Institute For Theological Encounter With Science and Technology
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Controversy and Participation in Debate

From time to time, we encourage all ITEST members to contribute to the ITEST Bulletin, by writing essays, letters and comments. Still, we receive only a few such contributions each year, and so nearly all the writing is done by a small fraction of our members. And we're not seeing the back and forth debate that we're sure ITEST members are capable of.

In this issue, you will find certain articles that are likely to stir controversy. Long-time ITEST member Ed O'Boyle criticizes some of Pope Francis' economic statements, and contrasts them with statements by Pope John Paul II two decades ago. (I suspect a lot of the difference is rooted in the economic systems of 20th-century Poland and Argentina.) Also there is an essay directing attention to the "natural" aspects of climate change. You may well find yourself holding a position on these (or other) controversial topics.

ITEST has always been comfortable encouraging the free exchange of ideas, as we did so visibly in our 2012 conference on "Early Life Issues." Similarly, regarding the ITEST Bulletin, we certainly welcome comments and counter-arguments to any essay we publish. Do not be discouraged or think we demand conformity to some imagined orthodoxy. It is very sad when someone reacts by just quitting, rather than engaging in discussion. When you disagree with something, argue the point! After all, the method of disputation has been used since the days of St. Thomas Aquinas to use reason in striving toward truth.

Especially, we would like to see more "encounter" between science and theology. ITEST members are very diverse in professions as well as geography. Perhaps owing to some unique feature of your background or career, you might have an idea that relates the two fields in some way that nobody has thought of previously. Finding and printing such ideas is one of the major purposes of the ITEST Bulletin. Those of us having a scientific background are eager to learn from our theology-centered colleagues.

Often it is claimed by secularists that science opposes religion, and too many religious people accept that premise and consequently stay away from science. We consider the role of ITEST (and all our members) to be one of showing why that premise is wrong – we seek to bring out the compatibility of faith and science, and to communicate that to our wider society.

Such communication begins by sharing ideas with each other. That's what the ITEST Bulletin is all about, and that's what we want you, our members, to do.

Thomas P. Sheahan

Director, ITEST

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Announcements

Jesuit Brother Receives Honors

Congratulations to **Jesuit Brother Guy Consolmagno** who has won the prestigious Carl Sagan Medal. The Division of Planetary Science of the American Astronomical Society (AAS) awards the medal to one person each year. They chose Consolmagno because he "…occupies a unique position within our profession as a credible spokesperson for scientific honesty within the context of religious belief." Further, the AAS recognized Brother Consolmagno for his diverse methods of reaching the public and for his achievements, including his insightful books and speaking engagements in both Europe and the United States. "Especially notable is his book "Turn Left at Orion," which "has had an enormous impact on the amateur astronomy community, engendering public support for astronomy," said the AAS. (*Material quoted from AAS and Jesuit News*)

ITEST recalls Consolmagno's contribution to the faith/science ministry with the paper he delivered at the 2007 ITEST workshop, "Astronomy, Cosmology Breakthroughs and the God Question." In his paper Consolmagno extolled the beauty of the cosmos saying "Beauty is something that is there by design…I see an evolution in the stars." *(Foreword to proceedings, p. ii. 2007).* Also, see "God the Father of Creation: Reflections of a Vatican Scientist" by Consolmagno in the ITEST bulletin, Volume 45, #1)

Update on May 2014 Workshop

Our "sunny and warm" prediction to have the proceedings of the **May, 2014 Workshop: "Faith/Science Challenges: the God Question, Do Teens Really Care?"** published in the summer issue of the bulletin, has met "dark and cold" reality. Usually proceedings from a conference or workshop require about six months of editing before publication and we are about 1/3 of the way through the tapes. We plan to publish the proceedings either in pamphlet form (including presentation and discussions) or in a combination of Father Robert Spitzer's talks on DVD and booklet or hard copy. Members paid through 2013 will receive the materials.

Good News from Holy Apostles College and Seminary

Working in conjunction with the National Catholic Bioethics Center (NCBC), Holy Apostles College and Seminary is pleased to offer a Master of Theology with a concentration in Bioethics through our Online Learning Program.

Holy Apostles and the NCBC have collaborated to provide a unique educational opportunity for professionals and students interested in receiving graduate training in the growing field of bioethics.

One result of this collaborative effort is a one-year sequence of graduate-level courses in bioethics available through Holy Apostles' Online Learning Program. This sequence of courses satisfies 9 graduate level credits and can be applied toward the concentration in Bioethics for the Master of Theology degree. Additionally, students may also qualify for the Certification in Health Care Ethics, a professionally recognized certificate offered directly by the NCBC.

