

INTERNATIONAL SECRETARIAT FOR SCIENCE-THEOLOGY DIALOGUE
NEWSLETTER

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The purpose of this newsletter is communication among people of common interest and concern. Its success is primarily dependent on the response of the recipients. Beginning in this issue with the article of Eishu Matsuoka, M.D., we are inaugurating a program of greater international input. Several ITEST members around the world have agreed to submit articles on a regular basis. To them we are grateful. We would encourage the other recipients of this Newsletter to take a more active role in making this a better product.

The Newsletter is published four times a year, January, April, July, October.

DECEIT AND SELF-DECEIT

Deceit is a natural attribute of man - self-deceit mostly - but since another natural attribute of man is honesty this leads to deceit of others as well. This problem causes a lot of tension in ourselves and between individuals and some try to resolve the problem by asserting there is no truth. That only serves to focus the tension, not diminish it, because it is simply an assertion of a truth that there is none. Others try to resolve the problem by avoiding it, but the problem is so unavoidable that that solution only leads to an avoidance of self. It leads to what some describe as an identity problem. It's much more serious than that.

I would like to propose a game to relieve some of the tension. In the game you look carefully at the opposite of every truth for the real truth. Imagining that the head of a coin contains as it were the truth we are occupied with, turn the coin and examine the opposite side for the real truth. Since self-deceit is a natural attribute of man, this can become a very serious game. It will drive you crazy, but it will keep you searching for the truth.

I stumbled on this game one day considering the motto of Boys Town here in Omaha, Nebraska. The motto says "He's not heavy, Father, he's my brother". It occurred to me that that may not convey the truth about a proper human attitude and that the flip-side may be more accurate. "I'm not heavy, Father, I'm his brother". I've tried this on a number of people (you can also play the game with others) and gotten even other versions, for example, "I'm not heavy, Father, he's my brother".

There are a lot of other opportunities to play the game. Let me suggest just a couple. "The best things in life are free" versus "The best things in life are very expensive" or "The problem with alcoholics is that they can't drink" versus "The problem with alcoholics is that they don't have enough experience at drinking". Try making up some of your own opportunities to play the game.

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P.S. If you don't think this has anything to do with biochemistry it's because you've never tried to discover anything in the laboratory.

LIFE SCIENCE PROMOTION ASSOCIATION

Our newspapers recently reported the first birth of quintuplets in Japan. The parents were happy but somewhat perplexed by the multiple births which were probably due to the use of an ovulation-inducing medication. There is still doubt about the survival of these immature babies -- they weighed about one kilogram each. Their survival depends on modern medical science. But might there not be a trap of sorts somewhere in that science? Or do I imagine things?

With the advancement of molecular biology we are working to bring forth human beings scientifically and technologically. Human life to some extent will be controlled by science. This is a greater and more urgent problem than most people recognize. Are we certain that human life can or should be controlled by specially designated people?

Modern science has developed through the progressive deepening and narrowing characteristic of specialization and analysis. "Life Science" has become identified with "biological science." While there are close relations between the two, it seems as if medical science has become too intimately connected with analytical biology and physical engineering. As a result we have lost sight of the human being who more and more is considered to be an object.

What does "life" mean? It has several meanings including: physical life, one's living, one's lifetime, and so on. Also, as we read in Chinese literature, a human being is an existence (directed) to live life as a real human being. Or, to put it another way, he or she has to endeavor to make himself or herself perfect, day by day, until the end. Thus we cannot analyze a life; we can analyze only shape, structure and function. We must adopt more than a biochemical approach.

The consideration of how to live has, not surprisingly, led Life Science into philosophy and religion. Medical science deals with human life and protects the right to live. That requires a deep knowledge of natural science as well as humanistic and cultural sciences and social sciences. Life Science is also synthetic, combining scientific and humanistic studies to seek law and order for human existence. Science is cognitive and finds its value in the quest for truth that goes on indefinitely into the future. But human life is limited, definite and can be lived only once. One who is deeply conscious that a human being has a limited existence is aware that science can be in need of control. For this reason I have directed the "World Join One's Hands" movement and am trying to develop it. I like the figure of one whose mental hand (religion) and material hand (science) are joined together to pray in perfect harmony. My aim is science based on religious sentiment and religion based on science. This is the true meaning of Gassho (Join One's Hands) in a recognition of the law of nature. Thus we reflect on the grace of all things and grow in gratitude.

