. Nonetheless, the awareness of Adam’s sin, manifested by the author of Wisdom, argues that he knew of that sin’s consequence, physical death, which had since become the general fate of all (7:1; 1:13f.). Most probably the “death” intended in Wisdom embraces both spiritual and corporeal destruction, and, by contrast, “incorruption” intends physical, earthly life and its continuation or transference beyond the grave to closer union with God.⁹

The late Jewish interpretation of Genesis 2-3 in terms of a special privilege of immortality probably correctly interpreted the original text. The author of Genesis 2-3 surely betrayed no inkling of a life after death, but he well reflected the double aspect of death as what is natural to man and as what should not happen to him according to God’s primordial plan. For man was formed originally from the dust of the earth, and it is to the same dust that he was later condemned to return (2:7; 3:19; cf. also *Sir* 40:1; *Wis* 7:1; 15:8). Moreover, Adam and Eve had to eat of the tree of life to preserve their life; indeed death was only to follow their expulsion from Paradise. For God did not want man to “put forth his hand and take also of the tree of life, and eat, and live for ever.” (2:9; 3:22) Finally, God’s spirit, or breath of life, that was given to Adam is found thereafter in his mortal descendants (6:3; 7:22; cf. also *Pis* 104:29f.); hence the breath, or spirit, does not of itself guarantee a permanent possession of immortality. Of himself therefore, a composition of dust and spirit, man has no claim to the corporeal immortality which God freely bestowed on him. W. Gossens represents the opinion of many others in wri-

⁹ Frey, 517-520 (with other references); Gaudel, 290f. Dubarle, p. 88, exaggerates perhaps the alleged lack of reference to a corporeal resurrection in Wisdom aside from 16:12-14. For the just will enjoy “the time of their visitation” as they govern nations under the Lord’s dominion (3:7f.) and sinners will see the just man who died and tremble with fear before him (4:16-5:15)—this vision apparently allows for a corporeal resurrection. Thus the author of Wisdom would not stand in contradiction with the belief in corporeal resurrection so strongly held in late Palestinian Judaism (e.g., *Dan* 12:1f.; *2 Mac* 7:9, 11, 14, 23, 29; 12:43-45; 14:46) and presupposed as a widely held Pharisaic belief in the Gospels (*Mk* 12:18-27; *Acts* 26:6-10; *Jn* 11:21-27; etc.). Cf. J. RADEMAKERS-P. GRELOT, “Resurrection”, *Vocabulaire de Théologie Biblique*, ed. X. Leon-Dufour et alii (Paris: Cerf, 1964), 911-919; M. HENGEL, *Judaism and Hellenism*, tr. J. Bowden (Philadelphia: Fortress, 1974), I, pp. 196-202; J. MCDERMOTT, S.J., *The Bible on Human Suffering* (Middlegreen: St. Paul, 1990), pp. 65-69.

ting, “*Gen 3:19* presents death simultaneously as the consequence of man’s constitution and as a punishment inflicted for his disobedience”.¹⁰

b) *Tradition*

If Scripture leaves us with a certain ambiguity about death, whether it is natural or the punishment for sin, it should hardly be surprising that a similar ambivalence should turn up in the Church’s tradition. The first important official pronouncement on the subject was hammered out under St. Augustine’s urgings at the Council of Carthage in 418 A.D. against the Pelagians. This provincial Council first anathematized anyone who held that “Adam, the first man, was created mortal, so that, whether he sinned or not, he would have died, and thus his exit from the body would not have been the wages of sin but a natural necessity” (DS 222).

Then the Council went on to link the “death” of *Rom 5:12* to the original sin of Adam, “in whom all sinned” (DS 223). More than one hundred years later, in 529 A.D., Caesarius of Arles gathered a group of thirteen bishops and eight illustrious laymen into the Second Council of Orange to refute Semi-Pelagian errors. This provincial Council condemned in its first canon (DS 371) anyone who maintained that Adam’s sin did not affect men for the worse in body and soul. While it is not clear against whom this canon was directed—even the Semi-pelagians admitted a weakening of man in body and soul as a result of Adam’s sin—the second canon clearly intended to hit the doctrine of Faustus of Riez, a leading spokesman for Semi-pelagianism in southern France:¹¹

If anyone asserts that Adam’s transgression injured him alone and not his offspring or that only the death of the body, which is the penalty of sin, but not also sin, which is the death of the soul, has passed into the whole human race through one man, he attributes injustice to God and contradicts the Apostle who says: “Through one man sin entered into the world and through sin death, and thus it has passed over into all men as in him (*in quo*) all sinned” (DS 372).

¹⁰ W. GOOSSENS, “L’immortalité corporelle dan les récits de Gen., II, 4b-III”, *Ephemerides Theologicae Lovanienses* 12 (1935), 735; Dubarle, pp. 68f.; W. VOLLBORN, “Das Problem des Todes in Genesis 2 und 3”, *Theologische Literaturzeitung* 77 (1952), 709-714; A. CHAZELLE, “Mortalité ou immortalité corporelle du premier homme créé par Dieu?” *Nouvelle Revue Théologique* 89 (1967), 1043-1068 (though he interprets “breath” as “immortality of life”, Chazelle admits that God can take it away and that death is both natural and a punishment for sin).

¹¹ J. GROSS, *Entwicklungsgeschichte des Erbsündendogmas* (München: Reinhard, 1963), p. 90.

A. Vanneste remarked that already the point of the canon was directed not against anyone denying that death came from Adam—that denial was not maintained by the Semi-Pelagians—but to those denying the transmission of Adam's sin to the whole race.¹²

What dogmatic weight these councils of Carthage and Orange actually bear is a moot question. Despite all of St. Augustine's efforts, it does not seem that Pope Zosimus actually approved all the decisions of the Council of Carthage. His letter in response to the Council has been lost and Augustine's use of it was vague.¹³ Moreover, the Council of Orange was never accepted by the Pope as binding. Even J. Gross admitted that Boniface II approved only the Council's final confession and not its canons. Furthermore, it was entirely forgotten from the ninth century until the sixteenth century. Only with its publication by P. Crabbe in a collection of conciliar canons in 1538 was it generally cited by theologians—just in time for the Council of Trent's decree on original sin in 1546.¹⁴

The Council of Trent was summoned to meet the Protestant threat to the unity of faith by simultaneously reforming morals and defining dogma. Not perchance the first major dogmatic treatment focused on original sin, a fundamental issue dividing Catholic and Protestants. Perhaps in its desire to refute the charge of Pelagianism leveled against Church practice and teaching by the Protestants or at least in order to lay the foundations for the fifth canon which directly contradicted the Lutheran position the Council took up again the canons of Orange II.¹⁵ Naturally the Council Fathers in their decrees touched upon the relation between death and original sin. Precisely because the Coun-

¹² A. VANNESTE, "Le Décret de Trente sur le péché originel", *Nouvelle Revue Théologique* 87 (1965), 697-699; Gross, pp. 65, 90.

¹³ F. FLOËRI, "Le Pape Zosime et la doctrine augustinienne du péché originel", *Augustinus Magister*, ed. E. Cayré (Paris: Etudes Augustiniennes, 1954), II, pp. 755-761; III, pp. 261-263; P.-M. DE CONTENSON, O.P., "Bulletin de Théologie Morale", *Revue des Sciences Philosophiques et Théologiques* 39 (1955), 58f.; A.-M. DUBARLE, O.P., *The Biblical Doctrine of Original Sin*, tr. E. Steward (London: Chapman, 1964), pp. 234f. (this is the English translation of *Le Péché originel* with a final chapter added, to which we here refer); W. REWAK, "Adam, Immortality, and Human Death", *Sciences Ecclésiastiques* 19 (1967), 72f., 78; cf. also A. Schönmetzer's introduction to DS 222-230. Others are a bit more cautious about what Pope Zosimus did or did not approve: cf. H. RONDET, S.J., *Original Sin: the Patristic and Theological Background*, tr. C. Finegan (Staten Island: Alba, 1972), p. 132; L. SCHEFFCZYK, *Urstand, Fall und Erbsünde: Von der Schrift bis Augustinus* (Freiburg: Herder, 1981), pp. 233f.

¹⁴ Gross, pp. 89, 94.

¹⁵ H. JEDIN, *Die Geschichte des Konzils von Trient, II* (Freiburg: Herder, 1957), pp. 113f., 120f., 135; Vanneste, 691f., 719; H. Köster, *Urstand, Fall und Erbsünde: Von der Reformation bis zur Gegenwart* (Freiburg: Herder, 1989), p. 54; Z. AIszeghy, S.J.-M. Flick, S.J., "Il Decreto Tridentino sul peccato originale", *Gregorianum* 52 (1971), 621f., 633.

cil did not want to decide disputed questions among Catholic theologians, of which the definition about original sin's essence gave rise to a wide variety of opinions, the Fathers of Trent decided upon a descriptive and historical approach to the problem. To understand what Adam's sin effected, it was necessary to have some idea about his state before the fall.¹⁶ This ecumenical Council defined that Adam's transgression resulted in "the anger and wrath of God and consequently the death with which God had previously threatened him, and with death, slavery under the power of him who henceforth 'possessed the reign of death' [*Heb 2:14*], i.e., the devil" as well as in deterioration of his whole state, "according to body and soul." (DS 1511). In the first draft of this canon had stood the phrase "the anger and wrath of God from which death followed". The final, approved version did not so clearly distinguish death as corporeal death from God's anger and wrath. Surely a similar change in the second canon let it appear that the fact of physical death, through presupposed, was not defined. The final version read:

"If anyone maintains that Adam's violation of duty harmed himself alone and not his offspring", that the righteousness and holiness received from God, which he lost, he lost for himself alone and not also for us; or that, being himself tainted by the sin of disobedience, "he only transmitted to the entire human race death" and punishments "of the body but not also sin, which is the death of the soul" let him be anathema (DS 1512). *Rom 5:12* was then cited to establish the Scriptural foundation of the doctrine.¹⁷ An in the previous canon the borrowing from Orange II, here indicated by the quotation marks, is obvious. But more interesting for us is the change made in the final draft from the original draft, which read: "sin, to which are owed as a penalty both deaths, of body obviously and of soul (*utraque mors, corporis videlicet et animae*)". The ensuing shift of emphasis let the point of the condemnation be directed against those denying the death of the soul. Hence some recent theologians have held that in all strictness a Catholic is only bound to hold that the death of the soul, not necessarily of the body, is due to Adam's sin. Just as the

¹⁶ Vanneste, 707f.; Alszeghy-Flick, 622.

¹⁷ Against the usual interpretation (e.g., Rondet, p. 174) that identifies the targets of this canon as Pighius, Erasmus, and Zwingli, Alszeghy-Flick, 615f., have convincingly argued to exclude the latter two. Since Pighius was a leading defender of the Catholic position in responding to Luther it hardly seems likely that the Council would have gone out of its way to direct an anathematization against him alone. Though on this point his doctrine contradicted the Council's and was mentioned in the prepared list of errors (cf. Vanneste, 720-722), this strong defender of papal infallibility was not a formal, obstinate heretic. He had already died piously in the Church in 1542 without leaving any heretical sect as his heritage. The reason for the canon, therefore, lies most probably in the defense of the Catholic position against the accusation of Pelagianism and the preparation for the condemnation of Luther's position in canon 5.

Council Fathers presupposed Adam's historical existence without defining it, so also corporeal death seemed so obviously to be the result of Adam's sin in the accepted *Weltanschauung* of Pelagians, Semi-Pelagians, Protestants, and Catholics that it was not explicitly defined.¹⁸

Whatever be the final results of historical investigation, a type of research not only legitimate but also necessary to understand, defend, and explain the fullness of Catholic faith, which is necessarily historical and bound to historical witnesses, one must also remember that explicit definitions do not constitute the sole truth of the Catholic tradition. Indeed, the fact of Jesus' life, death, and resurrection as well as the preaching tradition antedated the composition of Scripture and all magisterial definitions. Usually definitions resulted when a part of the tradition, oral or written, was denied or put into question. If any teachings have kept on reappearing regularly in the writings of Church Fathers and the great theologians, a good presupposition in favor of their truth should be allowed and encouraged until other evidence argues convincingly to the contrary.¹⁹ Surely the witness of Scripture and the constant tradition of the Church seem to have considered the death of the body also somehow due to original sin. In the declarations of Trent and Orange heretics and orthodox Council Fathers seemingly shared the idea that the death of the body was due to Adam's sin; hence there was no need to define it. Finally we should also note that in 1567 Pius V condemned the proposition of Michael Baius that the immortality of the first man was not a free gift of grace but man's natural condition (DS 1978). Similarly in 1794 Pius VI condemned the thesis of the Jansenist Synod of Pistoia that death was not the natural condition of man but the just penalty of an original fault (DS 2617).

These later papal decisions might at first seem to be at odds with the

¹⁸ Dubarl *Biblical Concept*, pp. 235f.; de Contenson, 58f.; Rewark, 73. Alszegey-Flick, 620f., however, surmise that the reason for the change was the wish to avoid the possible impression from the first draft that the "death of the soul" was a punishment inflicted by God for sins as bodily death was. For the arguments against the obligation of believing in a single, historical "Adam" cf. Van-neste, 714-717; Alszegey-Flick, 603, 623-635; K. RAHNER, S.J., "Theologisches zum Monogenismus", *Schriften zur Theologie* (Einsiedeln: Benziger, 1954-), I, esp. 255-293; "Die Sünde Adams", *Schriften*, IX, 259-275; "Erbstünde und Monogenismus", in K.H. WEGER, S.J., *Theologie der Erbsünde* (Freiburg: Herder, 1970), 176-223.