This 9-credit sequence of courses will be taught by adjunct faculty member, Father Tadeusz (Tad) Pacholczyk, Ph.D., who is also the Director of Education at the NCBC. Father Tad is recognized as one of the leading experts in the field of Catholic Bioethics.

To complete the concentration in Bioethics, students will be required to take one additional bioethics course offered through Holy Apostles to meet the required 12 credits for an area of concentration in the Master's Degree Program.

More information can be found on our website at www.holyapostles.edu/bioethics

Submitted by Professor Heather Vaccola, Institutional Liaison to the NCBC.

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The Remarkable Jesuit Chinese Missions

By Andrew Kassebaum

In late December 1668, in a contest held at the Chinese Bureau of Astronomy, the Jesuit Ferdinand Verbiest (1623-1688) correctly predicted the length of a shadow cast by a vertical rod. The Kangxi Emperor was impressed. But he challenged Verbiest to two additional tests: the prediction of the exact position of the sun and planets on a given day and the timing of an approaching lunar eclipse. Verbiest successfully completed the final two tests, and, in the process, showed that the Chinese had much to learn from their Jesuit visitors.

With his scientific prowess firmly established, Verbiest became close with the Emperor, often accompanying him on excursions throughout the empire. Verbiest would make the most of this opportunity. Before he had passed on from this life, he had designed a self-propelled vehicle, cast cannons for the imperial army, written a 32-volume handbook on astronomy, composed a 2000-year table of future eclipses, and rebuilt the imperial observatory, enriching it with several bronze astronomical instruments. His funeral serves as an indication of his achievements: it featured musicians, standard bearers, and fifty horsemen.[1]

Verbiest is one of many illustrious Jesuits to make valuable contributions to Chinese science. By 1800, more than 900 Jesuit missionaries had reached China.[2] It was science that served their primary purpose of sharing the Catholic faith and allowed the Jesuits to wield significant influence in China. Verbiest clearly understood the importance of science to evangelization efforts: "As a star of old brought the magi to the adoration of the true God, so the princes of the Far East through knowledge of the stars would be brought to recognize and adore the Lord of the stars."[3]

The Jesuit Chinese missions represent one of the great untold stories of modern history. Jesuit missionaries would introduce the telescope and the discoveries of Galileo, determine the Russo-Chinese border,[4] discover a land route between India and China,[5] introduce European astronomy and mathematics, revise the Chinese calendar, map out the empire using modern methods, introduce stereographic projection of maps, participate in the division of China into time zones, and discover that Korea was a peninsula rather than an island.

Besides Verbiest, several other missionaries stand out for their valuable contributions. Matteo Ricci (1552-1610), a student of Jesuit mathematician and astronomer Christopher Clavius, inaugurated the Jesuit missions in China when he reached Macau in 1582. Eventually adopting the dress of Chinese scholars and acting as an adviser to the Imperial court, Ricci introduced Christianity and recent European scientific discoveries to his Chinese hosts. In mathematics, he was the first to introduce trigonometry[6] and the works of Euclid[7] to China.

Ricci's most important scientific contribution, however, was his Impossible Black Tulip map, a cartographical wonder that greatly expanded Chinese geographical knowledge and was considered more accurate than contemporary maps of Europe.[8] While previous Chinese world maps showed only the fifteen provinces of China surrounded by water and a few islands,[9] the Impossible Black Tulip is the oldest surviving Chinese map to show the Americas. A 1602 edition of the map recently sold for $1 million and was displayed at the Library of Congress.

Ricci not only introduced European science to China, he was the first to provide Europe with an account of Chinese geography, culture, and literature. Ricci was more than a herald of scientific discoveries: he may one day be a saint. The Church has named Ricci a Servant of God, which denotes that his cause for beatification and canonization has been set in motion.

Another important Jesuit missionary is Adam Schall

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Andrew Kassebaum

Andrew Kassebaum is the Evangelization Coordinator for the Archdiocese of St. Louis. Before stepping into this role, Andrew earned a Master's degree in theology from Ave Maria University. After years of skepticism and reductionism, Andrew's life changed forever upon reading Pope Saint John Paul II's writings on the human person. Andrew is fascinated by the question of why science developed in Western Europe at a unique time in history. He can be reached at andrewkassebaum@archstl.org."

von Bell (1592-1666), an accomplished astronomer who entered Macau in 1619. By the time Schall von Bell reached China, the Chinese calendar, which had been used for 40 centuries, was in desperate need of revision. After arriving in Beijing in 1630, Schall von Bell began working tirelessly on calendar reform. Indeed, during his life, he would write no less than 150 treatises on this subject.[10] In 1644, Schall von Bell was able to earn the respect of the Chinese government by correctly predicting an eclipse (The Chinese astronomers had erred by an hour in their prediction). After Schall von Bell's astronomical feat, he was appointed director of the Board of Astronomy, the first Jesuit to fill this post.[11]