To join one's hands is a prayer that we become ourselves. It is in prayer that we cultivate the power of reflection and introspection. As Buddha admonished: "One who has religious sentiment will see through himself and one who is able to penetrate into himself will really understand religion." We must open our spiritual eyes.

Three years ago I founded an association for the advancement of Life Science. I felt the need to establish a genuine Life Science and to create a life philosophy. Life Science is the same as the

Uncertainty of Buddhism which pursued circulating causality of life and substance. Life Science is the science of becoming real human beings. I feel I have a mission to inquire into the law and the order of human existence. This inquiry is the basis of the activity I am continuing with the cooperation of people in every stratum of society.

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THE SCIENTIFIC LIMITATION OF BRAIN DEATH

Recently it has been strongly recommended that the time-honored clinical definition of death be redefined in terms of central nervous system performance--specifically, the demonstrated absence of brain activity. Classically the demise of the human organism has always been associated with the cessation of cardiac and respiratory activity and until recently presented no serious problem to the physician, lawyer or theologian. However, because of the mega-advances characterizing biomedical research of the last two decades, most notably in the fields of organ transplantation and prolongation of life, the traditional concept of clinical or medical death is being challenged. There is no question but that the practicalities and necessities of organ transplantation in particular have accelerated the re-examination of this definition and thereby thrown into sharp focus the scientific confusion which attends the transition of an individual from life to death.

Crucial to the problem of scientifically defining death in classical terms is the knowledge that technology has now provided us with mechanical and pharmacological support systems which can substitute for many of the vital processes, including cardiorespiratory function, by taking over as it were, the work loads of entire organ systems. As presently developed, some of these machines can be employed only for short periods of time; for example, total extracorporeal circulatory control utilizing an artificial heart; however, there is every reason to believe that eventually the engineering problems associated with these devices will be overcome permitting chronic implantation. Thus, we have to acknowledge the probability that eventually all of the major cellular complexes of the human body will be replaceable either by transplanted organs (man or animal) or sophisticated engineering modules. Admittedly, the expense and logistics of such undertakings will and would be enormous, but we must admit to these possibilities if we are to examine human death from an objective point of view since the anatomical structures which formerly formed the biological basis for the definition of this state are acknowledged to be replaceable by mere mechanical elements!

Chou, in a recent article, echoes the concern of many physicians in this country when he writes, "There has been increasing concern regarding medical as well as social and economic justification of using extraordinary means to maintain artificially vegetative function of a fatally injured person. It appears, therefore, that a redefinition of death based on integrity of the CNS has become preferable for at least two reasons: 1) to reduce the suffering of the patient, his family, and the burden on the hospital bed and the staff; and 2) to make available organs of such patients for transplantation." Here again the writer stresses the practicalities of shifting the clinical definition of death from the cardio-pulmonary to the central nervous system. But why is medical science placing such emphasis on this

particular system to the exclusion of all others? Because this system is not replicable, representing as it does the repository of the highest functions of man. The human brain provides the tissue substrate for intelligence, memory, behavior, emotion; yes, even personality. Within the intricacies of this organ, the most complex structure known, reside those unique factors which characterize us as human beings and as particular individuals. It could be argued that all organ transplantation and organ engineering replication and substitution is directed toward sustaining the performance of this single organ--the human brain. Conversely, when this elite cellular system fails it would seem reasonable to assume that what is characteristically "human" is also being lost from the body.

Many physicians, particularly in this country, are now equating clinical death in a patient with brain death. This new concept was given considerable emphasis with the publication in 1968, of the report of the Ad Hoc Committee of the Harvard Medical School, which stated "(Our) primary purpose was to define irreversible coma as a new criterion for death." While numerous sets of regulations have now been promulgated for the definition of a permanently non-functioning brain by other groups, the characteristics of irreversible coma laid down by the Harvard Committee have enjoyed the most universal acceptance. In general they are as follows: 1) Unreceptivity and unresponsivity; 2) no movements or breathing; 3) no reflexes; 4) flat electroencephalogram. All of the above tests must be repeated at least 24 hours later without showing change.