¹⁹ Admittedly it is often difficult to say what constitutes a persuasive argument. The case of Adam's historical existence provides a good case in point. Recent theologians, basing themselves on the discoveries and the resulting theories of paleontologists as well as on the literary genre of Gen. 1-3, had backed away from monogenism to allow for polygenism at mankind's origin (cf. previous note). Yet recent finds from analyses of DNA allow biologists to postulate mankind's descent from an single, original group, or tribe; which might just as easily be reduced to a single couple. The question of literary genre is more complex, for the question of historicity enters into the very evaluation of the genre.

Council of Carthage. But a careful reading and appropriate distinctions can balance the apparently conflicting statements. One might hold with Carthage that man would not have died by a necessity of nature, even if he had not sinned, because God's praeternatural gift of immortality would have prevented death. Such a distinction of a "praeternatural gift", long recognized in Scholastic theology, permits one to say with Pius V and Pius VI that man by nature is mortal. But certainly a change of emphasis had occurred between Carthage and Pius V. That change of emphasis, however, does not mean that one has to choose between contradictory positions. The same ambiguity in man was recognized by St. Augustine and St. Thomas, the great theologians who dominated their own and subsequent times. For Augustine, the paramount champion of grace in the Pelagian controversies, in Paradise man was seen to be at least, in the words of a commentator, "virtually immortal".²⁰ This phrase probably intends Augustine's famous distinction of Adam's immortality as the capacity not to die (*posse non mori*), not the incapacity to die (*non posse mori*). For in one sense man is mortal, in another sense immortal.

It is one thing not to be able to die, as God created some natures immortal; to be able not to die, however, is another thing, and the first man was created immortal in this way, because it was granted to him from the tree of life, not from natural constitution. Since he sinned, he was separated from that tree so that he might be able to die; he it was who, had he not sinned, was able not to die. He was therefore mortal by the condition of a living body, but immortal by the kindness of the Creator.²¹

So sin brought death, and death was henceforth interpreted as something threatening, even unnatural to man, who fights against it to his last breath, but in vain; for by his natural constitution sin has power over him apart from Christ. For St. Thomas man, composed of body and soul, was naturally corruptible: "Death is both natural on account of the condition of matter and penal because of the loss of the divine favor preserving man from death" (*S.T.* II-II, q. 164, a. 1, ad 1). Yet in the same response the Angelic Doctor acknowledged that because of man's form, i.e., "his rational soul, which is immortal..., death is not natural to man". Paradoxically man naturally longs for immortality. Because of man's soul, "which is proportional, according to its incorruptibility, to his end, which is perpetual felicity... nature would rather choose [for man] an incorruptible matter, if it were possible." (*S.T.* I-II, q. 85, a. 6) As H. Rondet wrote, "What is *natural* to an animal organism be-

²⁰ Rondet, p. 120.

²¹ AUGUSTINE, *De Genesi ad litteram*, VI, 25, PL 34, 354; cf. also *Opus Imperfectum contra Julianum*, VI, 30; PL 45, 1580; *De Peccatorum meritis et remissione*, I, 1-8; PL 44, 109-114.

comes *unnatural* for a soul made in the image of God. When one knows what an immortal soul is, one would postulate that only an incorruptible body would be worthy of it".²²

c) *Speculation*

The preceding survey of Scripture and Church teaching has apparently disclosed a ambivalent, if not paradoxical and even contradictory understanding of death. Simultaneously it was considered natural and the result of a sin that ought not have been. Moreover human immortality was first imagined in terms of continued life with a body and then as the perpetuation of a soul apart from the body, as if man were not a body-soul composite. How can one justify such tensions in a doctrine that claims to be divinely revealed?

Three answers may be given to that last question. First, the Catholic position accords very well with man's lived experience. All the corporeal, living creatures which man sees around him go "the way to dusty death". How man expect his fate to be different? Whatever is composed of parts cannot assure its own unity since parts stand in tension; matter is subject to change and corruption, the wearing away by time's rubbing as well as its unforeseen catastrophes. Nonetheless, man does feel death to be an intrusion, an insult, a defeat inflicted upon his consciousness and sense of proper dignity; he is reduced to a level beneath himself, being equated not only with dumb beasts but also with the silent dust underneath his feet.

Death should not be! So men protest against it. Yet man's outraged protested self-exaltation can be turned topsy-turvy in a moment. Hamlet caught the sense of ambiguity in human life, shot through with the nothingness of death, when he declaimed:

What a piece of work is man! How noble in reason! How infinite in faculties! In form and moving, how express and admirable! In action, how like an angel! In appearance, how like a god! The beauty of the world! The paragon of animals! And yet, to me, what is this quintessence of dust? (II, ii) If such is man's ambivalent composition and reaction to himself and death, this lack of rational consistency leads to our next intuition. Second, death is a mystery. It

²² Rondet, pp. 166f.; cf. also J.-H. NICHOLS, O.P., "Misericorde et sévérité de Dieu", *Revue Thomiste* 88 (1988), 183-185; C. JOURNET, *The Meaning of Evil*, tr. M. Barry (New York: Kennedy, 1963), pp. 238-244; J. ALFARO, S.J., "Trascendencia e immanencia de lo sobrenatural", *Gregorianum* 38 (1957), 47f.; L. SCHEFCZYK, "'Unsterblichkeit' bei Thomas von Aquin auf dem Hintergrund der neueren Diskussion", *Sitzungsberichte* 1989 (München: Bayerische Akademie der Wissenschaften, 1989), esp. 27-38.

represents "the undiscovered country from whose bourn no traveler returns". It is the place where all the hopes and fears of mankind meet. It puts into question the meaning of human life because it threatens the whole of life and cannot be integrated as a part into a greater human whole. Humans can find no final perspective from which to judge it; death rather judges them. Even human reason loses its claim to see and judge clearly in the face of death. It is not at all clear whether reason, which is oriented to being, can resist the non-being which death "incorporates". Hence human reason cannot adequately penetrate death and its meaning. This element of final mystery drives us back to acknowledging the mystery in the human life that is oriented to death, the mystery contained in the very composition of body and soul that constitutes the unity of the living man and in its diversity supplies the foundation for death. That leads us to our third answer.

In philosophical terms man represents a paradox to reason and to himself. As a soul-body composition, he is simultaneously a unity and a diversity. Soul and body are different yet are one. That is why man lives with tension.²³ Analysed in terms of form and matter, the more technical equivalents of soul and body, the paradox becomes more imposing. While form represents the principle of intelligibility and universality, matter is equated with the principle of individuality, or diversity, within a species. Precisely because individuality could not be grasped conceptually by human reason, the ancients predicted "infinity" of it. No concept or series of concept, even if extended endlessly, might exhaust the infinity of matter. Man, whose form encompasses a material infinity, is truly a finite infinite. No wonder that man is a mystery to himself; he can never pull himself intellectually clear of his own infinity. As long as he is not fully one with himself and known to himself, he is naturally and paradoxically subject to identity crises. Furthermore, the ancients recognized that the mind is oriented to reality, or being. Were the mind incapable of grasping being, every attempt at thinking should be aborted in its inception. Therefore, if the mind can grasp being, and if it cannot grasp individuality as individuality, the principle of individuality cannot be intelligible, cannot be being. Startling as it seems, the ancients affirmed the existence of non-being, or matter,

²³ This notion of man as a paradox of body and soul is well developed by J. MOURoux, *The Meaning of Man*, tr. A. Downes (1948; rpt. Garden City: Doubleday, 1961) and by P. ROUSSELOT, S.J., in *L'intellectualisme de saint Thomas*, 2nd ed. (Paris: Beauchesne, 1924); cf. J. McDERMOTT, S.J., *Love and Understanding* (Rome: P.U.G., 1983), pp. 15-19, 25-43. Cf. also K. RAHNER, S.J., *Geist in Welt* (Innsbruck: Rauch, 1939), pp. 35-62, who sees man as the combination of being and non-being, knowledge and ignorance, at the basis of metaphysics.

and all great philosophers followed them in that mind-boggling affirmation, even if matter was rebaptized the noumenon by Kant, sensible certitude by Hegel, or existence by Sartre.²⁴ Aristotle also equated matter and form with potency and act at the foundation of his physics and metaphysics, and that equation helps us to understand the mysteriousness of all reality.

Man is the strange mixture of simultaneous being and non-being. The world that man lives in manifests the same ambiguity.²⁵ Materiality permeates it and in modern physics materiality once again is proving itself in its depths impermeable to reason. Individuality cannot be defined further but only pointed to as the "here and now" or the "there and then". If there is any understanding to those words they must be understood in terms of space and time, from a wider perspective. Furthermore potency is the condition of possibility for motion. Now physics studies space, time, and motion as the conditions of possibility for understanding material bodies. In other words, physics studies material reality. Is it then surprising that modern physics should run into conundrums with the infinitely small and the infinitely great? As improbably as Zeno could arrive at the smallest unit in any material reality, which by definition is further divisible, so unlikely is it that Heisenberg's uncertainty principle can isolate and identify the smallest particle of matter. Though Einstein attempted to overcome the conundrums in Newton's infinite universe by having space curve back upon itself and thus in its way be rendered finite and intelligible, he found that his time could not remain continuous—and, given the convertibility of space and time, even his space would apparently demand that gaps or "black holes", whose depth defies measurement, make their appearance. Once again Zeno's paradoxes about the stadium that cannot be crossed and the arrow in flight that remains always at rest, paradoxes which play continuity and discontinuity off against each other in turn, seem to have revived themselves. These problems were to be expected. For when Einstein tackled the conundrums of Newtonian motion by elevating the definable speed of light to his absolute norm of measurement, did he not attempt to absolutize the finite? If space and time are themselves defined by the speed of light, how can they be employed as measurements to define light's speed? Is not this si-

²⁴ Cf. J. MCDERMOTT, S.J., "Zwei Unendlichkeiten bei Thomas von Aquin", *Theologie und Philosophie* 61 (1986), 176-203, for further reflections on this philosophical conundrum.

²⁵ The following reflections are but those of an amateur and are offered merely to stimulate thought. They are also the result of discussions with scientists and philosophers of science as well as of the reading of such books as: A. EINSTEIN-L. INFELD, *The Evolution of Modern Physics* (1938: rpt. New York: Simon and Schuster, 1966); A. EINSTEIN, *Relativity*, tr. R. Lawson (New York: Crown, 1961); W. HEISENBERG, *Physics and Philosophy* (1958; rpt. New York: Harper & Row, 1962); *Philosophic Problems of Nuclear Science*, tr. F. Hays (New York: Pantheon, 1952).

milar to Zeno's paradox about Achilles and the turtle when the speed of one object in motion is made to serve as the measure for another? Are not light and electricity defined in terms of both waves and electrons, or photons, pure relativity and "in-itselfness", continuity and discontinuity? One might go on enumerating the paradoxes of modern science, yet by now the point should have been made that not only man, the body-soul composition, but also the whole material universe is a mystery.

If the material world, which we take for granted, shows such paradoxical traits, it is hardly surprising that Catholic doctrine about death, which is rooted in matter's persistent refusal to be integrated into spirit for philosophy's sake, should exhibit certain paradoxes. But before proceeding to a reconciliation of the Catholic doctrine of death with reason, it is profitable to identify a further problem in the physical science. As it is well known, mathematics is the language of science, and after K. Gödel it is universally recognized that no mathematical system can be simultaneously consistent and complete.²⁶ If it claims to be complete, it must be inconsistent; if consistent, it must be open-ended. There is no axiom that is ultimate, that justifies itself, excluding all further questioning of its validity; only an arbitrary postulation can establish a axiom as absolute, and that arbitrariness introduces a moment of irrationality into the most rigorous, subsequent logical processes. In more universal, philosophical terms that mathematical insight can be translated into the basic hermeneutical problem facing modern philosophy: how can the finite mind ground itself or establish any standards of judgment? If there are no absolute standards, thought dissolves into the flux of feelings and intelligent discourse into shouting matches. The finite mind needs an absolute, but how can the finite so transcend itself as to arrive at an infinite perspective embracing all that is? As Pascal, that great scientist-mathematician-philosopher-mystic, noted long ago, man finds himself in the middle position between the infinitely great and the infinitely small, and both infinities remain mysterious to him.

Man's middle position places him before the question of the meaning of his life and death. Over his body he finds himself placed in relation to the whole material universe. For, paradoxically enough, the same matter which served as principle of individuation and diversity also serves as the link of continuity and union. Pure forms, if not reduced to indistinguishable unity by the lack of a further principle of diversity, would be totally isolated from each

²⁶ These reflections are derived from talks with philosophers of science and E. NAGEL-J. NEWMAN, *Gödel's Proof* (New York: N.Y.U. Press, 1958).

other, each being exactly what it is in itself and nothing more. So matter joins as well as distinguishes incarnated, or “materialized”, forms.²⁷ But this unity of man with the rest of the universe means that the universe enters into man’s very constitution. To understand himself, his own finite infinity, which at first seems infinitely small, he has to go outside himself to the universe and extend himself in the pursuit of the infinitely great. But as he could not grasp the infinitely small, so can he not grasp the infinitely great. He is extended beyond himself. Therefore, if there is going to be any grounding for whatever intelligibility man finds in himself and the world—and there must be some intelligibility or else man would not even think and question in the first place—that intelligibility must be grounded in an intelligence beyond his own, an intelligence which encompasses the infinity of matter. If this world of man’s experience is to be proclaimed intelligible, there must be an infinity of spirituality beyond material infinities. But how can man affirm the existence of a infinite God whose very infinity utterly surpasses the capacity of a finite mind?

