INSTITUTE FOR THEOLOGICAL ENCOUNTER WITH SCIENCE AND TECHNOLOGY

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In August, 1993 ITEST, for its 25th anniversary, made a brief foray into the realm of beauty. We are still convinced that beauty — perhaps beautiful things would be more accurate — offers an excellent bridge between faith and science. Who cannot be impressed by the beauty that abounds throughout creation? Equally, who, having heard, seen and tasted the goodness of the Lord, cannot but be impressed by his glory and his beauty?

Right now, however, the ITEST Staff is in a somewhat strange mood. In a sort of "what the heck" frame of mind, we have decided to offer a foray into humor. The world is somber enough and the usual content of the ITEST Bulletin is most often directly concerned with rather serious ideas. In this issue we bring you Father Coleman's take-off on "serious articles" as we are liable to encounter them in the best theological journals. We feel certain that those journals are strong enough to survive a little lampooning. So, in this literal age, you are warned that Father Coleman's article from the *Childe Harold Series* is a "serious attempt at the un-serious."

As we enter our 27th year of corporate life we invite you to "go out into the desert and look for and recruit one devil like unto yourself" for ITEST membership. We need more people — more knowledge, more wisdom, more commitment — if we are to have more influence in the scientific/technical/ecclesiastical communities. Someone — I believe it was Dr. Tom Sheahen — mentioned at the ITEST Workshop in March, 1994 that we have to do more singing to the choir if we're going to succeed in breaking down the myth of a faith/science conflict. Thus we ask each of you to enlist at least one of your friends, colleagues, etc. as an ITEST member. We'll be adding an ITEST brochure to the membership renewal letter in about a month.

I wish you the joy of the Lord. In a world that seems "snarlier" every day, may the peace and joy of the Lord fill your hearts.

Robert Brungs, S.J.

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"AN INTELLIGENT CHILD'S GUIDE TO TRANSPOSITION" (A), *The Childe Harold Series*

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Once[1] upon a time and space[2] A. W. created the heavens and the earth and all that is in them.

A.W. was quite an artist, so A.W. filled the entire universe with every interesting and beautiful thing A.W. could imagine, which is to say at least one of everything possible, including the endless variety of tropical fish and the multicolored birds. A.W. was really into color and detail. And, of course, A.W. did not overlook good things to eat, such as double-chocolate chocolate-chip ice cream.[3]

One of the problems A.W. had right away was if you make things which vibrate slow enough to be detected by human perception and want them to be distinguishable from each other, there have to be spaces between them. People have a lot of trouble getting the picture otherwise, and since people were the only ones who would really be able to appreciate the creation, A.W. modified the original concept. From an intensely compact circular universe which could fit snugly in the lifeline groove of A.W.'s hand, A.W. blew the whole thing up.[4] Try to picture the surface of a balloon expanding as air is pumped into the balloon. Some think of this in a more physical manner, as in a "Big Bang," but others think this is a concept a bit earthy even for A.W.[5] Please don't ask whether A.W. was inside or outside that intensely compact circular universe, not that those words have any meaning anyway.

Some go on to speak of the basic elements of the universe, which originated in this "Big Bang," in terms of quarks which come in the following flavors (from the lingering radiance of the ice-cream effect, no doubt): up, down, strange, charm, top and bottom. A perfectly sensible way to describe things you can't see anyway.

What A.W. wound up doing was making each thing separate so it could stand alone in three dimensions. A simple example of something would be created, and then a whole line of that prototype would be developed with its becoming more and more complex. So with living things A.W. started with one-celled beings and worked up to human beings and angels.[6] We think our complexity was a sign that A.W. was particularly fond of us. But, as a being *sui generis,* A.W. may be very simple or very complicated. We don't know for sure.[7]

Everything was working well. The universe was expanding with startling rapidity. The dust clouds were whirling into galaxies, and the galaxies were spinning into stars and planets and other assorted celestial phenomena. But A.W. was uncomfortable with all of the empty places in creation. A.W. said to no one in particular: "You know, if you weigh all this stuff, it just doesn't add up to 100%."[8]

Wisdom, a kind of non-violent adjutant had spent the entire process[9] of creation just hanging out and playing[10] around celestial command central. This finally got on A.W.'s nerves. After Wisdom's saying once more: "What can I do?", A.W. told Wisdom, "Since you are so good at taking up space[11] around here, I want you to go and fill up the nooks and crannies of the universe. That way A.W. could have the material creation add up to 100% and big-scale creation would be able to maintain a kind of dynamic balance. A.W. was very pleased with the solution to the problem.

Well, there is always a critic. When A.W. was designing the most advanced of the living beings, A.W. had decided to go really overboard. "Why should We be the only being in the universe who is self-aware[12] and can make choices?" (When you are a Trinity of persons you can talk to yourself and no one thinks it strange; but you have to use strange grammar). So A.W. shared these abilities with angels and humans.