With his newly earned position of authority, he reduced the number of Chinese calendars from five to two. Because of his astronomical and calendrical work, Schall von Bell was given the title Mandarin of the First Class, an honor normally reserved for Chinese dignitaries, and a sign of Schall von Bell's influence. "It can be said," writes a Jesuit historian, "that no westerner in the whole history of China ever enjoyed as much influence as Schall did."[12]

Remarkable Jesuit contributions were not confined to the sixteenth and seventeenth centuries. Several Jesuits connected with the Zikawei Observatory would make important contributions into the twentieth century. Marc Dechevrens (1845-1923) became director of Zikawei in 1876. With fellow Jesuits Francisco Faura and Jose Maria Algue, Dechevrens was one of "the first to study the nature and characteristics of typhoons."[13] An instrument he designed to measure wind velocity was installed on the Eiffel Tower for the 1889 World's Fair.

In 1888, Stanislas Chevalier (1852-1930) succeeded Dechevrens as director of the observatory, continuing his predecessor's work with typhoons. Chevalier also carried out a cartographic study of the Yangtze, made no less than 1200 astronomical observations, and determined the geographical coordinates of 50 Chinese towns. His research eventually led to the creation of 64 maps, earning him a medal from the Geographical Society of Paris. [14] Finally, in 1920, Ernesto Gherzi (1886-1976) was appointed to Zikawei, where he studied typhoons and Chinese climatology. Gherzi was "one of the first to investigate the relationship between microseismic noise and oscillations in the atmospheric pressure."[15] He later became a member of the Pontifical Academy of Sciences.

Taken collectively, the Jesuit Chinese missions form an important chapter in the long and often complex relationship between religion and science. Joseph Needham, in his important multi-volume *Science and Civilisation in China*, highlights the significance of the Jesuit Chinese missions: "In the history of intercourse between civilisations there seems no parallel to the arrival in China in the 17th century of a group of Europeans so inspired by religious fervour as were the Jesuits, and, at the same time, so expert in most of those sciences which had developed with the Renaissance and the rise of capitalism."[16] When history offers us 'no parallel,' we should take notice.

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Computing and Convergence: Bigger, Faster, Better?

By John Ashby, MA

Part II

This is Part II of the essay on computers published in the spring issue of the bulletin, volume 45, #2. Written for an ITEST workshop in March, 2000 the paper detailed the "state of the art" for that decade. Following Part II, the author comments on developments that have taken place since then and wonders "...whether computers haven't become entirely invisible."

The Computing Technology Environment

Rapid developments in digital technologies can be generally categorized in four major areas: processing, memory, storage, and transport. All of these areas are certainly well represented by comparing a typical microcomputer of 1980 with a similar contemporary one.

The same development categories that have improved the computer itself also extend to the devices that are used as inputs and outputs to the machine. For example, the TRS-80 offered keyboard input period! Other devices such as light pens and joysticks were offered in later models. Today's PC will also have a mouse, microphone and speakers, audio in/out, CD playback, and may have a scanner or digital video camera as an accessory as well as dozens of options.

Processors are the devices that contain transistorized "instructions" that govern data manipulation in a computer. Processor speeds have doubled approximately every 18 months from the earliest IBM PC at 4.77MHz to Intel's recently announced Pentium III offering at 1GHz (1,000MHz). With support from newer operating systems today's computers can also share the load among multiple processors, scaling up to 8-way SMP (symmetrical multiprocessing) and beyond. Yet the external speeds by which these chips communicate with the motherboard has not kept pace, increasing to only 100MHz in that same time period.

Processors have also gotten "bigger" in more than just physical size. Today's Pentium processors exceed 7.5 million transistors, as compared to the 29,000 offered in the original 8088 chip of the IBM PC. And they can read or write up to 64 parallel bits of information (1s and 0s) at one time with their expanded bus width, as compared to the 8-bit bus of the 1980 Intel offering.

Memory chips actually store the volatile data that processors will work with while the machine is operating. Memory speeds have not kept pace with the processor, which is one of the primary reasons for the 100MHz limit on external processor speeds. Yet with the introduction of 64-bit widths, interleaving, cache memory, new memory types, and techniques that eliminate processor "wait states," improvements in memory speed have continued.

Memory size has, of course, continued its astonishing growth. Not only is it common to find 128MB of memory in a new Windows 2000 PC, but the maximum addressable memory for the PC architecture has grown from 1MB in 1980 to 64GB in a modern Pentium III machine.