At this point man faces the question of life and meaning. He cannot stay within his own mixture of being and non-being and hope for meaning. Is then his “protension”²⁸ oriented to the infinity of matter or the infinity of God, toward ultimate unintelligibility or toward a greater than human intelligibility? Here no purely rational argument can persuade. But man at least can see that the choice in favour of unintelligibility destroys all hope and grounds for achievement as well as human reason itself. So Nietzsche rejected reason to affirm himself ecstatically as superman with his will to power lusting for challenge. But death put an end to Nietzsche’s self-transcendence, and the history of the twentieth century has taught modern man to grow wary of such egoistical self-affirmation. So Heidegger was much more cautious, preferring to see an infinite horizon of being receding constantly before man’s attempt to master and grasp it. Yet because the infinite horizon is infinitely close, it threatens man, being-unto-death, with his own finitude. Only in death, the definitive, can the meaning of an individual’s life be known. Before that consummation he must live in anxiety and, to remain authentic, refuse to commit himself to

²⁷ Such ideas are worked out in Rahner, *ibid.* Cf. J. McDERMOTT, S.J., “Karl Rahner on Two Infinities: God and Matter”, *International Philosophical Quarterly* 28 (1988), 439-457, for the following argument opening up into the possibility of affirming God. Similar arguments are developed by B. LONERGAN, S.J., *Insight* (1958; rpt. New York: Harper & Row, 1978), pp. 271-529, 634-686, and P. ROUSSELOT, S.J., “Métaphysique thomiste et critique de la connaissance”, *Revue Néoscholastique de Philosophie* 17 (1910), 476-509; cf. McDERMOTT, *Love*, pp. 121-139.

²⁸ The kind reader is requested to grant us this neologism, hacked from the Latin *protendere*: to stretch forward or out. It attempts to convey the notion of tension even while preserving the basic meaning of tending towards, or transcending.

any final meaning in life. But for most people who have to make decisions based on reason death is too late to learn the reason for living. What traveler returns from the grave? After the debacle of World War II Heidegger's pupil, Sartre, apparently grew tired of waiting for an answer and bearing the burden of anxiety in ambiguity. Life had to be lived and decisions made. If no answer to life is possible in life, life must be absurd. Consequently he proclaimed the priority of non-being over being, existence over essence. Neither Sartre nor many of his existentialist fellow travelers needed much encouragement to illustrate and prove their thesis by pointing to "the heart-ache and the thousand natural shocks that flesh is heir to", the failures and frustrations of life that ebb into death. Surely failures and frustrations presupposed hopes grounded in some positive experience. But did these hopes serve only as the ever-receding carrot placed on a stick before the jackass to make it run until ultimately it grows weary of the chase and drops in its tracks? Is hope but the illusion necessary for frustration?

At this point only the Christian message can illuminate mankind's fate. Salvation cannot be attained by a reason of merely technical analysis much less by a reason of Gnostic pretensions. God created the world out of love for love, for God is tri-personal Love, the source and goal of all that is. The experience of love is given in a mother's or father's love for a child, and on that basis all hopes can be constructed and all dangers dared.²⁹ Though love is first received as a gift with life itself, it does not remain passive, but creatively activates. Love calls for a response, as depth calls to depth. As love gave all, love cannot be faithful to itself unless it also demands all. Great men have freely given their lives, in fiction and fact (think of Achilles and Socrates), for their friends, but even their witness remained ambiguous. Human love is always subject not only to failure but also to misinterpretation by observers and by the lover himself. Do their deaths merely witness to mankind's self-infatuation or inability to face the void of meaninglessness? Even more, does not the death of the innocent but confirm the utter absurdity of this world where injustice triumphs and cruelty reigns? On what basis can men trust themselves to and believe in the meaningfulness of life and love? In the face of this ambiguity that adheres inevitably to all things human after sin, God spoke a definitive word of love in history, a sign that men might understand. The Son of God became man to give His life not only for His friends but also for sinners, the very friends who betrayed Him. Only He who is love can assure men of

²⁹ The remainder of this argument takes up from a different perspective the positions argued in our writing of footnote 1. Cf. also a short intuitive summary in H.U. VON BALTHASAR, *Mein Leben: Durchblicke* (Einsiedeln: Johannes, 1990), pp. 90-96.

the reality of love, and since love cannot remain at the level of mere words, the divine Word took flesh to die, to give His all and so to give the supreme sign of love. And that sign was not in vain, for He conquered death, returning from the grave to conquer the hearts of His friends and declare that the meaning of life is love. He told men who they are, created in the image of God and renewed in the image of the Son, thus resolving man's identity crisis.

The act of faith in Christ and His message is not a blind leap contrary to reason. In fact, reason on its own has become ever more unreasonable and arbitrary in modern philosophy. How can reason, caught in the impossibility of explaining the infinite as the condition of possibility for understanding the finite, ever reject definitely any belief as irrational? Indeed, it seems at times that the belief in reason is itself irrational since no reason can be given for it. But the sense of meaning in human life was given with a parent's love before the discursive play of reason began. Reason can only live from love. For strangely enough, the structures of reason and love correspond exactly. As reason presupposes an absolute which the finite and relative might somehow grasp, so love reveals an absolute to the finite creature, who is called to be willing to surrender all that he is and has, all that this world can offer with its beauties and allurements. For love demands preferring the beloved to oneself, a fidelity even unto death—such a fidelity that is pledged in marriage and lived in true friendship. In this call for absolute selflessness, to total fidelity, we recognize that no finite creature can ground its absoluteness. No human person can say to another, "You ought to love me, you should be willing to give your life for me". Yet true love drives out conditional giving; it demands the whole heart. Only God can raise in Himself the absolute claim for love, and it is God who is calling us to respond to Himself in and through our responses to each other.

God displays His omnipotence in awakening our freedom. Without an absolute man has no reason for any choice and freedom dissolves into natural necessity or induced whim. Only God can provide man with the intelligible grounding for his choice. Thus human freedom and divine omnipotence are correlative, not opposed. Then the structure of freedom, fulfilled in love, joins absolute (God) and relative (man), just as finite reason finds itself incapable of abandoning the absolute in all its affirmations. If the structures of love and reason parallel each other and correspond exactly, it takes a slight change of perspective to recognize that reason does not judge the final validity or invalidity of love. Love rather saves reason. Reason cannot explain and ground itself. But if reality is ultimately love, then the structure of reality corresponds to the structure of reason, and truth has been well defined as the correspondence of mind and reality. So the mystery of love prevents finite reason from de-

stroying itself in the contradictory dialectic between universal and particular, finite and infinite. Love summons reason to look beyond itself to find that its meaning has been bestowed upon it as a pure gift. And after sin, when selfishness invaded the world and made it impossible for man to answer the question about life's meaning and the validity of love from his own powers and experience, God gave the clearest sign of love. Thus the Christian faith is stronger and more certain than any merely natural faith in love, which supplies the requisite grounding for reason's truth and validity.

If the above analysis is correct, reason's search for reason has been disclosed finally to be man's looking for love. To find love in a world tainted by sin man cannot remain in himself but must go beyond himself. This "protesion" involves letting go of one's claims to one's own rights and dignities, an abandonment into the hands of a greater Lover. This abandonment of self, however, does not mean the destruction of self, rather its confirmation. For God demands all only because He has given all freely, and those whom He loves He does not abandon. In joining itself freely to self-giving Love and Life the finite freedom, the finite person, cannot be obliterated. The free choice of love's sacrifice of self involves the greatest sense of self in humility, the awareness of the greatness of the unmerited gift of infinite love, and in exaltation, the wonder of one who has been joined to the infinite beloved and raised beyond himself. The God who calls to such an abandonment will not destroy but preserve whom He has created. Man is made for immortality because Love is infinite and immortal. God does not contradict Love, Himself, by destroying in creation.

From a Christian perspective the meaning of death becomes clear. It is the invitation to respond to love by consigning one's all into God's hands and discover the gift of immortality.³⁰ God gives everything back to His beloved and gives Himself as love. Admittedly this view of death runs counter to the experience of most men, who suffer death as a feared intruder. Yet a Christian need only look on Christ to learn that death can also represent the acme of active self-giving and therefore of self-realization. For Christ not only offered His life freely to the Father for the sake of sinful men but also invited His disciples to take up their cross and follow Him. Joining themselves to Him in love, they are empowered to an active self-giving in death. The menace of death results from sin, which has isolated men from God and from each other. After sin the universe no longer transparently reflected the Creator's love. In fear men strove to preserve their own lives as if they were the

³⁰ These reflections have been stimulated by K. RAHNER, S.J., *Zur Theologie des Todes* (Freiburg: Herder, 1958), esp. 52-72.

source and goal of life; they wished to absolutize their own finite infinities, thus committing a contradiction as well as a sin. But one might well imagine how things might have been otherwise in a world untouched by sin. Through a fullness of life man would have been striving to give himself ever more fully to God's love in caring for the earth and others entrusted to him. Death, or the completion of his task, would have marked a peaceful transition to something more, a qualitative intensification of love and union with God. This would not necessarily have involved a separation from loved ones, but an expanded way of being present. They would not have lost their full bodiliness. For matter is the principle of individuality, and St. Paul as well as the Franciscan tradition spoke of a "spiritual body" (1 Cor 15:44).³¹ Just as Jesus after His resurrection could be present to His disciples, so the "dead" might have remained present to their families and friends, assuring them of a greater way of existing. These, in turn, would be more capable of perceiving the presence of the "dead" since their attention would not be riveted upon themselves and their self-preservation. Just as the paradoxical present state of man places the emphasis upon the distinction of body and soul manifested in death, a world without sin might have acknowledged the same paradox of man, incarnate spirit, and placed the accent upon the spirit unifying and vivifying the body.

Such speculations about life after death in a sinless world are in one sense superfluous. For *de facto* God made a world in which He foresaw that man would sin and God would become flesh to carry the burden of sin, giving of Himself in a way that man otherwise would never have imagined. Yet in another sense such speculations serve the useful purpose of reminding us that human life and death could have been experienced differently. God did not have to create man as he now is. Moreover, these speculations were encouraged by the Christian experience of the resurrection and therefore readily introduce our second major perspective on death.

³¹ In Thomism individuality is attributed to both matter and the individual act of existence: cf. E. GILSON, *Le Thomisme*, 5th ed. (Paris: Vrin, 1944), pp. 518-520; J. WEISHEIPL, O.P., *Friar Thomas D'Aquino* (Gardern City: Doubleday, 1974), pp. 208, 234, 251. Some attribute individuation to both in turn: L. SWENEY, S.J., *Authentic Metaphysics in an Age of Unreality* (New York: Lang, 1988), pp. 173-186. R. O'DONNELL, C.S.P., "Individuation: An Example of Development in the Thought of St. Thomas Aquinas", *New Scholasticism* 49-63, traces Thomas' various attempts to solve the problem of individuation before "completing" Thomas' doctrine by grounding individuation paradoxically in the (universal) form. In the same direction M. BROWN, "St. Thomas Aquinas and the Individuation of Persons", *American Catholic Philosophical Quarterly* 65 (1991), 29-44. Cf. also McDermott, "Zwei Unendlichkeiten", esp. 181-184, for matter as both intelligible and unintelligible.

B. THE RESURRECTION

For Christians sin and death of course do not provide the last word about human life. God's Word is final, and the Word of God became flesh precisely that He might conquer death and share His life with us. As St. Paul wrote, "He was handed over for our sins and was raised for our justification" (*Rom* 4:25). The resurrection marks Christ's conquest of death not just for Himself but also for us who are called to love Him and believe in Him. In His resurrection He is but the "first fruits" "the first born among many brethren," "the beginning, the first-born from the dead". (*1 Cor* 15:23; *Rom* 8:29; *Col* 1:18) Clearly the resurrection includes Christ's body. As the so-called Creed of Damascus professed, "Death's empire conquered, He rose on the third day with that flesh by which He was born, suffered, and died". (DS 72; cf. also DS 485: Council of Toledo VI in 635) In defining the bodily assumption of the Blessed Virgin Mary Pius XII (1953) declared that she received the special grace of participating in Christ's victory over death (DS 3901). It certainly was fitting that she who dedicated herself without reserve and without the least sin to God, going even to the cross with her mother's heart, should share in the victory of her Son just as she shared in His death. The disappearance of her body, like her Son's, was given to us as a sign of the full conquest of death accomplished in Christ.³²

For us the grave remains not only as the challenge to our faith in a love stronger than death but also as the reminder of what life without Christ is doomed to: the hopelessness of utter defeat in which the spirit, made for love, is subordinated to the dust, the non-being of matter, through its refusal of love. For by refusing love man attempts to deny the tension in the "protension" that marks his life in the middle position. In refusing to let himself be lifted by the God who would give and preserve his individuality, his sense of himself revealed in love and his renewed "protension" in love toward ever greater love, in insisting rather on holding onto material pleasures or in seeking to join himself by his own powers to a spiritual illumination man gives up the tension between finite and infinite that constitutes his very humanity. The lack of tension that should characterize human life is then manifested by the separation of body and soul and the body's consignment to dust.

Corporeal resurrection should not be imagined just as an external inter-

³² Cf. J. McDERMOTT, S.J., "On Mary's Assumption", *Homiletic and Pastoral Review* 85 (Aug.-Sept., 1985), 24-28.

ruption of the laws of mortality by the Lord of life.³³ If we recognize in Jesus a model case, it is easy to consider His resurrection as the perfecting from within of the human nature by the Love that is His person. He strove to give Himself ever more fully in time to the Father; His human nature grew in knowledge, grace, and wisdom before God and men (*Lk* 2:52), as His person permeated with its freedom ever more His human nature, body and soul. In His humanity He became ever more who He is. The final, transforming penetration occurred on Calvary as the self-oblation to the Father was completed. "It is consummated" (*Jn* 19:30), marks the thorough penetration without remainder of personal freedom into the last recesses of His human nature. Not without reason did St. John name Jesus' crucifixion an "elevation". For that word signifies simultaneously Jesus' death, resurrection, and ascension to the Father's right hand (3:14; 8:28; 12:32-34). For the total self-sacrifice in love means the complete unity with God, which is at once resurrection and ascension. Only for our sake was the body allowed to remain three days in the tomb. It served as a sign of what sin intended, the death and abolition of God from the world, which is simultaneously the destruction of man. Yet the victory was completed on Calvary to be manifested to us on Easter Sunday. Such is God's plan that embraces in love the matter which He created in order that it may be elevated into the glory of the spirit suffused with love. Nothing was created to be lost. "God did not make death, and He does not delight in the death of the living" (*Wis* 1:13).