The angel Satan, one of the resulting and most complicated of all the living beings said that he did not like the very fine and delicate cords[13] which connected human beings and angels to A.W. A.W. protested that they were invisible, and if they should be cut things would not work right. Satan said he did not care, they were ugly and they were too controlling. He said to A.W.: "Get a consciousness."[14]

Determined to be codependent no longer, Satan cut his silver cord,[15] whereupon he turned a peculiar color,[16] and went off (shockingly enough), by himself. It was not long before he had convinced the human beings, who were the next most complicated living beings, to do the same thing. A.W. had put them in charge of the earth. Satan said by going along with A.W. on the rules for conduct in the primeval garden spot of the world they were just enabling A.W.'s controlling nature and constant need to give. "Were you asked if you wanted to manage some garden for ever, when you could be CEOs of a strip mining operation? Make choice have a meaning."

Well, A.W. became depressed, and creation, cut off from its source of "right thinking" started going to hell in a handbasket.[17] The shock of it all shook heaven.

After a long time had passed, a moment's peace broke out in most of the so-called[18] civilized world. A.W. decided it was time to make a move. When A.W. had been creating, it was in the mode of a "idea person." There was a engineer who would take the idea, make the blue prints and implement them. At first this person was called *imago Dei invisibilis* (Col.1:16), or *logos* (John 1:1-3), for short, but later we found out that this person's secret and real name was Jesus. (Luke 1:31).

A.W. told Jesus that since he understood how the whole creation worked, (He was adept at using TOE (Theory of Everything) and GUT (Grand Unified Theory) software on the cosmic computer), he was to go to the living beings on the earth, and see if he could get them reattached to their silver cords. Everyone realized that the mission might not go well. Things were nervous in heaven. One of the angels said that Jesus was the tears of A.W., and everyone agreed that that about summed it up.

Jesus had his work cut out for him. First of all, he had to explain in a very round about way what he was doing on earth. Most people had forgotten about the silver cords altogether, but they had their ideas on what was what. Jesus gathered some chaps together and filled them in on the full story. Jesus said to everyone else that if things were going to quit going to hell in a handbasket, the people were going to have to get together in dynamic, affirming and other-centered relationships.[19] Everyone could get that message. The problem was that scarcely anyone wanted to bother with it. They rather liked treating others as things and as sex objects. It would mean a complete restructuring of things, and they didn't think the Romans would go along with it.

Finally, Judas, one of Jesus' executive committee, decided that Jesus was never going to be a Superstar[20] with this attitude. Worse than that, Judas understood the pitch, knew that Jesus was right, but hated him for it as he despised weakness of any kind. He decided that before the madness went any further, Jesus had to take a trip to New Jersey.[21]

Jesus was not just anyone's fool. He could see that things were getting tense. So he said to the Committee: "Look, they're going to take me out. You've got the basic message but there are still some gaps in it. When I get out of New Jersey - I won't spend more than two nights and three days there[22] — I will send Wisdom and she will fill in the gaps. When that happens, I will reattach your silver cords. But there is one thing more" — and this is when He told them about the sun beam and the tool shed.[23]

In the midst of this edifying discourse which does not appear in the Christian scriptures,[24] the Committee was coming unglued, more at the thought that they might have to accompany Jesus to New Jersey, than what might happen to him there. It was at this point that Nathaniel said, in a non-judgemental manner: "Lord, the chaps and I have done some spontaneous sharing and we don't think your elevator goes all the way to the top." Nathaniel was always saying guileless things, so Jesus ignored him.

Jesus said: "Now look, you all. We didn't spend three years going to all those parties in peoples' upper rooms just because I liked parties. I don't want you to forget me, and that's what happens to people who go to New Jersey. So here's what I want you to do.

Find a tool shed like the one we are using today for whatever the meal it is we are eating. Make sure its back wall faces the east.[25] Make a hole in the wall big enough for everyone present to stand in the morning sun light. Then in the morning of the same day of the week I get out of New Jersey, tell them to gather at the tool shed. If they stand in the sunbeam, and look in the direction of the sun, they will, with Wisdom's help and the help of their reattached silver cord, see everything and how it all fits together. For those without faith, there will be only dust particles. For those who believe, at some point the experience will bring each person inner illumination and enlightenment.[26]

And that, dear Childe, is how it might have been reported had John Macquarrie and Clives Staples Lewis written one of the Gospels.[27]

ENDNOTES:

A. Transposition: a theological term referring to the putting of the infinite into the finite. In the text A.W. refers to the Deity — the Alpha and the Omega (first and last letters of the Greek alphabet). The Omega looks a lot like a "W" with weak legs).

1. Once: In the Greek text, this word is a verb, in the imperfect tense, showing ongoing, continuous duration.

2. Time: historical time. Not to be confused with primordial time, dream time, mythic time, or even central daylight time. Time and space began with the

appearance of the universe. Try not to think about this as it will mess you up real good if you do.