If these clinical and electroencephalographic conditions are existent for the period stated there appears to be little reason to argue the irreversibility of the cerebral function, for in 1969 the American EEG Society reported that of 1,665 patients presenting with isoelectric electroencephalograms and meeting the above neurological criteria, only three patients recovered some cerebral function and these had been in coma from drug intoxication (it has been recognized for some time that great care must be utilized in applying the above criteria for brain death in patients known to be suffering from drug intoxication or hypothermia).

Recently Chou has questioned the need for an absolutely flat EEG tracing, particularly in those cases where the neurosurgeon has operated on the brain and recognized the extent of the tissue damage. Our experience, now quite extensive, is similar to Chou's in that at surgery the brain may show evidence of overwhelming destruction, totally incompatible with survival, yet during the early post-operative period electrocortical activity and spinal reflexes could be obtained. Thus, the brain may be incapable of recovery even when it does not meet all of the clinical and electroencephalographic limitations imposed by the new definition of brain death.

An additional shortcoming in the present proposals for defining brain death is their universal requirement for repeated examinations over a lengthy time interval. As a consequence, the problem has arisen (particularly with reference to securing organs for transplantation under excellent physiological conditions) of making an absolute judgment of brain death immediately or at least within a relatively short period of time, which cannot be satisfied by present criteria.

To assist in more scientifically defining brain death, Shalit et al have investigated the blood flow and oxygen consumption of the dying brain. They found that when the cerebral oxygen consumption fell below one-third of the normal values, brain death was manifested by classical clinical signs. Their studies which attempt to biochemically define brain failure and death add an entirely new and significant

dimension to the definition of this state. Unfortunately, like the traditional neurological and electrical examinations, they emphasize the need for repeated sampling of arterial and jugular venous blood in order to measure cerebral metabolism over an extended period of time. Our own biochemical studies of metabolism in the failing brain demonstrate a gradual reduction in the oxygen consumption (but still present) right up to the moment of total physiological collapse of the brain.

It was evident then, that even with the additional parameter of cerebral metabolic measurement (and the calculation of cerebral blood flow) a period of time during which the examinations are repetitively performed is required to absolutely establish brain death as obviously indicated by the demonstration of non-function persistence or no improvement in the abnormal measurements. Presumably the proof of the correctness of these protocols for documenting brain death is that the cerebral performance does not improve and the patient is incapable of survival without the employment of extraordinary means to support vital body processes.

Obviously, then, the scientific limitations of brain death as presently conceived are time dependent. If we wish to define irreversibility of brain death acutely, then the advantage of time (with its multiple studies) would be lost and would require an absoluteness of methodology and definition which are not yet available in the programs which have been described. In all probability, the scientific limitations of such a definition would require direct examination of brain tissue employing both biochemistry and neurophysiology to assess the actual state of performance of the brain tissue to assure irreversibility. While this would require invasive techniques (operative) they could be accomplished through small trephinations of the skull which offer little or no danger to the patient. Employing standardized equipment biopsies of brain tissue would be obtained for direct chemical analysis and a small series of stereotaxically oriented depth electrodes would be placed in major subcortical areas of the brain. In this way the tissue matrix of the brain could be examined directly hopefully providing a profile from which present and future tissue irreversibility could be argued with a high degree of certainty. Fortunately considerable research has been done on the biochemical failure of the brain in the experimental animal during the process of dying, demonstrating the expected lactate as well as other metabolite accumulations and substrate exhaustion. Meaningful comparisons could be made between this data and that in humans in defining the biochemical profile of the failing brain.

Less information is available referable to surface and depth EEG recordings in the agonal state, nevertheless, sampling of the deep systems (particularly the reticular activating system) and appropriate sites following evoked stimulation would assist significantly in defining brain death neurophysiologically.