As Christ's resurrected life conquered death and involved a further human existence with a spiritual body in "the heavenly places" (cf. *Eph* 2:6), He serves as a model for us in order that our lives might be fully permeated by love and so be brought to completion in God. Such perfection occurred in the case of Mary, His mother. Fittingly her body was preserved from the corruption of death, the sign of sin's victory. Though Christ's was one in nature with the eternal Father, Mary's human nature and person had been freely and totally dedicated to the service and love of Christ. Untouched by sin, she too became thoroughly permeated by the divine love that conquers death. Thus her corporeal ascension provided a sign for us of the victory of divine Love over death even in a human person.

A similar fate is reserved for all believers who love Christ wholeheartedly. Though death does not deprive them of God's presence—they exist as individual somehow with "spiritual bodies" in heaven—their "material bodies" lie subject to the ravages of the grave as a sign that sin, original sin and perso-

³³ The reflections in this section have been stimulated by J. MARITAIN, *On the Grace and Humanity of Jesus*, tr. J. Evans (New York: Herder and Herder, 1969), pp. 75-81, 134-144.

nal sins, had touched them. But at the end of the world, in the resurrection of the body, that sign shall be transformed. As St. Paul wrote, death is the last enemy to be conquered before Christ delivers His kingdom to the Father so that "God may be all in all". (1 Cor 15:23-28) In that final transformation of the material universe Christ's full victory will be manifested to all. Then it will be fitting that our "spiritual bodies" renew their close contacts with our "material bodies". For matter, as we saw, is also the means of communication among embodied spirits such as human beings are, and since no one is fully himself unless in relation to all others, the final resurrection of our bodies marks the total transformation of the universe and of ourselves. As humans we shall be fully who we are, joined to all the other justified incarnate spirits in love. What we left in the grave will be reincorporated into our resurrected lives and contribute to the reality of all others joined to Christ in His resurrected Body, the Church, henceforth only eternally triumphant. For this reason the Catholic Church has consistently insisted on respect being paid for the dead bodies of the faithful; their destiny is to share in resurrected glory, in the full victory of Christ.

Before ending our considerations of resurrected bodies, we should recall some anticipations in the restorations to life effected through the prophets Elijah and Elisha (1 Kings 17:17-23; 2 Kings 4:25-37; 13:21), Jesus' raising the son of the widow of Naim (Lk 7:11-17) and the raising of Lazarus, who was dead for three days and probably close to putrification (Jn 11). God has power to raise the dead even before the resurrection to eternal life. Though we cannot count on such miracles occurring regularly in operating rooms or morgues, these few events remind us that even dead bodies belong to the Lord and we should have respect for them, not treating them merely as instruments.

C. BODILINESS AND FREEDOM

As a final point of reflection I would like to mention briefly the relation between death and freedom. After death, judgment. Scripture reminds us often that we have to appear before the divine judgment seat where we shall be judged and rewarded according to our works in this life (Mt 16:27; 25:31-46; Jn 5:25-29; Rom 2:5-7; 2 Cor 5:10; etc.). In 1520 Leo X condemned the alleged opinion of Luther that the souls in purgatory were not "outside the state of meriting or augmenting charity". (DS 1488) In so doing he just seemed to be remaining consistent with the solemn definition of Benedict XII in 1336 that right after death, before the general judgment at the end of time, the just

who die in charity without need of purgation enjoy the beatifying vision of God, those dying in grace, but with need of further satisfaction of the penalty due to their sins, must be purified before they are admitted to the beatific vision, and those dying in the state of mortal or original sin are condemned to hell (DS 1000-1002). In short, this means that for human beings freedom of contrariety, which involves the possibility of sinning as well as of meriting, ends with death. One is tempted to invert that relation and say that human life lasts as long as freedom of contrariety. Yet that cannot be of much help here in measuring the moment of death precisely because freedom is not measurable. Nonetheless this fact of freedom's immeasurability and the immense importance of freedom for man's final fate should warn us against being too hasty in judging people to be dead. If freedom is a mystery, so is death and so is life. Even man's sufferings can serve to bring him closer to God as he responds to the invitation to unite himself ever more with the crucified Christ.³⁴

In thus introducing mystery into life we are not opposing science and reviving the old battle between science and religion. Modern science, which is meeting only probabilities and relativism, recognizes every more clearly how reality is shot through with mystery. In fact, only if the love which religion proclaims is true, does reason find a meaning. Only then is an absolute given which can serve as the norm to which scientific theories, abstractions at best, approximate asymptotically. Only then does the scientist recognize the objectivity grounding all his hypotheses and the validity of his experiments. The finite has to be grounded in the infinite without losing its relative intelligibility and meaning. Ultimately science is intended to serve love and life, the mysteries found in human experience and grounded in the God of love. Finally all is meant to reflect the mystery of Christ, who lived, died, and rose again in the freedom of omnipotent love.

³⁴ Cf. McDERMOTT, *Bible*, esp. 113-129; "Sofferenza", *Dizionario di Teologia Fondamentale*, ed. R. Latourelle-R. Fisichella (Assisi: Cittadella, 1990), 1154-1160.

RÉFLEXION PHILOSOPHIQUE ET THÉOLOGIQUE SUR LE MOMENT DE LA MORT

JEAN-MICHEL MALDAMÉ, O.P.

Nos échanges et réflexions ont montré que le terme de vie, et celui qui lui est corrélatif de mort, qui s'y oppose, reçoivent une pluralité de sens. Je propose une brève clarification de ces divers points de vue. Je suivrai pour cela la démarche qui correspond à la ligne générale de ma recherche dans le dialogue entre Science et Théologie.¹

1. Je ferai d'abord des remarques de nature épistémologique. Elles me semblent indispensables pour que nous ne tombions ni dans le scientisme, ni dans l'idéalisme.²

2. Je ferai ensuite des remarques qui relèvent de la philosophie de la nature.³ Je sais que cette discipline est absente de la culture contemporaine, mais je la crois indispensable pour faire le lien entre la métaphysique et les connaissances scientifiques. La mort est un événement tout à la fois biologique

¹ Cf. J.-M. MALDAMÉ, « Chronique d'histoire et de philosophie des sciences », *Revue Thomiste*, t. 81, n° 4, p. 639-671; « Science et culture », *Revue Thomiste*, t. 89, n° 2, p. 309-326; « Place de l'homme dans l'univers », *Revue Thomiste*, t. 90, n° 1, p. 109-131.

² Par scientisme nous entendons la réduction de l'accès à la vérité à la seule méthode scientifique au sens moderne du terme — c'est-à-dire un système conceptuel, tenant compte de tous les faits expérimentaux connus et soumis à la vérification; il y a une interaction entre les faits et les théories; les sciences sont soumises à des révolutions conceptuelles liées à leurs progrès. Cf. J. PARAIN-VIAL, « Philosophie des sciences de la nature », Paris, Klincksieck, 1985. Par idéalisme nous entendons les formes de pensée qui considèrent que les données des sciences sont indifférentes à la recherche de la philosophie. Cf. J. LARGEAULT, « Principes de philosophie réaliste », Paris, Klincksieck, 1985.

³ Cf. J.-M. AUBERT, « Philosophie de la nature », Paris, Beauchesne, 1965. F. RUSSO, « Nature et méthode de l'histoire des sciences », Paris, Librairie scientifique et technique Albert Blanchard, 1983. D. DUBARLE, « La philosophie de la nature chez Hegel et Aristote », *Archives de philosophie*, 1975, p. 3-51. Nous employons le terme dans son acception traditionnelle (dans la tradition aristotélicienne) et non au sens romantique de la « Naturphilosophie ». J. LARGEAULT, *Systèmes de la nature*, Paris, Vrin, 1985. ID., *Principes classiques d'interprétation de la nature*, Paris/Lyon, Vrin/Institut Interdisciplinaire d'Etudes Epistémologiques, 1988.

et métaphysique. Le lien entre ces deux instances de connaissance demande le du point de vue de la philosophie de la nature.

3. Les points du débat entre biologistes et médecins qui ont eu lieu pendant notre première journée de travail participent à une anthropologie. Elle est impliquée dans les débats issus des connaissances biologiques. Je me dois de les expliciter. Je le ferai, convaincu que la vérité ne saurait être divisée. Ce que les sciences disent de l'homme renoue avec ce que la Bible révèle du sens de la vie humaine et de ses valeurs. Je montrerai comment les perspectives complémentaires impliquées dans les débats scientifiques accueillent les valeurs promues par la foi chrétienne.

Ces trois étapes me semblent indispensables pour articuler les connaissances biologiques, morales et métaphysiques.

I. EPISTÉMOLOGIE

La mort peut-elle être définie par la fin du fonctionnement d'un organe essentiel à la vie de l'homme, tel le cœur, le cerveau?⁴ A mon avis, non! Pourquoi?

La mort concerne un individu qui ne se réduit pas à un organe, ni même à une fonction de l'ensemble de ses organes.⁵ La cessation du fonctionnement d'un organe est seulement un critère, en fonction duquel le médecin ou les proches constatent la mort. Si un tel critère est irrécusable, il reste un signe que la mort est advenue. Il ne définit pas la mort.

Le constat de la mort est le fruit d'une décision de la part de la famille, des proches, du médecin ou de l'équipe hospitalière. Leur décision prend en compte les critères bio-médicaux, mais elle n'est pas l'enregistrement passif d'un ou de plusieurs critères. Le médecin n'applique pas des règles opératoires, comme un ordinateur. Il juge en conscience. Face à la même situation, des médecins peuvent très légitimement décider de manière différente.

La détermination du moment où la mort a eu lieu relève d'un acte

⁴ Telle est la question posée par les intervenants qui ont précédé cette communication. La question est venue des problèmes posés par les transplantations d'organes. Parmi les moralistes chrétiens qui ont attiré l'attention sur les questions posées par la pratique médicale, il faut citer P. VERSPIEREN, « les prélèvements d'organes », *Etudes*, Février 1977.

⁵ La notion d'organe a été étudiée d'un point de vue philosophique par G. GARGUILHEM, *La connaissance de la vie*, Paris, Vrin, 1985. Cette étude comporte un chapitre remarquable qui montre que l'opposition entre Aristote et S. Thomas d'une part et Descartes d'autre part est souvent caricaturale, cf. le chapitre « machine et organisme » p. 101-127. Cf. J. E. SCHALANGER, *Les métaphores de l'organisme*, Paris, Vrin, 1971.

prudentiel qui unit connaissances biologiques et médicales, mais aussi des références éthiques et une philosophie de l'homme. La foi ne doit pas être absente d'un tel acte. Précisons bien qu'elle laisse une pleine autonomie aux critères biologiques.

L'épistémologie que je présente ici brise avec le scientisme qui pense que la science légitime tout ce qu'elle permet, pourvu que ce soit rationnellement conduit. La décision médicale ne se réduit pas à la conclusion de l'examen des critères médicaux. Elle est relation au patient. La médecine est un art; elle n'est pas une technique.⁶ L'exercice de la médecine est une responsabilité.

L'épistémologie que je présente prend acte de ce que la science est ouverte.⁷ Une conclusion ne saurait être considérée comme absolue. Elle est relative à un état des connaissances. La cessation de la respiration a été un critère de la mort; puis, l'arrêt du coeur; aujourd'hui, on considère l'arrêt du fonctionnement cérébral. Ces critères sont liés à un état des connaissances scientifiques, biologiques et médicales. Ils seront peut-être remplacés par d'autres plus précis. La recherche est ouverte. Mais en tout état de cause, ces nouveaux critères assument les précédents. Le perfectionnement n'en change pas la nature. Ce sont des critères utiles, et même indispensables, pour prendre une décision. La performance technique ne diminue en rien la responsabilité, ni la spécificité du jugement porté sur le moment de la mort.

Pour cette raison, il faut considérer la philosophie impliquée dans les termes que je viens d'employer à la suite des interventions des éminents spécialistes qui ont déjà pris la parole. Une telle analyse permettra ensuite de fonder les interrogations théoriques et pratiques qui sont le but ultime de notre groupe de travail et de la suite qui pourra être donnée à notre rencontre.

II. PHILOSOPHIE DE LA NATURE

Les termes employés dans nos débats ne relèvent pas seulement de la science, ni de la seule morale. Ils relèvent d'une philosophie née de la réflé-

⁶ La distinction entre art et technique ne repose pas sur la nature de l'instrumentation, mais sur la place qu'y occupe le jugement de l'artisan ou de l'ouvrier. La technique est l'application, par pure déduction, de règles opératoires ou de procédés de fabrication particularisant les lois de la sciences à des situations particulières. L'art implique un jugement qui relève de la vertu de prudence au sens où S. Thomas emploie ce terme. La prudence est chargée d'assurer la vérité pratique de l'action et donc sa bonté morale. Le jugement de prudence est pratique. Il prescrit le choix qui fait partie de l'action concrète et qui vise la production d'un effet.

⁷ L'histoire des sciences montre bien cette ouverture. On peut consulter l'ouvrage récemment paru sous la direction de M. SERRIS, *Éléments d'histoire des sciences*, Paris, Bordas, 1989.

xion sur la réalité sensible, connue par la science. Conformément à la tradition thomiste, j'appelle ce domaine des connaissances: philosophie de la nature.