Actually there is nothing in this first sentence which is not violently disputed among theologians and scientists in any configuration you please. Some more or less scientific literature on this topic: Dr. Eva-Maria Amrhein and Fr. Robert Brungs S.J., *The Vineyard: Scientists in the Church* (St. Louis: ITEST Faith/Science Press), 1992. Thomas Berry, *The Dream of the Earth* (San Francisco: Sierra Club Books, 1988. Robert A. Brungs, S.J. and S. Marianne Postiglione, RSM, editors, *A Seminar with Fr. Stanley Jaki* (St. Louis: ITEST Faith/Science Press) 1992. Robert A. Brungs, SJ, *You See Lights Breaking upon Us* (ITEST Faith/Science Press, St. Louis, Missouri), 1989. Robert A. Brungs, SJ and Marianne Postiglione, RSM, eds, Some *Christian and Jewish Perspectives on the Creation* (St. Louis: ITEST Faith/Science Press) 1991. Paul Davies, *The Cosmic Blueprint: New Discoveries in Nature's Creative Ability to order the Universe* (New York: Simon and Schuster) 1988. Paul Davies, *God and the New Physics* (New York: Simon and Schuster) 1983. Paul Davis, *The Mind of God: The Scientific Basis for a Rational World* (New York: Simon and Schuster) 1992. P.C.W. Davies, *The Forces of Nature* (Cambridge: Cambridge University Press) 1979. J. Krishnamurti and Dr.David Bohm, *The Ending of Time* (Francisco: Harper) 1985. Robert T. Francoeur, *Perspectives in Evolution* (Baltimore: Helicon) 1965. Nick Herbert, *Quantum Reality: Beyond the New Physics* (New York: Doubleday) 1985. A. Hulsbosch, *God in Creation and Evolution,* Martin Versfeld, translator (New York: Sheed and Ward) 1965. Stanley L. Jaki, *The Savior of Science* (Washington, D.C.: Regnery Gateway) 1988. Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press) 1970, second edition. Leon Lederman with Dick Teresi, *The God Particle: If the Universe Is the Answer, What Is the Question?* (New York: Dell Publishing) 1993. Lawrence LeShan and Henry Margenau, *Einstein's Space & Van Gogh's Sky: Physical Reality and Beyond* (New York: Macmillan Publishing Company) 1982. Daniel Liderbach, *The Numinous Universe* (New York: Paulist Press) 1989. Anne Lonergan and Caroline Richards, eds, *Thomas Berry and the New Cosmology* (Mystic, Ct.: Twenty-Third Publications), 1988. Ted Peters, ed, *Cosmos as Creation: Theology and Science in Consonance* (Nashville: Abingdon Press) 1989. S. Marianne Postiglione, RSM, ed, *Transfiguration: Elements of Science And Christian Faith* (St. Louis: ITEST Faith/Science Press) 1993. Erwin Schrödinger, *What Is Life?* (Cambridge: Cambridge University Press) 1967. Michael Talbot, *Beyond the Quantum* (New York: Macmillan) 1986. Michael Talbot, *The Holographic Universe* (San Francisco: Harper Perennial) 1991. James S. Trefil, *The Moment of Creation: Big Bang Physics from Before the First Millisecond to the Present Universe* (New York: Macmillan) 1983. Ken Wilber, ed, *Quantum Questions: Mystical Writings of the World's Great Physicists* (Boston: Shambhala) 1985.

The article in your hand represents the cutting edge of the theological investigation.

3. Some people think this is because A.W. is obsessive/compulsive about detail. Of course, A.W. may just be very, very thorough.

4. "Imagine . . . a huge sphere enclosing an enormous volume of space containing many galaxies. Now, picture space everywhere rapidly shrinking, like Alice in Wonderland after eating the magic cake. The sphere contracts to a smaller and smaller radius; but however shrunken it becomes there is still unending space and an infinity of galaxies outside it. If the sphere shrinks to literally nothing, then we have the mathematically delicate problem of an infinite universe which is infinitely shrunken. There is still no centre or edge, but the contents of any sphere, however large it started out, would be crushed together into a single point. Astronomers believe that it was from such an infinitely shrunken, yet unbounded, state that the universe exploded. (Paul Davies, *God & the New Physics* (New York: Simon and Schuster), 1983, page 16.)

See also, Mahalia Jackson, *Black Gospel and the Big Bang: He's Got the Whole World in His hand* (Chicago: Music International) 1961.

5. Cf. Philippians 2:5-11. "He was in the form of God; yet he laid no claim to equality with God, but made himself nothing, assuming the form of a slave. Bearing the human likeness, sharing the human lot, he humbled himself, and was obedient, even to the point of death, death on a cross." (verses 6-8.)