We simply do not understand the evolving pathophysiology of cerebral failure which is rendered highly complex since the brain is actually composed of many cellular systems performing specific functions and yet intimately associated with the entire brain organ. Each of these tissue substrates has its own metabolic rate and actually "fails" as a function cellular aggregate at its own unique time constant. Thus it must be admitted that brain death as presently defined is a generalization indicating failure of gross performance and, more important, over-all organization, since numerous sub-systems within the brain are still viable and functioning!

It should be remembered also that the entire brain of the sub-human primate can be removed from its body and maintained in a high performance state for hours supported exclusively by machinery.

Likewise, small cell aggregates from brain can be grown in tissue culture and thin slices of cerebral tissue can actively respire for hours in appropriate nutrient fluids. Even if the integrity of removed brain cells is destroyed by special techniques and the various resultant cellular fractions, e.g., mitochondriac, are examined they are capable of taking up oxygen for hours.

Particularly disturbing in this context is the knowledge that large portions of human brain can be surgically excised with retention of normal or near normal cerebral function and that infants are born daily displaying awake patterns, excellent movement, and reflex activity but actually have only the rudiments of a brain organ!

We have much to learn referable to the phenomena of brain failure and death before we can construct with certainty the scientific limits of this definition, particularly if the decision is to be rendered immediately or over a minimal time span. After all, like all biological activity, life and death merge into one another representing a continuum and the neuroscientist can only in the final analysis determine the point of irreversibility of this highly complex system at which the possibility of organized activity which characterizes human behavior has been exceeded.

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THE PRAYER OF PRAISE

The questions surrounding experimentation and therapy in human genetics are questions that clearly call for precise scientific understanding and sober moral sensitivity and reflection. But there is another element that is also worthy of consideration if the level of reflection in these matters is to be adequate. And this is the level of ultimacy and especially the level of prayer.

For it is through prayer that men and women become aware of the lively and joyous spontaneity through which God, Jesus, Spirit break through and bring healing, completion, meaning, life, love, and understanding in ways that are concrete and surprising. Without prayer, it seems to me that we can do very little but bang our heads against the thick wall of mystery that gets both taller and wider the more we think and the more we come to know. Whether mystery is that hard wall or whether it is a gentle spongy turf that is pleasant to land on (though in its own way uncertain and awesome) depends largely, I think, on the activeness with which we pray.

Pray what or pray how? Fundamentally, I think that all of us need to learn more about the simple prayer of praise. How often do you and I actively praise and thank God for the little and the large things, good and bad, that enter into our lives each day, each minute of the day? For our research, for our education, for our intellects, for our homes and families, our work, our friends? Even - yes - even for our impasses and our troubles? How often do we say "Praise God, praise Jesus, praise the Lord" as we go about our business - is it really only our business? each day? Psalm 106:47 says that

we will "find our happiness in praising you." I know from my own experience and the testimony of others that this is true.

But why say this here? Simply to make a pious pitch or to satisfy a minister's whim? No. It must be said in our context as serious reflectors on the scientific and moral scene, because our studies and our dialogues can so easily get sterile and ponderous. Not simply perplexing, but weighty like a millstone or an albatross. And after awhile we get a sense of this, and we get dull and lose our sense of direction. Praising God puts us back at the heart of things, and reminds us of who sends us to do this work and who is our true way of doing any of it and our true love and inspiration through it all. We must dare to stare mystery in the face and to name it with joyous praise. Praise God!

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ANNOUNCEMENTS:

We should like to extend our congratulations to the following ITEST members for their achievements:

Fr. John Padberg, S.J. is now the President, Weston College, Cambridge, Massachusetts.

Dr. Claude A. Frazier, M.D. of Asheville, North Carolina, recently was awarded the North Carolina "Baptist Layman of the Year" award for 1975. This award, which goes to the layman who is active in Christian service, is a means of recognizing laymen who keep the Church's meaning their objective. This award is presented annually by the North Carolina Baptist Men's Convention.

Fr. Walter J. Ong, S.J. has been elected second vice-president (president-elect) of the Modern Language Association, MLA, with automatic succession to the presidency of the 30,000 member organization in 1978.