Son statut est récusée par les philosophies idéalistes et matérialistes qui ne reconnaissent comme réel qu'une partie de ce qui est et s'accordent paradoxalement pour considérer que la mort est un phénomène qui relève de la seule biologie et la détermination de son moment des seuls critères opératoires.

Dans la perspective de notre rencontre pluri-disciplinaire et de notre commune quête de vérité, je pense qu'il nous faut reconnaître que la mort ne peut être définie sans considérer le sujet humain. La question est alors: comment penser l'être humain en son unité, dans la totalité de ce qu'il est?⁸.

Dans les débats que nous avons eus, je vois deux perspectives. Je les caractérise par deux termes; unité et totalité. Ils ont été pensés ici — ils le sont habituellement —, de deux manières différentes: totalité unifiée ou bien unité totalisante. Il s'agit de deux approches différentes de l'individu ou personne de nature humaine. L'anthropologie que nous présenterons devra unifier ces deux perspectives dont voici les thèmes majeurs.

1. *L'homme est une totalité unifiée*

En considérant l'individu humain comme totalité, on le comprend selon des catégories de pensée, marquée par la thermodynamique et la théorie générale des systèmes.⁹ L'approche systémique permet de rendre compte des réseaux, des liaisons, des boucles de causalité, des interactions qui font d'une multiplicité un être unifiée. L'individu humain assume une multiplicité d'atomes, cellules, tissus et organes. Il est un. Il est un organisme.¹⁰

⁸ Le dialogue entre scientifiques et philosophes reste difficile sur ce point. En témoigne les réflexions de M. HENRY, « Ce que la science ne sait pas », *La Recherche*, n° 208, mars 1989. Dans le prolongement des thèses de la Phénoménologie, Michel Henry pose la question de la vie avec acuité. Il y a là une des interrogations les plus radicales dans la pensée philosophique contemporaine. Cf. M. ESPINOZA, *Essai sur l'intelligibilité de la nature*, Toulouse, Université du Mirail/Éditions universitaires du sud, 1987.

⁹ Le développement de la thermodynamique est sans doute au principe d'un renouveau de la manière dont la science aborde la nature et la vie. Cf. I. STENGERS et I. PRIGOGINE, *La nouvelle alliance. Métamorphose de la science*, Paris, Gallimard, 1986; ID., *Entre le temps et l'éternité*, Paris, Fayard, 1989. Sur la fécondité des travaux de I. Prigogine et son influence sur la biologie et la médecine, on peut se rapporter au colloque de Cerisy La Salle, consacré à la pensée scientifique et philosophique de ce savant. Les actes ont été publiés sous le titre *Temps et devenir*, Genève, Patifio, 1988.

¹⁰ Cf. L. VON BERTALANFFY, *Théorie générale des systèmes*, Paris, Dunod, 1980. *Pour les applications à la biologie*, cf. J. TONNELAT, *Thermodynamique et biologie*, t. I: *Entropie, désordre et complexité*, t. II: *L'ordre issu du hasard*, Paris, Maloine, 1978.

Il est compris aujourd'hui comme une structure ouverte, où est niée la croissance de l'entropie.¹¹

La perspective systémique peut être affinée par une théorie générale de l'information et des modèles cybernétiques, de manière à rendre raison des activités nobles de l'homme, telle la conscience, la raison, la parole, ... Elle rend raison du rapport original au temps.¹²

Le corps est compris comme une totalité unifiée par un principe que l'on appelle l'âme. La vie est l'unité, suscitée et maintenue, de la diversité des éléments. La mort est la désagrégation et la dissolution de cette unité active. Elle est liée à la fin des activités d'un organe qui joue un rôle majeur dans le maintien et le renouvellement de l'unité. Pour les anciens Hébreux, c'était le sang; pour les anciens Grecs, le souffle ou *pneuma*; pour les modernes, un organe central (le cœur, le cerveau).¹³

La totalité est unifiée avec une telle rigueur que rien ne peut être touché sans que le tout soit concerné, tant dans le plaisir que dans la douleur.

2. *L'homme est une unité totalisante*

Une autre perspective considère l'individu humain à partir de son unité. Dans cette vision du réel concret, ce qui est premier, c'est la forme. Elle est perçue dans son unité et sa simplicité. Les mathématiques éduquent l'esprit à cette manière de percevoir les êtres du monde sensible.¹⁴

La forme est un principe d'unité. Elle unifie une multiplicité d'éléments qui, sans son dynamisme, resteraient dans une diversité irréductible.¹⁵ Le principe de l'unité du vivant est actif. Il préside à la lutte contre la dispersion,

¹¹ Sur la notion d'organisme, E. MORIN donne une vue synthétique qui assume les résultats des bouleversements conceptuels de la science du XX siècle. Il le fait dans *La méthode*, t. I: *La Nature de la Nature*, t. II: *La Vie de la Vie*, Paris, Le Seuil, 1977 et 1980. Pour un exposé plus traditionnel voir C. TRESMONTANT, *Le problème de l'âme*, Paris, Le Seuil, 1971.

¹² Cf. P. DELATTRE, *Système, structure, fonction, évolution. Essai d'analyse épistémologique*, Paris, Maloine, 1985.

¹³ Cf. E. MAYR, *Histoire de la biologie. Diversité, évolution et hérédité*, Paris, Fayard, 1989.

¹⁴ Dans cette perspective, on doit se référer aux travaux de René Thom. Cf. R. THOM, *Paraboles et catastrophes. Entretiens sur les Mathématiques, la Science et la Philosophie*, Paris, Flammarion, 1983; cet ouvrage et vulgarisation donne une présentation des travaux mathématiques (topologie algébrique) qui ont une incidence sur les sciences de la vie. Une présentation de son oeuvre et de son influence sur les autres domaines du savoir est donnée par le Colloque de Cerisy la Salle consacré à sa pensée publié sous le titre *Logos et théorie des catastrophes*, Genève, Patino, 1988.

¹⁵ Nous avons recours aux termes de la philosophie classique. Cf. A. FOREST, *La structure métaphysique du concret selon saint Thomas d'Aquin*, Paris, Vrin, 1956. La notion de forme a pris une importance très grande en philosophie de la nature à partir de la science de l'information. Cf. L. BRILLOUIN, *La science et la théorie de l'information*, Paris, Masson, 1959.

contre l'érosion et la dispersion. La forme est principe d'un autre ordre que les éléments qui lui sont soumis.¹⁶ Sans elle, en effet, tout revient au divers et au chaos.

La notion d'acte nomme cette puissance qui surmonte la diversité et la multiplicité. Les énergies qui font l'être vivant découlent d'elle. Elles ne la produisent pas; elles sont avec elle un co-principe en situation de passivité face à la puissance active de la forme qui, pour tous les vivants, s'appelle âme.

Dans nos débats une telle perspective privilégie l'âme humaine, forme du corps humain. C'est l'âme qui fait le corps humain différent de celui des animaux, tant par sa sensibilité que par son aptitude à des activités spécifiques. Le principe d'unité rend mieux raison de ce qui différencie l'homme des autres vivants: la pensée et la parole.¹⁷ L'âme humaine reste cependant un co-principe de la personne. Elle n'est jamais pensée abstraction faite du corps.

3. *Le moment de la mort.*

Selon ces deux perspectives, la mort ne se pense pas de la même manière. Dans la première perspective, la mort est une désagrégation. Le moment de la mort advient quand un organe central ou une fonction nécessaire à la totalité de l'organisme sont détruits. La mort est la rupture du lien entre les fonctions et les organes. La mort est inscrite dans une certaine durée. Elle apparaît au médecin comme un processus à traiter.¹⁸

Dans la seconde, la mort est la séparation de l'âme et du corps. Le corps cesse d'être un. Il devient cadavre, amas anarchique de matière, atomes épars dans la biosphère. La mort est un événement irréversible. L'âme humaine, connue à partir de ses propriétés, n'est pas détruite comme telle par cette séparation. Elle demeure, même si elle ne peut exercer son rôle actif en donnant à la chair de prendre forme en un corps.¹⁹

¹⁶ Cf. J. DE FINANCE, *Être et agir dans la philosophie de S. Thomas*, Paris, Beauchesne, 1945; ID., *Le sensible et Dieu. En marge de mon vieux catéchisme*, Paris, Beauchesne, 1988.

¹⁷ Cf. A. FOREST, *L'avènement de l'âme*, Paris, Beauchesne, 1973 qui développe les thèmes traditionnels qui disent l'âme à partir de ses actes.

¹⁸ La connaissance de ce processus permet de garder en vie des malades qui auraient été considérés comme mort il y a peu de temps. On parle à ce propos, de manière impropre, de réanimation, car le malade ne revient pas de l'au-delà de la mort, mais d'un état proche de la mort. L'âme n'a pas été séparée du corps. Cf. J.-M. MALDAMÉ, « Quelle connaissance scientifique de l'au-delà? », *Lumière et Vie*, 1990, 195, p. 15-28.

¹⁹ Ceci est lié à l'irréversibilité du temps. La question du temps est revenue au premier plan des débats de philosophie de la nature. Un état de la question est donné par P. CONVENÉY, « L'irréversibilité du temps », *La Recherche*, Février, 1989, p. 190-199. Un status quaestionis est donné par R. LESTIENNE, *Les fils du temps*, Paris, CNRS, 1990.

La définition, développée par S. Thomas d'Aquin de l'âme comme forme du corps, unifie les deux perspectives qui toutes deux montrent la dignité de l'âme et du corps et fonde le respect que l'homme doit avoir de lui-même, de son semblable et tout particulièrement de ce qui est vécu lors de la mort, au terme de la vie terrestre.

La douleur vécue au moment de la mort rappelle à tous ceux que tente la philosophie idéaliste que l'âme et le corps sont ensemble pour constituer un même être humain. Les activités qui font la dignité de l'homme ne peuvent être comprises dans une philosophie dualiste: ni les activités de connaissance et d'amour, ni à fortiori ce qui relève de l'action.

III. ANTHROPOLOGIE

Les deux points de vue que je viens de présenter très rapidement, doivent être unis et fonder une anthropologie qui permette de guider les décisions médicales en tenant compte de la réalité corporelle qui est l'objet de la médecine. Elle se caractérise par trois points: 1. la valeur du corps, 2. la singularité, 3. la solidarité.

1. *La valeur du corps*

Le corps n'est pas une partie de l'homme. Il est co-principe de tout ce qui est humain. L'homme n'a pas un corps; il est en et par son corps. L'âme n'est pas dans le corps comme dans un lieu constitué d'avance. Elle est co-principe de l'être humain.²⁰ Elle est dans tout le corps et pas seulement dans une partie. Pour cette raison, il est préférable de parler de la mort en nommant toujours « celui qui meurt », un sujet humain, que l'on peut appeler individu, si on considère le caractère indivis de son être, ou personne, si on considère la nature spirituelle de son principe d'unité.

La foi chrétienne en la résurrection de la chair confirme la reconnaissance de la valeur du corps. Le discours mystique ne doit pas faire illusion sur ce point.

²⁰ Cf. M. HENRY, *Philosophie et phénoménologie du corps*, Paris, P.U.F., 1965. F. CHIRPAZ, *Le corps*, Paris, Klincksieck, 1988, résume la recherche actuelle en philosophie. Les incidences en théologie sont relevées par A. DARTIGUES, *La révélation, du sens au salut*, Paris, Desclée, 1985 dans le chapitre VIII: « Résurrection de la chair et monde nouveau ». Ce point est développé par H. U. VON BALTHASAR, *La gloire et la croix*, t. I, *Apparition*, Paris, Aubier, 1965.

Celui qui meurt est tout à la fois corps et âme. Il vit sa mort avec son corps et son âme. Le médecin soigne une personne.²¹ La Bible ignore tout dualisme et fonde une attitude qui récuse les abus de langage qui opposent âme et corps, au mépris de la valeur de la chair qui est appelée à participer à la résurrection.

2. *La singularité*

L'individu humain est singulier. Cette notion empêche tout dualisme, puisque cette singularité vient à la fois de sa chair et de son esprit.

Dans le récit biblique de la Genèse, il est dit que les vivants sont créés « selon leur espèce ». L'homme n'est pas dit « selon son espèce ». Il est image de Dieu.²² En philosophe, je vois cette image dans l'unité. L'homme est à l'image du Dieu unique, par sa singularité, qui est inscrite dans son âme et dans son corps — jusque dans ses gènes.

L'homme, personne unique et singulière, est confronté à la mort. Il est appelé à la vivre, comme le moment où il passe de ce monde à cet état intermédiaire (et mystérieux) dans l'attente de l'universelle résurrection dans une création transfigurée.²³

Le moment de la mort ne peut donc pas être réduit à l'instant de l'arrêt du fonctionnement d'un organe central, car il s'agit d'un acte vécu par une personne et non par un organisme différent des autres par sa seule complexité.

²¹ Parmi les lieux de réflexion où s'élabore une réflexion chrétienne sur les problèmes liés à la mort, il convient de citer le Centre Laennec (12, ru d'Assas, Paris). Cf. le numéro spécial des *Cahiers du Centre Laennec*, « *La souffrance de celui qui meurt* » : et P. VERSPIEREN, *Face à celui qui meurt*, Paris, Desclée, 1986. La reconnaissance de la valeur de la personne au moment de la mort est liée au centre d'un nombre importants de travaux liés au développement des soins; intensifs. Cf. E. KUEBLER-ROSS, *Les derniers instants de la vie*, Genève, Labor et Fides, 1977. ID., *La mort, dernière étape de la croissance*, Monaco, Le Rocher, 1985. C. JOMAIN, *Mourir dans la tendresse*, Paris, Le Centurion, 1984. R. SEBAG-LANOË, *Mourir accompagné*, Paris, Desclée, 1986. J. VIMORT, *Ensemble face à la mort*, Paris, Le Centurion, 1987. L. DINE, *Vivre la mort*, Desclée de Brouwer, 1988.