Timothy Ferris, (*Sky and Telescope,* August 1993, page 4), calls the Big Bang "misleading, trivializing, and inappropriately bellicose. . ." (paraphrased by Cheryl J. Beatty, "Participatory Cosmology: The Big Bang Challenge," *Sky and Telescope,* March 1994, page 20.) Ferris extended an invitation to the readers to submit a new and more appropriate name. Persons from 41 countries sent in 13,099 responses. Beatty emphatically denies the interest in changing the name arose because of the political incorrectness of the phrase (read: sexual innuendo of the phrase), but notes that the phrase was invented by Fred Hoyle as a putdown of the theory underlying it. A winner was not chosen by the judges,

Hugh Downs, Ferris and Carl Sagan, even with such promising entries such as "What Happens If I press This Button?" "Bertha D. Universe," "The Big Boot," "Portrait of the Universe as a Young Bam," and "You're Never Going To Get It All Back In There Again." Their rationale for not awarding the prize was: "The idea of space-time and matter expanding together and not 'into' anything may be permanently beyond reach in the universe of short and lucid phrases." (See pages 21-22 of the article cited above.)

6. "Men and women have always sought, by one means and another, to be together rather than apart. At first they were together by the simple expedient of being unicellular, and there was no conflict. Later the cell separated, or began living apart, for reasons which are not clear even today, although there is considerable talk. Almost immediately the two halves of the original cell began experiencing a desire to unite again — usually with a half of some other cell. This urge has survived down to our own time. Its commonest manifestations are marriage, divorce, neuroses, and, a little less frequently, gunfire." (James Thurber and E.B. White, *Is Sex Necessary? or: Why You Feel the Way You Do* (New York: Harper-Collins) 1984.

7. "Central to Whitehead's philosophy is that God is responsible for ordering the world, not through direct action, but by providing the various potentialities which the physical universe is then free to actualize. In this way, God does not compromise the essential openness and indeterminism of the universe, but is nevertheless in a position to encourage a trend toward good. Traces of this subtle and indirect influence may be discerned in the progressive nature of biological evolution, for example, and the tendency for the universe to self-organize into a richer variety of ever more complex forms. Whitehead thus replaces the monarchical image of God as omnipotent creator and ruler to that of a participator in the creative process. He is no longer self-sufficient and unchanging, but influences, and is influenced by, the unfolding reality of the physical universe. On the other hand, God is not thereby completely embedded in the stream of time. His basic character and purposes remain unchanging and eternal. In this way, timelessness and temporality are folded into a single entity.

Some people claim that a 'dipolar' God can also combine necessity and contingency. Achieving this, however, means giving up any hope of that God might be SIMPLE (emphasis in original) in his divine perfection, as Aquinas supposed. Keith Ward, for example, has proposed a complex model for God's nature, some parts of which might be necessary, others contingent. Such a God, though necessarily existent, is nevertheless changed by his creation, and by his own creative action, which includes an element of openness or freedom." (Paul Davies, *The Mind of God: The Scientific Basis for a Rational World* (New York: Simon and Schuster) 1992, page 183).

8. "If we simply add up all the mass we can see with our telescopes and compare it with the current volume of the universe, we fall short by a factor of 10 or perhaps 100." (Ted Peters, editor, *Cosmos as Creation* (Nashville: Abingdon Press), 1989, page 52. The article cited here is written by the editor and has the same title as the book.

Cf. Sirach 42: 19, 21-25: "He knows all that has ever been and all that ever will be. . . . The orderly world shows the greatness of his wisdom. . . . All his works are beautiful, down to the smallest and faintest spark of light. . . . Nothing the Lord made is incomplete. Everything completes the goodness of something else. Could anyone ever see enough of this splendor?" (Good News Bible). See also: James Trefil, "Dark Matter and Missing Mass: How Much Should There Be?", *The Dark Side of the Universe* (New York: Doubleday) 1988, page 105-120, and Wallace Tucker and Karen Tucker, *The Dark Matter: The Quest for the Mass Hidden in Our Universe* (New York: William Morrow) 1988.

9. Process?? Yes; that is a good question. Is it a dynamic or static universe, open or closed, flat or oscillating, the only one possible or one of many parallel examples? See, A. Hulsbosch, *God in Creation and Evolution* (New York: Sheed and Ward), 1965. Also: "With you is wisdom, who is familiar with your works and was present when you created the universe, who is aware of what is acceptable to you. . . ." (Wisdom: 9:9.)

10. "The Lord created me (wisdom) the first of his works, long ago, before all else that he made. . . . When he set the heavens in place I was there . . . when he made the earth's foundations firm. Then I was at his side each day, his darling and delight, playing in his presence continually, playing over his whole world.... (Proverbs 7:22,27,29,30-31.)

11. Space around here: you try creating a universe out of nothing and see how long your patience lasts, especially with the very close working conditions prior, in a manner of speaking, to the Big Bang.

"It is (the Lord) who has created (wisdom), beheld and measured her, and infused her into all his works. To everyone he has given her in some degree, but without

stint to those who love him." (Sirach 1:9-10.)

12. Self-aware: when you look at yourself in a mirror and know it is you. "The Lord created human beings from the earth. . . He clothed them with power like his own and made them in his own image ... and gave them minds with which to think." (Sirach 17: 1,3,6)

See also: John R. Mabry, "Cyberspace and the Dream of Teilhard de Chardin," *Creation Spirituality,* Summer 1994, page 24: "In Teilhard's estimation, human kind is the crowning achievement of the universe, because it is in us, and as far as we yet know, only in us, that the Creation has become self-aware."

13. Reported in many accounts given by those traveling in the astral plane. Any Tibetan Buddhist should be well informed on this subject. See also, Doris Lessing, *Canopus in Argos: Archives series: Re: Colonized Planet 5, Shikasta: Personal, Psychological, Historical Documents Relating to Visit by Johor (George Sherban): Emissary (Grade 9) 87th of the Period of the Last Days* (New York: Vintage Books) 1981; *The Marriages between Zones 3,4, and 5 (As Narrated by the Chroniclers of Zone 3)* (New York: Vintage Books) 1981; *The Sirian Experiments* (New York: Vintage Books) 1982; *The Making of a Representative for Planet 8* (New York: Vintage Books) 1983; *Documents Relating to the Sentimental Agents in the Volven Empire* (New York: Vintage Books) 1984.

Angels are beings without bodies and are therefore sexless. However, for our purposes, since men are blamed for 99.9% of the evil in the world, the writer has chosen to use the male reference for Satan.

14. Cf. Carl G. Jung. *Answer to Job,* R.F.C. Hull, translator (Princeton, N.J.: Princeton University Press), 1958 and 1969. In *The Collected Works of C.G. Junq,* volume 11, Bollingen Series XX. Jung's point is that A.W. lived in the unconscious until Job shattered A.W.'s bliss with his infernal questions.

15. Somewhat in the manner described in Isaiah 38:12, "You have folded up my life like a weaver who severs the last thread." (New American Bible).

16. *Codependent:* 98% of homes in the American colonies are dysfunctional. Codependency is a technique for surviving such a stimulating experience. That Satan could behave in this manner indicates the immediate, even anticipated, effects of the breakdown of "right thinking." *Peculiar color:* Something like Uncle Ed looks on New Year's morning.

When the humans severed their silver cords it introduced a condition into human life something known as death. "God did not make death, nor does he rejoice in the destruction of the living. For he fashioned all things that they might have being . . . by the envy of the devil, death entered the world, and they who are in his possession experience it. (Wisdom 1:13-14 16).

17. It was a very large basket.

18. So-called: Fast food and Rock and Roll had not yet been invented.

19. The meaning of this likely will be revealed later.

20. Superstar: A person famous enough to hire an agent in order to appear on the talk show circuit. It is related to another 20th century concept, "moment of fame," referring to a duration of approximately 15 minutes. An example of Johannine irony borrowed from an ironical person of the 20th century, Andy Warhola.

21. New Jersey: A place suffused with mythical connotations. The Valhalla of the Mafia, a mythical brotherhood. Roughly equivalent to Gehenna.

22. Probably due to some kind of Frequent Flyer deal.

23. Tool shed: one possible specific meaning of an all purpose word for storage structure, "*sd-rc,*" traced to the Ugaritic texts. "*Sd*" can be transliterated "*Shad*" and means shed, and "*rc*" as "*rach*" meaning tool. "*Rach*" survives in English by way of the Old French "*rachet*", a wrench. "*Shad*" comes to us from the Middle English "*shad*" or "*shadde,*" meaning framework. The eating space of the house acquired this name because it was used as a place to store the tools used in cultivating the family farm, or in the city the plot used for growing Matzo. The word is applied by extension to an upper room in the house used for eating and/or entertaining on a larger scale than the equivalent space downstairs.

24. That St. John omitted this pericope is unfortunate. It is every bit as enlightening as the story of the man who was dumped in the swimming pool regularly by his weird friends. (John 5).

25. Hole in the East wall: Most likely the origin of the rose window in the more ancient churches. The size of the window was determined by how many people could be expected to stand in the sun beam at the same time. An ancient Gaelic liturgical text, the so-called MAIOR IN MINOR (The Greater into the Lesser), notes the concern of early Celtic converts of getting skin cancer at Sunday Mass from repeated exposure to the sun.

The authenticity of the text is questioned because as we all know the sun does not shine in Ireland. It is possible the text was written by Gaels but originated on the Costa del Sol, where the Irish migrate in the winter. The invention of stained glass, the Industrial Revolution, the Second Vatican Council and Coppertone Sun Screen 16 has resolved this concern.

Today, there are no rose windows, but as hardly anyone comes to Sunday Mass expecting to be enlightened, it is not a problem. Cf. Alan W. Watts, *Myth and Ritual in Christianity* (Boston: Beacon Press) 1968, pages 232-236. Watts alleges that Christians have utterly forgotten and no longer have access to the meaning and colossal energy underlying the symbols they handle with such casual disregard in religious services.

26. Isaiah 60:1-2, "The Lord rises upon you and his glory appears over you." 1 Peter 2:9. "But you are a chosen people, a royal priesthood, a holy nation, a people belonging to God, that you may return the praise of Him who called you out of darkness into his wonderful light." 1 John 1:9-10, "Anyone who claims to be in the light but hates his brother is still in the darkness." 1 John 1:5-7, "God is light and in Him there is no darkness at all. If we walk in the light as he is in the light, we have fellowship with one another."