²² Gn 1, 26. Cf. P. BEAUCHAMP, *L'un et l'autre Testament*, t. II: *Accomplir les Ecritures*, Paris, le Seuil, 1990, en particulier ce qui est dit du corps (p. 35-50) et ce qui est dit d'Adam (p. 91-104) et le commentaire de GN 2-3 (p. 115-158). Pour une étude plus détaillée du thème de l'image voir H. CAZELLES, « MYN — espèce, race ou ressemblance », *Mémorial du cinquantenaire. Ecole des langues orientales de l'Institut Catholique de Paris*, p. 105-108 et P. BEAUCHAMP, article « Mfn », *Theologisches Wörterbuch zum Alten Testament*, Stuttgart, 1894, col. 867-869.

²³ Cf. G. MARTELET, *L'Au-delà retrouvé*, Paris, Le Centurion, 1974.

3. *La solidarité*

La philosophie prend acte des conditions de la vie. Elle perçoit que l'individu humain ne peut vivre s'il est seul. Il a reçu la vie de ses parents. Il l'a développée grâce à une culture et à la reconnaissance de sa valeur. Même s'il est solitaire, il est solidaire.

La mort ne détruit pas cette solidarité. Toute mort est un événement pour les autres. Nous-mêmes, ne parlons de la mort qu'à partir de la mort des autres.²⁴

La mort ne peut être définie sans considérer l'environnement de celui qui meurt. Le moment de la mort est défini en fonction de l'environnement médical: médecins, personnel hospitalier, installations hospitalières, etc. Un constat de décès n'est pas identique dans un hôpital très moderne ou dans un pays pauvre, privé d'équipement sanitaire. L'environnement de celui qui meurt n'est pas seulement médical; il est affectif, familial et social.

Cette solidarité joue également de la part de celui qui meurt. Il peut faire de sa mort un don de soi, un acte de charité pour d'autres. Le don d'organe peut être vu dans cette perspective et être voulu comme un don.

Une telle intention doit être reconnue et respectée. Le don d'une partie de ce qui fut le corps d'un vivant et donc une partie de lui-même, ne doit pas être l'occasion pour l'équipe médicale qui a besoin d'une partie de son corps de ne pas lui laisser vivre sa mort dignement, voire même de hâter le moment de la mort ou de négliger d'en observer strictement les critères biologiques. Le cadavre du donneur doit être respecté, d'autant plus qu'il accordait de la valeur à son corps au point d'en donner une partie post mortem.²⁵

La vie n'est-elle pas ce qui est reçu et ce qui se donne?²⁶ Sachant que la corruption détruira ce qui reste de soi, ne vaut-il pas mieux le donner à un autre qui fera de ce qui a cessé d'être une partie de soi, une partie de son corps?

²⁴ Cf. PH. ARIES, *L'homme devant la mort*, Paris, Le Seuil, 1977; ID., *Essai sur l'histoire de la mort en Occident*, Paris, Le Seuil, 1975; L. V. THOMAS, *Anthropologie de la mort*, Paris, Payot, 1976.

²⁵ Cf. A propos des dons d'organes, en France il y a eu des échanges riches au plan des conceptions morales lors des débats parlementaires au Sénat (vendredi 19 novembre 1976) à l'Assemblée nationale (jeudi 9 décembre 1976).

²⁶ Le thème du don relie la réflexion que nous menons à la théologie de la création. Cf. GHISLAIN LAFONT, *Dieu, le temps et l'être*, Paris, le Cerf, 1986. Le thème du don est aussi présent à la réflexion de DENIS VASSE, *Le poids du réel, la souffrance*, Paris, Le Seuil, 1983; ID., *Le chair envisagée. La génération symbolique*, Paris, Le Souil, 1988. Pour une présentation de la théologie de la création comme don, on peut se référer aux recherches de Maurice Bellet. Cf. JEAN-MICHEL MALDAMÉ, « L'itinéraire de Maurice Bellet. Une phénoménologie de la création », *Revue Thomiste*, t. 88, n. 2, p. 299-314.

CONCLUSION

Pour déterminer le moment de la mort, je pense qu'il faut unir les deux perspectives de philosophie rapidement présentées. Pour la première la mort est une désorganisation que l'on peut saisir à partir de la fin du fonctionnement d'une partie essentielle du système biologique du corps humain. Ces parties sont liées entre elles. La destruction de l'une entraîne la destruction des autres. La mort est alors dans ce processus de désagrégation et de destruction de l'unité de l'organisme vivant.

Cette perspective doit être étroitement unie à l'autre considération qui voit la mort comme une séparation. La mort apparaît alors comme un événement qui concerne l'âme que les sens n'atteignent pas directement. Son moment précis est impossible à déterminer — même si on peut le cerner de mieux en mieux. On constate que la mort a eu lieu, en étant attentif à la séparation dont les effets se constatent à la désagrégation organique — la corruption de la chair.

Ces deux considérations se rassemblent dans le jugement que le médecin ou les proches portent sur l'instant de la mort. Elles sont aussi liées à une considération métaphysique. La métaphysique ne définit pas la mort sans s'informer du résultat des sciences, de la philosophie des savants et, par là, de la philosophie de la nature. Les termes d'âme et de corps introduisent à une considération de l'existence et donc à la question de l'être, indispensable pour dire la vérité de la personne humaine.

La métaphysique fonde la morale. Celle qui ressort des réflexions précédentes est soucieuse de la responsabilité humaine. La reconnaissance du moment de la mort est une décision. Elle doit être prise en connaissant les critères bio-médicaux, interprétés strictement. Ainsi, il ne suffit pas d'une lésion d'une partie du cerveau, mais il faut l'arrêt total de son fonctionnement. La détermination dépend du contexte médical; mais le perfectionnement des techniques médicales ne remplace pas la considération que celui qui meurt est un être humain unique et singulier. Cette affirmation morale, comme telle accessible à la droite raison, est radicalisée par la foi qui sait que l'homme est appelé à une vie qui ne se réduit ni au seul présent, ni au seul horizon terrestre. « *Expecto resurrectionem mortuorum et vitam venturi saeculi* ».

“CEREBRAL DEATH”: IS THIS SUFFICIENT TO ESTABLISH HUMAN DEATH?

LINO CICCONE

INTRODUCTION

Before entering into the discussion of this matter, I feel that it would be both useful and opportune to make some observations concerning the context within which the question of the determination of physical death is placed, namely, in the light of and in relation to another question, that of organ transplantation.

Clearly, there are important connections between the two issues. The establishment and spread of organ transplants is mainly responsible for the resulting research and working out of criteria capable of establishing with speed and precision the moment of a patient's death, an indispensable condition for the legitimate removal of organs.

However, an *extremely careful and speedy verification that death has occurred is often necessary, independent of any plan to remove organs for use in transplants*. It is to be noted that among the dramatic problems that are daily faced by doctors working in intensive care and reanimation units is that of deciding when it is lawful, and even more when it is a duty, to terminate specific action, in the absence, I repeat, of any plan to remove organs for transplant use. Indeed, once a patient's death has occurred, to persist in providing intensive care is nothing more than a macabre messing around with a corpse.¹ As emphatically stated by Corrado Manni, “There is no logical, scientific or human reason to continue assisting a corpse”.² On a subjective level, any such

¹ Cf. WERNER PIA H., *Morte cerebrale: « vita significa regolazione e ne, morte significa perdita di regolazione e modulazione »*, in PONTIFICIA ACCADEMIA DELLE SCIENZE, *Prolungamento artificiale della vita*, Libreria Editrice Vaticana, Vatican City 1987, p. 137.

² MANNI C., *Cerebral death, Scientific aspects and ethical problems*, in “Medicina e Morale” 36, 499 (1986).

action is not just an absurd and useless farce and thereby morally untenable, but is also a disgraceful waste of costly means of treatment and specialist medical personnel. In addition, serious harm is caused through the useless employment of personnel and equipment often urgently needed for other patients in serious danger of death, for whom delay in finding a bed in a reanimation unit is equivalent to passing a death sentence which could have been avoided.

There is another important advantage in treating the question of the determination of the fact of death as an issue apart, namely, that of *removing one of the unjust reasons for withholding consent to the removal of organs for transplant use*. As again noted by Professor Manni, "the fact that instrumental therapeutic assistance is interrupted only for those patients that have undergone a "cerebral death" and have to be sent to the operating theatre for the removal of organs", whilst for other patients that have died in the same manner "respiratory assistance is continued until cardiac death occurs", "causes some family members to believe that the anaesthetist or reanimator who requires consent for organ removal and hence wishes to terminate therapeutic assistance could use further means to save the life of their loved one"³ but prefers to do otherwise so as to ensure human organs in as perfect condition as possible for transplant recipients. This factor lies at the base of refusing consent to remove organs for transplants.

Thus, it is advantageous to the said cause for organ transplants to work out appropriate contributions to the solution of the question concerning the determination of the moment of death, independent of any reference to the removal of organs for transplantation.

1. CONCERNING THE CONCEPT OF DEATH

1.1. When asked to define the concept of death, one requires an answer to the question "what is death?". The question "what is?", or as put by Socrates "τί ἐστί" in its most precise meaning concerns the essence of a given reality, in our case, the reality of a person's death. It is clear and well-known that any analysis of reality at this level falls within the domain of philosophy and theology. It does not and could not fall within the competence of the experimental sciences, also because death is experienced only by those who die and thus without any possibility of supplying others with even the minimal information concerning their experience.

³ MANNI C., *op. cit.*, p. 498.

However, the competences are reversed when it is a matter not of defining what death is but of working out valid criteria *to establish with certainty when a human organism is still living and when instead life has ceased to exist within it*. The field of competence in this area is that of the *biomedical sciences* and not of philosophy and theology. On this point it is worth recalling the clear words of Pius XII: "It is the task of the doctor, and particularly of the anaesthetist, to give a clear and precise definition of the "death" and of the "moment of death" of a patient, who dies from a state of unconsciousness". A little further on in the same speech, the Pope stated: "As regards the ascertainment of this fact in particular cases, the answer cannot be deduced from any religious or moral principle and, under this aspect, does not lie within the Church's competence".⁴

In the series of Communications issued by the Pontifical Academy to specify the topic of our meeting, the formulation of the title given to the meeting in the definitive programme seemed central, in particular as regards death, that is: "*determination of physical death*", namely the death of the human organism.

The "concept of death" provides an implicit reply to the question: "what is physical death?" It therefore seeks *to define what is the fact or rather what are the pathological changes in the human organism that terminate its state as a living organism*. From this viewpoint the answer is clearly to be found in the field of the biomedical sciences.

1.2. Besides providing an answer to the question "what is physical death?", these sciences must single out *the scientifically noticeable organic changes that are unequivocal signs that death has certainly occurred*, reducing to the minimum the time between the moment that death occurs and its verification. *The precise moment of death* can and must be carefully defined on a theoretical level. However, it seems, at least in the light of current knowledge, impossible to grasp it with certainty from outside at the precise moment at which it occurs. This is because the death of a human organism in the context of a patient in coma in intensive care is the terminal point of a gradual process that is slow and further slowed down by treatment and by progressive weakening of the complex conditions that make up a living organism. The need *to ascertain with the maximum possible speed* the occurrence of physical death arises exclusively when it is planned to use the deceased's organs for a transplant. Although not with the same degree of urgency, the need for care-

⁴ PIUS XII, *Risposte ad importanti quesiti sulla rianimazione* (24 novembre 1957) in *Discorsi e Radiomessaggi di Sua Santità Pio XII*, vol. XIX, Tipografia Poliglotta Vaticana, Città del Vaticano 1958, pp. 615-621.

ful attention still exists in order to avoid the above-mentioned continuation in the needless treatment of a corpse which brings about serious consequences for others.

1.3. The conclusions drawn from the biomedical sciences concerning the moment of physical death and its ascertainment are then to be taken up by *philosophical and theological reflection* as a valid and adequate base to state that it is the moment in which death of a man is verified, namely the separation of the soul from the body.

Given the spiritual nature of the human soul, this is an event that escapes any possibility of observation and survey by man. Because of this, *death assumes* the features of a reality belonging to the world of *mystery*. However in the light of faith, the mystery surrounding death takes on a much richer and more profound meaning. There emerge the meanings of death on a level wider than the entire existence of man and the history of man in which it is not just man but rather God Himself who is so intimately involved. One could say that the intertwining of the divine with the human element which characterises human life right from the beginning (I refer to creation, direct and immediate, by God, of each and every human soul), reaches its peak at the final moment of its earthly life which is at the same time the beginning of another way of life that for us is mysterious. A way in which the decisive factor for each aspect of the personal situation is the kind of relationship with God: of joyful communion in love or of bitter separation and severance, both of which are final and without redress.

It is therefore for no rhetorical reason that the title proposed by the Second Vatican Council for the paragraph devoted to death in the Pastoral Constitution "*Gaudium et spes*" is as follows: "De mysterio mortis" (n.18). The paragraph begins by stating: "Coram morte aenigma condicionis humanae maximum evadit".

1.4. It is necessary not only for philosophers and theologians but also for biologists, doctors and scientists in general, and of all those dealing with the theme of death to have the *explicit awareness* of this unavoidable *aspect of mystery* in relation to death. It is necessary to be aware of the fact that what one seeks to understand is but one aspect of a much more complex reality which is mysterious. This is one of the indispensable premises required in order to proceed with extreme caution in attributing a character of absoluteness to one's conclusions and with deep respect for every man who dies, in establishing directives and norms of behaviour concerning such a case.

2. "CEREBRAL DEATH": IS IT SUFFICIENT TO STATE THAT HUMAN DEATH HAS TAKEN PLACE?

Coherently with all that I stated on the first working day, the question falls within the province of biomedical sciences; this does not mean that ethics are of no relevance. I shall start with a premise.