27. C.S. Lewis, *God in the Dock: Essays on Theology and Ethics*, "Meditation in a Tool Shed" (Grand Rapids: William B. Eerdmans Publishing Company), 1970, pages 212-215.

John-Macquarrie, *Principles of Christian Theology*, "Human Existence" (New York: Scribner), 1977, pages 59-83.

[Dave Nantais, a grad student in bio-chemistry was one of five students from Iowa State University who attended the March, '94 workshop on *Secularism versus Biblical Secularity.* Dave, one of ITEST's younger members, learned of ITEST through Fr. Jon Seda, Dir. of the Catholic Campus Ministry program at ISU.]

All guests who present themselves are to be received as Christ, for he himself will say: I was a stranger and you welcomed me (Matt 25:35). Proper honor must be shown to all, especially those who share our faith (Gal 6:10) and to pilgrims"

From the Rule of St. Benedict

The beautiful campus of St. John's University in Collegeville, Minnesota was the site of the second annual Collegium workshop on Faith and Intellectual Life, sponsored by Fairfield University. Tom Landy, S.J. is the founder and director of the 8 day program that explores ways to integrate Christian faith and academic scholarship on both Catholic and secular campuses.

We were treated to excellent presentations from James Heft, SM of the University of Dayton, Rev, Bryan Hehir from the Harvard Divinity School, Ann Matter from the University of Pennsylvania and Bernard Cooke. Each of these speakers presented ideas on faith and intellectual life based on their individual backgrounds and expertise. In addition, group discussions were encouraged on a wide range of subjects, from the Church as a learning church, to a sacramental world view, and there was even an impromptu lunch discussion on the Pope's encyclical on the ordination of women. We were also split into groups based on our backgrounds and occupations. I was in the science and technology group, and we spent a good deal of time discussing what ethics in science means to us in contrast to its meaning to society. We also discussed ways in which we can use our own "charism," or gifts in our everyday work.

Time for prayer was plentiful and being at a monastery made the prayer even more enjoyable. All participants were invited to morning prayer led by the monks, which was a new and exciting experience for me. Their form of prayer seems methodical, but also contemplative and soothing. We were encouraged to write in a journal, and to spend some time alone with God. It seemed to me that everyone at Collegium benefitted from this.

One day was devoted entirely to retreat and reflection. Five workshops were offered, based on Benedictine, Ignatian, Dominican, Franciscan and Christian feminist spirituality. The groups were small which encouraged sharing, and the day was perfect for walking around the lake or sitting in the sun.

The best part of the Collegium for me was the wonderful fellowship among all of the participants.I am still in touch with some friends that I made during the week.

Everyone had ideas to share and we all grew closer. The setting was ideal for this workshop. Dick Rice, SJ who led my retreat group put it nicely when he said, "The silence up here is delicious!" I couldn't agree more! I was fortunate to receive a fellowship to attend this program, and I consider myself lucky to have been exposed to the people and ideas that were present.

[The following is a continuation (from the Summer, 1994 of the *Bulletin*) of the paper from Father Miguel Lorente, S.J., Professor of Physics at the University of Oviedo, Spain. Father Lorente's address is: Residence San Ignacio; Doctor Casal, 9; Oviedo, 33001, Spain.]

Optics and sound

a) Theories on the nature of light:

New discoveries at the end of the]7th century led to radical changes of all existing theories of light. In 1665 the Jesuit Grimaldi demonstrated the existence of diffraction. . . In France, Cartesianism still held full sway, so that Malebranche tried to reconcile it with the vibratory theories of Grimaldi, Hooks and Huygens.

Father Pardies and Hooke, two contemporary of Malebranche, tried to develop Grimaldi's optics into a complete theory of aether.

Grimaldi's own view were based on the existence of diffraction phenomena, which he himself had discovered. His experiments had convinced him that the mere notion of light rays, the basis of geometrical optics, failed to explain all optical phenomena. "There exists," he wrote, "a fourth method by which light can be propagated, viz., by diffraction, which is quite distinct from the three modes known hitherto" (rectilinear propagation, reflection, refraction). From the fact that opaque bodies can deflect light, he concluded that light must travel with a finite but undetectable velocity. He also believed that light differs from matter not only by its subtlety but also by its generation, and that it can be compared with sounds because both are produced by the rhythmical agitation of a medium. "Light is a fluid that moves extremely quickly, vibrating through transparent bodies."

After Grimaldi, aether theories became more materialistic and more accurate — more Cartesian, we might say. In particular, they attempted to account for motions in the aether, Malebranche and Grimaldi demanded a true causal vibration, though they were vague as to the exact mode of propagation."

Light, Huygens, wrote at the beginning of his *Traite de la lumiere* (1690), is the movement of the matter between us and luminous bodies. Huygens' theory had many similarities with those of Pardies and Hooke, with both of whom he kept in close touch.