2.1. *Notes on terminology*

2.1.1. The use of the term "*cerebral death*" is widely criticised and rightly so as being inappropriate and dangerous. If it is desired to state unequivocally that death of the entire brain has occurred, it would be right to speak of "*encephalic death*" or of "*total cerebral infarction*".⁵ In my humble opinion it is most important to foster, in an intelligent and courageous manner, *a change of terminology* both within and outside the scientific world. In this way the entire complex of tricky problems concerning death linked to the various forms of cessation or of persistent functioning of one part or another of the encephalon with the resulting detailed investigations concerning the so-called apallic state or the state of vegetative life and so on. However, I will continue here to use the expression, "cerebral death" as used in the Programme for our meeting simply for purposes of convenience and to avoid any misunderstanding.

However, I wish to go even further with my terminological notes. Until criteria which today are called "indirect" were used to establish that a person was dead, that is, to ascertain the final cessation of cardiac pulsations and breathing, no mention was ever made of "cardiac death" or of "pulmonary death" but just simply "death". In this way the correct and proper distinction

⁵ Thus, for example, THE SWEDISH COMMISSION ON THE DEFINITION OF DEATH, refused to accept the adoption of the expression "cerebral death" in its final report (December 1984), and favoured instead that of "*total cerebral infarction*" (cf. DAVID H. INGVAR, *The concept of death. Comments on an official enquiry in Sweden, in the PONTIFICAL ACADEMY OF SCIENCES volume, The Artificial Prolongation of Life and the Determination of the Exact Moment of Death*, Pontifical Academy of Sciences, The Vatican City 1986, p. 70).

Scholars in the Neurosurgery Institute of the Università Cattolica in Rome point out that to speak of "the brain" brings into question only certain parts of the encephalon, and ignores the mesencephalon, the bridge and the bulb, that is the so-called "cerebral trunk". The precise scientific term indicated by them is the "encephalon" (G. ANILE, G. MAIRA *Biologia e fenomenologia della morte cerebrale*, in "Medicina e Morale" 36, 501 (1986). Strangely enough, these two writers subsequently fail to adopt the expression "encephalic death", as would have been logical, but instead retain the expression "cerebral death".

was maintained between the fact of death and the signs or criteria for its verification. Indeed, this distinction is obscured by using the term "cerebral death" to indicate the death of the human person.⁶

This undue confusion at a scientific level is fraught with harmful difficulties for the great majority of people.

Indeed, there is a prejudicial difficulty for ordinary people in accepting the idea that death of an organ, the brain, could mean the death of the entire human organism. "Cerebral death" means "brain death" and not that of the person. If it be scientifically established that the total and irreversible cessation of the functioning of the brain is a sign of human death, as was, and still is, the irreversible cessation of the functioning of the heart and lungs, then it is clearly important that the terminology used is not another obstacle to the understanding and acceptance of this new way of conceiving of the idea of death.

It therefore seems particularly useful and important that in such a case, the expression already used in Sweden "*death through total cerebral infarction*" might be used. Such a notion is scientifically irreprehensible and clearly similar to that of "death by cardiac infarction" that is in current use and already properly understood by everyone. Thus the death of the individual could be affirmed with greater clarity, a death of which cerebral infarction is the cause, as very often is cardiac infarction and establishing of such is the ascertainment that death has taken place.

2.1.2. Another confusion to be eliminated is that arising from the expression "*electroencephalogram*" incorrectly given to a clinical examination. Here, there is a scientific and linguistic inaccuracy, the inverse of that which we have noted regarding "cerebral death". The term would be only correct if the recording was the measurement of the activity or lack of activity of the encephalon. Instead, it is only capable of measuring the activity or otherwise of the cerebral cortex. For experts, the question may seem futile, given that there are words in every language the etymological meaning of which is replaced by the meaning that current use has eventually given them. This is confirmed by the fact that in dictionaries a distinction is often made between the etymological and current meaning of a term.

But in our case the situation is different. As regards the organs of information body, the "flat electroencephalogram" is an expression usually used to state the instrumental recording that death has taken place. In this way the mistaken belief was cultivated, with serious consequences, that such a type of

⁶ Also this distinction has been laudibly reaffirmed by the aforementioned Swedish Commission (cf. PONTIFICAL ACADEMY OF SCIENCES, *op. cit.*, p. 66).

EEG was sufficient to give a certain diagnosis of death. The worst of these consequences are outlined in the *euthanasia perspective*. Indeed, in this way a willing social consent is prepared for the legislator or magistrate who may decree the cessation of treatment, as too for the doctor who may suggest the same to the family, solely on the basis of an isoelectric EEG, given the widespread belief that a flat EEG = death of the patient.

Consequently there are valid motives for undertaking the promotion here also of the use of a different terminology, in response, on the other hand, to the truth, to indicate that which until now has been incorrectly called an electroencephalogram. It could be called, for example, an "electroneocortigram" ENG.

2.1.3. I would like to conclude this point by anticipating the *objection of naïvety* which could easily be raised against a proposal to change by now universally accepted scientific terms.

I would consider such proposals naïve in any other setting. However, this does not seem to me to be the case here, should they be accepted. Here, they would be proposed not merely by someone insignificant like Carneade, or an isolated or obscure scholar but by a prestigious institute, namely the Pontifical Academy of Sciences and for their part, by each of the illustrious scientists who are its members, with specialist knowledge of such sciences involved as neurology, neurosurgery, anaesthesiology and others still.

In matters of vital importance, such as when human life is at risk, the removal of ambiguous and inexact words and concepts so as to *bring clarity and correctness, is a prime and fundamental service of truth and life*, especially in a world already heavily immersed in fog and smokescreens that conceal from many the true nature of extremely serious measures and lines of conduct. The case of the social and juridical legalisation of abortion in our times contains warnings in this regard that would be unpardonable to ignore or underestimate. The same can be said of the steps being taken to legalise euthanasia especially when one considers for example, expressions such as "assisted death" or "the right to die with dignity" to label what are really out and out homicides and/or suicides. To call things by their proper name is also an ethical requirement.

2.2. *The central problem*

However having dealt with these terminological problems, one is still faced with the question whether "cerebral death", correctly understood as the

total and irreversible cessation of all the encephalon functions is sufficient to state that death of the human organism has taken place, and therefore that of the person.

2.2.1. I shall restrict my contribution to matters within my field of competence, namely ethical aspects. From this point of view, the main question to resolve is *whether cerebral death is not just a sufficient sign but a certain indisputable one, leaving no doubt as to the death of the individual*. Indeed, it is clear that there are radically different ethical requirements of conduct for a living human individual and for a person who is no longer alive but simply a corpse. In order to treat that person as a corpse it is absolutely necessary to be certain that death has really occurred. Otherwise one would be stained with a homicidal desire.

2.2.2. In favour of an affirmative solution to the question lies the observation that cerebral death understood as death of the entire encephalon, does *not simply involve the non-functioning of an organ* in the human organism, as far as that is important, but its *entire character as an organism*, namely “a system capable of maintaining, in a more or less autonomous manner a proper functional and structural organisation in an independent or not totally dependent state of equilibrium from the environment conditions external to the system itself”.⁷ Therefore, with cerebral death one has the “permanent cessation of the functioning of the organism as a whole”⁸ and therefore its death. “The continuance of vitality in cells, tissue or even organs no longer coordinated by the entelechy unifying the organism as a whole (..), is no longer life of a human individual but purely biological and cellular life. Cells of this type can live also in culture and outside the organism. The critical concept is that of organism. The living individual is either an organism or it is no longer living as an individual according to Professor Sgreccia, Director of the Bioethics Centre of the Catholic University of Rome.”⁹

2.2.3. It should be added that there should be also certainty also as regards *irreversibility* of the non-functioning of the entire encephalon. Perhaps

⁷ KOREIN J., *The problem of brain death: development and history*. In “Brain death: interrelated medical and social issues”. Korein J. ed., *Annales of New York Academy of Sciences*, pages 19-38, 1978, cit. in G. ANILE, G. MAIRA, *op. cit.*, p. 507, note 8.

⁸ BERNAT J. L. and coll., *On definition and criterion of death*, in “Annals of Internal Medicine” 1981; 94: 389-394, cit. by E. SGRECCIA, *Aspetti etici connessi con la morte cerebrale*, in “*Medicina e Morale*” cit. p. 523.

⁹ E. SGRECCIA, *op. cit.*, p. 523. The A. refers to RAMSEY P., *The Patient as Person*, Yale University Press, New-Haven, p. 53.

this is the most delicate aspect of the question. It is well-known that irreversibility sets in when prolonged and complete non-functioning of the brain, resulting from the cessation of blood circulation, brings about a process of gradual deterioration, also of the *brain structure*. This is what makes a functional revival impossible. The time that this takes is a source of disagreement among experts. The time suggested runs from just a few minutes to 40 or 60 minutes, i.e. an hour.¹⁰ The criteria adopted to consider that death is confirmed (for which the irreversibility aspect is essential), criteria worked out by both scientific bodies and the legislator in several States, all establish a length of time greatly in excess of 40 or 60 minutes. I make special reference to both the Harvard criteria (1968), as well as to the more recent ones of the American Neurological Association (1977): from the initial 24 hours, the time has now fallen to a period that varies between *12 and 6 hours*¹¹ thanks to progress made in ascertainment techniques for the various biological phenomena involved in cerebral death.

2.2.4. One *may conclude* this point in the following terms: bearing in mind the teaching of Pius XII already referred to above, that recognises the exclusive competence of doctors to ascertain death, *Catholic morality can accept*, both on a theoretical and practical level, *the conclusions on the matter arrived at today by highly qualified scientific organisms*, as long as they offer proven certainty.

2.3. *Final suggestion*

May I make a last mention of what has been raised from the discussions carried out over recent days. It emerged, amongst other things, as a task to be carried out, that of *making some contribution towards encouraging a growing awareness in society of the clear and convinced perception* that the ascertained death of the entire brain is the ascertained death of the individual. As regards the proposal made in the introduction to abolish the expression "cerebral death" and to replace it with "death by total cerebral infarction", I should like to add here that for most people this is not sufficient even for those of a high cultural background. Nor is it possible to proffer a concise definition, however exact it might be.

¹⁰ G. ANILE, G. MAIRA, *op. cit.*, p. 505.

¹¹ J. E. LEESTMA, J.R. HUGHES, E.R. DIAMOND, *Temporal correlates in brain death. EEG and clinical relationships to the respirator brain*, in Arch. Neurol. 41: 147-152, 1984, cit. in G. ANILE, G. MAIRA, *op. cit.*, p. 505, note 9.

In my view it would be more efficacious to have *an accurate description of the changes that occur in the brain when such an infarction is ascertained*. What is required is an unexceptionable scientific description that is comprehensible to everyone.

Permit me to put forward this proposal even for the final document of our meeting, if it is agreed that total cerebral infarction indicates human death with absolute certainty.

THE ETHICAL RELEVANCE OF BRAIN DEATH

I. CARRASCO DE PAULA

Since Mollaret and Gullon introduced the not very felicitous expression *coma dépassé* in 1959, a broad interdisciplinary debate has been going on which even today cannot be considered closed. This debate, involving doctors, philosophers, jurists, specialists in ethics, etc., concerns the criteria which ought to regulate medical intervention in patients whose vital functions are maintained by means of life support systems. While suffering from cerebral lesions of various types, including even some which are incompatible with life, these patients may nevertheless be maintained in a state similar to a coma for several days, with the aid of the requisite technology. A pathologist would have no doubt about determining the moment of death as that in which the brain was irreparably damaged. Other people, however, who have seen the patient breathing and perceived the beating of his heart for hours and even days, experience an instinctive and almost insurmountable resistance to accepting that such an individual is to be considered a corpse, even though he be incapable of surviving without the support of artificial means. Even for the majority of doctors, the common image of death implies the absence of any indication of cardio-respiratory activity, as well as the appearance of certain tell-tale signs such as the loss of color in the skin, the drop in temperature, the absence of muscular movements, etc.

The situation has not been improved by the substitution of the French neologism with an English one: "brain death". In the first place, because the idea of qualifying death with particular adjectives seems suspect to many people, who wonder whether the initiative may not be hiding a vast and mysterious attempt to camouflage death, removing it from the realm of ordinary experience and thus opening the door to further manipulations of the already troubled life of man.

Secondly, as some have already pointed out, the expression "brain death", more than describing that an individual has become a corpse, seems

rather to be offered as a new definition of death itself, a definition in which the subject of death, the person, is improperly substituted by a part or organ of his body. Since the destruction of other vital organs indispensable for life such as the heart, liver, kidneys, etc., does not necessarily imply the death of man, it is not clear why the brain must be considered to be an exception.

However, crux of the matter, and that which more than any other factor is making the dialogue between specialists extremely complex, has been the lack of terminological homogeneity among doctors, accentuated by the current discussion on the extent of encephalic damage necessary to constitute death. Initially, the destruction of the entire brain was intended: "total brain infarction". Today, however, some authors have asserted that the irreparable lesion of only one part or segment of the brain is sufficient. Of these, some indicate the cerebral cortex and speak of "cortical death", whereas others hold that it would be more exact to consider the brain stem.¹ Since these various opinions seem well fixed in their respective positions, and are currently irreconcilable, the uncertainty increases and it becomes arduous and unreasonable, especially for one not expert in neurology, to found a personal judgement on scientific views not shared by all researchers in the field.

Given this situation, before attempting an ethical judgement on the applicability of the concept of brain death to man, it seems indispensable first to clarify the following points:

- 1) the role belonging to each individual specialist involved in the problems posed by the definition and diagnosis of human death;
- 2) the sense in which "brain death"² constitutes an ethical problem.