(M.A. Tonnelat; Taton, 295-297)

Huygens failed to adopt Hooke's idea on transverse vibration. . . It was left to Father Ango (1640-1696), following Father Pardies, to fill in the gaps. According to him light originated from the intrinsic vibrations of a source and spreads through the aether in the form of waves. These waves may be likened to ripples on the surface of the sea, and do not transport matter. Though Ango did not say it in so many words, his aether must have been a material medium, because he thought it could communicate vibrations to the air. Huygens, who gave a clearer definition of the aether, failed to be nearly as explicit about the exchange of motions between the subtle and the material medium.

Pardies, Hooke, Huygens and Malebranche wrote their main works roughly at the time that Newton was preparing his. Their opposition to his theory ushered in a stormy period in the history of optics.

(M.A. Tonnelat; Taton. 298)

b) Colour theories:

In 1617 the Jesuit Galeotto Mariscote tried to refute the Aristotelian colour doctrine by demonstrating that colours are produced not by the prism itself by the refraction of light rays. If a ray enters the prism at right angles to its surface, no colours appear. Moreover, the "purest" ray, yellow, is not the ray closest to the apex of the prism, as Aristotle's theory would suggest; it is the central ray, which must have crossed a thicker layer of glass than the red ray and ought to have been the darker of the two.

Father Pardies tried to produce a compromise between Descartes and Aristotle. Like Aristotle and Barrow, he

assumed the existence of two fundamental colours: white produced by reflection from convex surfaces, and black, produced by absorption by concave surfaces. All other colours were mixtures of the two of them; all were produced by lateral motions of the agitated aethereal substance. This was also his explanation of the irization effects which Grimaldi had obtained during his diffraction experiments.

After his studies of dispersion, Newton propounded the theory that white light is made up of a number of pure colours each with a specific degree or refrangibility... Father Pardies tried unsuccessfully to compound colours into white and then dismissed Newton's theory as an hypothesis. Only when he used Newton's method was he able to carry out the experiment successfully.

(M.A. Tonnelat: Taton, 303-5)

c) Interaction of light with matter

Scientists criticized Newton's *Opticks* on quite different grounds. . . It is a remarkable fact that R.G. Boskovic (1711-1787), a Jesuit disciple of Newton, nevertheless struck a blow against Newton's theory when he showed that the rectilinear propagation of light is neither proven nor even demonstrable (*Dissertatio de Lumine,* Rome 1749). Boskovic also tried to clarify Newton's theory of fits. Newton had assumed that fits of easy transition and fits of easy reflections resulted from the combined actions of the luminous corpuscles and the aether. In this hypothesis waves travel ahead of the light corpuscles and determine their admission or rejection by transparent bodies. Boskovic adopted a more rigorously corpuscular theory, in which he considered material corpuscles as material points surrounded by spheres of attraction or repulsion. When he used this theory to explain opacity and transparency reflection and transmission, and even double refraction, he merely emphasized the pitfalls in the path of a purely corpuscular conception of light.

(M.A. Tonnelat; Taton, 460)

d) Sound waves:

The concept of waves and the propagation of vibrations by a movement called "undulatory" began to take form in the late 17th century. Huygens's *Traité de la lumiere* (1690) summarized the prevailing views, while Grimaldi's *Physico-Mathesis* (1665) compared the propagation of light to that of water waves. Father Ango's *Optique* (1682) has this to say of wave motion: "It is the motion used by contemporary philosophers to liken the rarefactions and compressions of part of the air which, according to Aristotle, are needed for the production of sound to the waves which appear on the surface or still water when a small stone is thrown into it." According to Father Ango the only distinction between sound and light waves is that the latter produce unusually rapid vibrations in a much rarer medium than air — the aether. . . From all these investigations and discoveries Father Ango concluded that sound is more than a pure quality. Though he lacked the correct terminology, he made a clear distinction between intensity (amplitude) and pitch (frequency), thus showing how much progress the analysis of sound had made in the 17th century.

(P. Costabel; Taton, 464-5)

Geology and Astrophysics

"In 1610 and again in 1612, Galileo observed spots of the sun's disk. In this he was anticipated by Fabricius . . . and possibly by Father Scheiner, a Jesuit teacher at Ingolstadt who claimed that he had observed the spots in 1611. He sent three epistles to Markus Welser in 1612 (with the pseudonym Apelles) telling about his discoveries."

(Walusinski; Taton, 276. Ostwald, 209-21 1)

"In 1630, Father Scheiner prepared the first map of these spots and their movements, thus demonstrating that the sun was neither immutable nor immobile. As a result the whole Aristotelian picture of the sun and the earth became changed."

(Walusinski; Taton, 376)

"The first map of the moon was prepared by Peirese... there followed the lunar maps of Langrenus (Spain, 1645), Hevelius (Danzig, 1647) and of the Jesuits Riccioli and Grimaldi (Italy, 1650)."

Niccolo Zucchi (1586-1670), "the Italian Jesuit, observed spots on Mars and belts on Jupiter in 1640."