ROLES AND COMPETENCIES

Death is one of those complex and multi-faceted topics which lends itself to being examined from many angles. In the following reflections it has been thought desirable to leave out all aspects which may be defined as consequen-

¹ See, for example, D. LAMB, *Death, Brain Death and Ethics*, Croom Helm Ltd., London 1985.

² Among the various meanings of brain death, the following seem to be the most important and the most utilized: 1) destruction of the brain and the irreversible loss of the functions proper to this organ; 2) the collection of objectively verifiable signs which indicate, not only the complete devastation of the brain, but also that the decease of the has in fact taken place.

tial, in order that we may concentrate on what seems to be the central problem: that of the determination of death, or rather of the state of death.³

Determining whether or not a given man is dead is a typically epistemological problem, which first requires that a response be given to the following three questions:

- 1) what is death: the problem of definition;
- 2) in what way does it manifest itself: the semiology of death;
- 3) how can one identify, in an objective manner and without possibility of error, the signs of death in a concrete subject: the diagnosis or ascertaining of the state of being a corpse.

The definition of death is an anthropological problem and therefore involves different disciplines. Of these, philosophy provides the most exact and profound definition when it affirms that it consists in the separation of the soul and the body, that is, in the removal of the vital principle of the person from the personal organism which it vivifies. Once the unity of the person has been destroyed, what remains is no longer a human body, in the strict sense of the word, but a corpse. This concept has great importance because it underlines the essential ontological difference between a living man and a dead body, a difference which is at the basis of the different ethical attitude to be observed with regard to one or the other.

If there exists a nearly unanimous consensus concerning the definition of death, the same cannot be said regarding the manifestations of death. In fact, for some time it has been thought that death occurred before the complete disappearance of every sign of vital activity and the clear beginning of the process of decomposition; because it was thought that an organism no longer exists as such from the moment in which it irreversibly loses the capacity to act as a whole. On this basis it was held—and continues to be held—that the definitive arrest of cardio-respiratory activity was sufficient to ascertain the onset of death, even if a certain partial and residual biological activity continued for some time.

Medicine played a central role in affirming these concepts, but not an exclusive role. In fact, "cardiac death" or "respiratory death" is a concept with profound cultural roots, going back for centuries, based on individual and common experience of death and influenced by the dominant anthropological conceptions which coupled and even identified respiration with the "breath of life" and the heart with the locus of the "Self" of the person.

³ It is held, in fact, that it is neither possible nor absolutely necessary to determine the exact moment of death.

Today it seems that medicine itself no longer considers the collapse of the heart and lungs as a sign of the onset of death, but that it is rather the increase of intracranial pressure and cerebral edema, blocking the flow of blood to the brain, which rapidly determines the irreversible lesion of neural cells and tissue. However, while the presence (or absence) of breathing and the beating of the heart are phenomena accessible to non-experts, the verification of cerebral functions, especially in a subject in a state of coma, requires a specific professional preparation possible only for a doctor. From the fact that total brain infarction can be diagnosed only by a doctor, however, it cannot be inferred that the medical profession alone must decide whether or not "brain death" may replace "respiratory death". In the face of such a complex and delicate dilemma, a serious and far-reaching confrontation is necessary between the medical and anthropological sciences. The latter offer concepts and perspectives which permit a more global and adequate approach to the subject. One may consider, for example, ethical problems relating to transplants, or the complexity of the legal criteria which regulate rights of inheritance, questions which have far-reaching consequences for the individual and for society.

There is no question, however, as to who should be responsible for the diagnosis of a state of death in a concrete individual, that is, who should certify the presence *hic et nunc* of those signs which manifest beyond any possible doubt the irreversible cessation of any activity of the organism as a whole. Obviously such a certification is the exclusive task of the medical profession. The problems of an ethical nature which may arise in this area fall within the specific realm of professional ethics.

THE CONCEPT OF "BRAIN DEATH" UNDERSTOOD AS THE DEFINITION OF HUMAN DYING IS ETHICALLY INAPPLICABLE

A twofold relationship can be established between the two fundamental concepts which we have examined: the death of the person and brain death. The first, of a deductive nature, is based on the premise that the brain is not only an organ indispensable for human life like the heart, kidneys, liver, the majority of the endocrine glands, etc. but is also: 1) responsible for the integration of the other vital systems of the organism; 2) the first to suffer a truly irreparable damage, and 3) the only one whose functions cannot be replaced by any artificial means. From this it is *deduced* that the irreversible loss of brain functions adequately mirrors the death of the person.

Such a conclusion has the appearance of truth. I hold, however, that it lacks a sufficiently solid and convincing epistemological foundation:

1) it seems that the integration of the various organs and systems necessary for the organism to operate as a whole does not depend only on the brain, even if it certainly plays a central role of “conductor of the orchestra”.

2) just as it has been demonstrated—against the contrary view, which until recently was universally held to be true—that the arrest of cardio-respiratory functions does not necessarily imply death, so it could become theoretically unexceptionable the hypothesis, as someone has already suggested,⁴ that a person could be considered dead even when a considerable part of their brain is still functioning;

3) it cannot be excluded that technological progress could succeed in constructing an artificial substitute for the brain at least in its role as an integrating system for the organism, even though today this seems unlikely.

Beyond these objections, which may seem overly academic, we can push our reflections further in depth. The proposition that *the death of the person consists in the death of his brain*, like any definition, is situated not on the level of good and evil but on that of truth and error. Such a definition poses an ethical problem only at the moment when it is to be applied or put in operation. However, in matters touching upon values of a fundamental and primary nature such as life, for example, a confused and uncertain formulation cannot even be taken into consideration,⁵ because ethics demands that minimum of certainty, rigor and evidence which would prevent decisions and choices from risking, for example, the treating as a corpse he who is not yet a corpse.

The semantic content of the expression “brain death” is anything but clear.⁶ If we wish it to signify the definitive loss of cerebral functions, it becomes indispensable to specify which functions are being referred to. A response that indicated “all the functions of the brain” would not be adequate, as is demonstrated by the diversity of views in this regard.⁷ Furthermore, it

⁴ See, for example, *Death: Beyond Whole-Brain Criteria*, edited by R.M. Zaner, Kluwer Academy Publishers, Dordrecht 1988.

⁵ For this reason, the ethical principle must prevail that the human embryo, precisely because it is human, must be treated as a person; and its personal rights must be recognized and respected, regardless of all hypotheses concerning the genesis of the human being.

⁶ The ambiguity arises from the combination of the terms *death* and *brain*. A formulation such as “total brain infarction” is more technical and is therefore less objectionable.

⁷ Many authors challenge the necessity of certifying the suppression of all functions, and would find sufficient the irreparable loss of the activity of the cortex, that is of the functions of consciousness. While others hold that is superfluous to consider the state of the cortex when the functioning of the brain stem is seriously compromised.

must not be forgotten that the brain is not an isolated organ, but forms part of an organism without which it cannot function. Therefore, it would be necessary to specify clearly the relationship existing between the cessation of the cerebral operations and the rest of the vital activity of the entire organism. This brings us back to the simpler and more evident definition of death as the irreversible loss of all the operations of the organism as a whole, and not just those of an isolated organ.

AN ETHICALLY VALID USAGE OF DETERMINING THE STATE OF DEATH ON THE BASIS OF SIGNS OF A NEUROLOGICAL NATURE

The second relationship between death of the person and brain death is of an inductive nature. If it can be demonstrated that the appearance of certain signs (and those of a neurological nature seem to be the first to appear) is always associated with the cessation of all activity of the organism as a whole, and not just of the organ directly responsible for the appearance of those signs, then it is obvious that a new and reliable way is being opened up towards the creation of a new method for the diagnosis of the state of death. In this case, the ethical problem does not concern the use of a definition with a strong and controversial anthropological significance,⁸ but has to do rather with the methodological conditions required for any diagnosis of human death. These are:

- 1) the capacity to provide an absolute certainty,
- 2) the presence of reasonable motives which justify the introduction of a new method;
- 3) the ability to foresee and offset any possible negative consequences.

Let us examine these elements in inverse order.

The discussion concerning consequences is particularly complex. A biomedical procedure could conceivably be scientifically valid, and still be judged inadvisable, or even to be prohibited, because of possible foreseeable consequences concerning the individual, the family, society, etc. The adoption of a new procedure to diagnose death, such as that based on the lesion of the entire brain, must be accompanied by measures to forestall either the risk of possible abuse, or the danger of an inadequate extrapolation to other situations. For example, we know that the neurological signs of death for an adult

⁸ In fact, the point of reference continues to be the definition of death as the irreversible extinction of every activity of the organism as a whole.

are not equally reliable if applied to a baby or to a fetus. Yet there have been attempts to define the embryo, the anencephalic baby, or patients in a persistent vegetative state as subjects who are brain dead, although they demonstrate enough integration of vital functions, even though they are deprived of consciousness.

As for the motivations for the adoption of a new diagnostic method, they appear serious and substantial. In fact, by means of the signs corresponding to the destruction of the brain:

1) the diagnosis of the state of death may be made in the presence not only of a residual biological activity, but also with cardiac and respiratory activity artificially supported. In this way a precious aid is offered in the field of reanimation, because it facilitates the taking of particularly difficult decisions concerning the suspension of treatment which the diagnostic procedure now reveals to be fruitless;

2) the diagnosis of death can be ascertained more rapidly, which permits a notable reduction in the lapse of time between death and the extraction of organs for transplantation, permitting a greater biological integrity of the organs and therefore a better prospect for the success of the transplant itself.

We are now left with the third condition, which is the most central and important, because it has to do with the diagnostic certainty of the symptoms and with the reliability of the methodology to be followed for certifying their presence. Obviously on both counts, it is the task and duty of medicine to verify these conditions and to offer the necessary guarantees in their regard. If medicine—pursuing its own methodology—is able to affirm what it is empirically demonstrated beyond any reasonable doubt, that the appearance of signs A, B, C, D, etc., all together, always and without exception coincides with the total and irreversible absence of any vital activity of the organism as a whole, it seems to me that all we have to do is to take cognizance of this fact, and to confirm the ethical licitness of the use of such a diagnostic technique for the previously indicated ends and with the proper precautions to impede inappropriate consequences.

IN CONCLUSION

I would like to conclude by taking up again the reflections with which I began, in regard to the notable terminological difficulties and conceptual confusion which reign in the not inconsiderable literature on "brain death". The attempt to respond to all the questions generated by such a situation, involving issues which are properly anthropological by nature and which therefore carry significant ethical implications, would be an undertaking requiring quite a different level of application and commitment. However, the problem for the specialist in ethics is enormously simplified once it has been determined that what is in question is the applicability of a concrete procedure to diagnose that a certain physical state is truly that which corresponds to a corpse. The method will be licit if 1) it fulfills the conditions of reliability and security required by medical ethics itself, 2) if it is used for medically valid purposes, and 3) if it excludes those circumstances which could render the use of the method unworthy of man. The task of verifying whether or not these three conditions have been respected in the case of "brain death" is one that principally belongs to medical science.

APPENDIX

CONCLUSION

of the meeting of the Working Group
held at the Pontifical Academy of Sciences, October 19-21 1985

on

“THE ARTIFICIAL PROLONGATION OF LIFE
AND THE DETERMINATION OF THE EXACT MOMENT OF DEATH”

(Originally published in
Pontificiae Academiae Scientiarum Scripta varia 60, pp. 113-114)

At the invitation of the Pontifical Academy of Sciences, a Working Group met on the 19th, 20th and 21st of October 1985 to study “the artificial prolongation of life and the exact determination of death”.

After having reviewed the recent progress in reanimation techniques and the immediate and long-term effects of cerebral damage, the Working Group discussed the objective criteria of death and the guidelines in facing a persistent state of apparent death. On the one hand data obtained from experiments undertaken in mammals reveal that the resistance of the brain to absence of cerebral circulation can permit recoveries previously considered impossible.

On the other hand, it is established that when the whole brain has suffered an irreversible damage (cerebral death), any possibility of sensitive and cognitive life is definitely abolished, while a short vegetative survival can be maintained by artificial continuation of respiration and circulation.

I. DEFINITION OF DEATH

A person is dead when he has suffered irreversible loss of all capacity for integrating and coordinating physical and mental functions of the body.

Death has occurred when:

- a) spontaneous cardiac and respiratory functions have irreversibly ceased, or
- b) there has been an irreversible cessation of all brain function.

From the discussion it appears that cerebral death is the true criterion of death since the definite cessation of cardio-respiratory functions leads very rapidly to cerebral death.

The Group thus analyzed the various clinical and instrumental methods to ascertain this irreversible cessation of cerebral functions. In order to be sure, by means of the electroencephalogram, that the brain has become flat, that is, that it no longer shows any electric activity, the observation must be made at least twice within a six-hour interval.

II. MEDICAL GUIDELINES

By treatment the Working Group understands all the medical interventions, however technically complex, which are available and appropriate for a given case.

If the patient is in permanent coma, irreversible as far as it is possible to predict, treatment is not required, but care, including feeding, must be provided.

If some prospect of recovery is medically established, treatment is also required or pursued.

If treatment may bring no benefit to the patient, it can be withdrawn, care being pursued.

By care the Working Group considers the ordinary help due to bedridden patients, as well as compassion and affective and spiritual support due to every human being in danger.

III. ARTIFICIAL PROLONGATION OF VEGETATIVE FUNCTIONS

In case of cerebral death, artificial respiration can prolong cardiac function for a limited time. This organ survival thus produced is indicated when organ explantation is regarded in view of transplantation.

This is possible only in case of cerebral lesion, total and irreversible, occurring in a young subject, essentially after a brutal trauma.

Taking into consideration the important progress of surgical techniques and of the means to increase graft tolerance, the Working Group considers that transplantation of organs deserves all the support of the medical profession, of legislation and of the population in general. The donation of organs must, under all circumstances, respect the last will of the donor or the consent of the relatives if they are present.