(Walusinski; Taton, 278-279)

In the 17th century the German Jesuit, A. Kircher, presented the first "plutonist" theory of the earth. . . Kircher began his geological studies during a visit to Rhineland. In 1663 he arrived in Rome, where, together with Father Scheiner, he observed the sun and prepared the extraordinary solar map which he published later in his *Mundus subterraneus* (1664). On it, the sun was shown a "Central fire" with a number of "glory holes of nature" and "volcanic mountains." Even

so, Kircher considered the sun as a star in the process of development; hence it was but a short step to think that the earth, too, was constantly changing. This is, in fact, how Father Kircher depicted it in a drawing (*Mundus subterraneus,* vol. 1, p. 194), to which he attached the legend: "Ideal System of Subterranean Fire Cells from which Volcanic Mountains arise, as it were, like Vents." The whole idea was a fantasy, and so was Kircher's view that the ocean level is maintained by subterranean channels through which the tides could drive the sea water to the top of the mountains. Even so, Kircher may be called a modern geologist, for he maintained that "neither within nor without has the earth remained in its original state," and that it is constantly changed by erosion, incursions by the sea, river deposits and earth quakes, which later he blamed for the disappearance of Atlantis."

(Furon; Taton, 375, 379)

Biology

José de Acosta (1539-1600) was called the "Pliny of the New World." Together with other missionaries and talented physicians, he started the description of the botanical and zoological Kingdom in the West and East Indies.

"Acosta gives some classification of the animals based on reproductive methods. All lower animals are generated by spontaneous methods, for instance, 'rats, frogs, bees and all other imperfect animals are engendered by the earth'."

(Delaunay; Taton, 150-153)

Acosta, "after a long stay in Perú and México, published *Historia natural y moral de las Indias* (Seville, 1590), of which the chapter devoted to natural history mentioned various American plants, including maize, potato, pineapple, banana, cocoa, agave and coca."

(J. Taton; Taton, 615)

He is considered also as a precursor of the theory of evolution.

(F. del Pino; S. Garma)

M. Boym (1612-1699) from Poland studied the "flora of China and Japan".

(R. Furon; Taton, 574)

F. Buonani (1638-1725) is considered to have given a prior explanation of the mechanism of reproduction in the plants, because he "depicted pollen grains on the stigma of a flower (*Althea hirsuta L.*) in 1691." This occurred before the experimental study of plant sexuality was started by J. Carnerarius in 1694.

(A. Davy de Virville; Taton, 368)

P. Camelli (1661-1706), the Moravian physician after whom the camellia is named, studied climbing plants in Manila and sent specimens to Petiver and Ray, who catalogued them.

(A. Davy de Virville; Taton, 374)

J. I. Molina (1738-1829) "studied the natural resources of Chile. After the expulsion of the Jesuits in 1768 he published the results of his research, including the flora of Chile (Bologna, 1782).

(J. Taton; Taton, 616)

"The circulation of sap was studied by the French Jesuit N. Sarrabat (1698-1737), who plunged the tip of a branch into the red juice of *Phytolacca* and observed its rise in the vessels of the branch".

(A. Davy de Virville; Taton, 558)

Medicine

"The Jesuit, Matteo Ricci, opened infirmaries in Cathay in the 16th century."

(P. Delaunay; Taton, 139)

"Medical ophthalmology was viewed by such physicists as Peirese, Scheiner and Mariotte." It seems odd that, at a time when Redi's experiments disproving the theory of spontaneous generation went largely unheard, Father Kircher and A. Hauptmann should have suspected the existence of microbes, which the former called "invisible creatures" and the latter regarded as worms or maggots.

(Dulieu; Taton, 352-353)

Ricci, Kogler, Pereira, Verbiest, Fontaney, Schall, Rho, Jartoux: Taton gives a long description of the scientific work of these missionaries in the imperial court in China. They cultivated astronomy with the introduction of the Ptolemaic system, the telescope and the celestial planisphere. In mathematics they introduced in China trigonometry, Napierian logarithms, infinite series and perspective in geometry. They wrote books on mechan-

the orientation of apostolic activities. "The Jesuit drive for apostolic work found its worldly expressions in three main areas: in education, in (Catholic) European courts and in the foreign missions," and the needs and environments of these three areas contributed to scientific progress.

With regard to the third point of Merton's program, Harris mentions almost 6,000 original works written by Jesuits between 1600 and 1800, 80 % of which deal with Aristotelian natural philosophy, astronomy, mathematics, physics and natural history. Some 1,600 Jesuits contributed at least one item to this corpus, however, fully half of the total literary output came from just 200 authors, each of whom wrote seven scientific items or more. Among these works 4,000 were commentaries, treatises, text books, cursus, 600 journal articles and about 1,000 manuscripts.

After the conclusion of his article, Harris suggests some type of generalized Merton thesis, namely the application of the Merton history research program to other scientific communities in old or recent times: "The case of Jesuit science does in fact seem to be a qualified confirmation of a generalized version of the Merton thesis. . . A supraconfesional doctrine of the sanctity of mundane labor, in conjunction with a high esteem for learning and reason, provide a fertile ground for the acceptance and development of active-empirical forms of early modern science."

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