Storage devices include hard drives, floppies, and other media that contain data in nonvolatile forms whether the computer is operating or not. Removable media have evolved from the first 90KB 5-1/4" mini-floppies to 250MB Zip drives and beyond. Early hard drives with their l0MB (on the original IBM XT) have evolved to to-

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John M. Ashby

John M. Ashby is a lifelong Educational Technologist and teacher. He is currently the Technology Coordinator/Computer Teacher for St. Gabriel the Archangel Parish in South St. Louis, a position he has held for the last five years. His 34 years at Saint Louis University included adjunct teaching as well as full-time roles in IT and Media Services management. John's practical hands-on experiences with technology during the years when microcomputers were increasingly driving innovation in photography, video, and other media have contributed to his reflections on the impact of technological change on the world we live in today. He holds an MA and BA in Communication from Saint Louis University.

day's standard drives of 15GB and higher. And CD, DVD, tape drives, and numerous other options offer solutions that target distribution, near-line storage, and backup.

Storage devices have also seen great gains in speed. Even removable floppies, currently a 3-1/2" format, have seen increased magnetic density and two-sided recording result in performance increases. Hard drive transfer rates have made dramatic gains, with the early 1MB per second peak speeds now eclipsed by 80MBps high-performance SCSI units. And new interface standards such as ATA/66 and Ultra SCS13 LVD have brought additional performance to computer users as newer machines make extensive use of hard drives as "virtual memory."

The transport of data between machines once meant primarily the exchange of data by asynchronous means such as tapes or diskette exchange ("sneakernet"). But the synchronous transport of data has progressed quickly in many forms. Modems, which in 1980 connected to the CompuServe Information Service at 300 baud, are now common for Internet connections at 56Kbps and beyond with DSL, cable, and satellite modem options. And most businesses and institutions of higher education today use Ethernet as a standard method of sharing files, data, and printing devices. Ethernet was originally a l0Mbps cable transport, but today 100Mbps is common and Gigabit Ethernet is becoming available.

The "pipes" that carry data between campuses, cities, and other places are also becoming bigger and faster, due largely to the popularity of the Internet. While the telephone companies were the original suppliers of bandwidth for wide-area communication, today's computing environment includes a variety of data transport media via fiber, satellite, and dedicated high-speed backbones that compete for data service markets.

The Convergent Environment

Assuming that computers and the Internet had earlier reached the "critical mass" that has generated the rapid adoption of new computing technologies across our society, the maturation of a market at this stage quite naturally will evolve toward diversification of applications and features as competition for a large, but more fixed-size, customer base becomes intense. This diversification, which caters to individual tastes and to more specialized market segments at the expense of core innovation, marks the maturation of any major technology trend.

This is not to say that mature technologies do not change. However, maturation brings with it a desire for "compatibility," "interoperability," "standardization," or a "migration path" that reassures users of the value of their purchase as a precondition of sale. Sometimes such standards are created by regulation for the "public good" as in radio, television, and telephony. Yet at other times standards result from a mixture of competition and negotiation, as in recent standards that have emerged for Internet browser software (file formats, applets, plug-ins). The road to standardization is not always smooth (remember Betamax?), but proprietary deviations from established standards are often resisted by consumers in favor of the "sure thing." Thus mature technologies are marked by pressure from current users to avoid any changes that risk the integrity of existing standards.

Computers themselves, especially desktop microcomputers, exhibit the characteristics of mature technology levels, but the broader digital convergence market is still approaching critical mass. As new input devices, output devices, and service-level applications for traditional computing functions emerge, they often take on a life of their own that goes beyond the computing infrastructure from which they emerged. Convergence technologies suggest new paradigms that at first will compete with, and then change the media that spawned them. Video games did this to computers, the Internet did this to mail-order catalogs, and fax did this to printed product literature. Can the U.S. Postal Service avoid changing in response to email?

As new input devices, output devices, and service-level applications for traditional computing functions emerge, they often take on a life of their own…

The convergence of digital technologies on traditional media applications has already created a number of new equipment applications. Photography now requires no darkroom, with digital cameras and ink printers moving as quickly as the PCs that make the digital darkroom viable. Digital/High-Definition Television is now being broadcast in most major cities in the U.S., with full con-

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version and the end of today's analog television by 2006 mandated by the FCC. DVD (Digital Video Disc) and the "Tivo" hard-disk video recorder provide such high quality and versatility to video playback that VHS is really showing its age. Digital flat-panel Plasma televisions and LCD projection displays offer picture quality that today's television systems can't match. And new wireless technologies, "smart" appliances, and web-connected phones are all searching for the buyers who will define "the next big trend."

Convergence addition is the "new math" of businesses who are speculating on how content can be leveraged with technological delivery systems.

Convergence addition is the "new math" of businesses who are speculating on how content can be leveraged with technological delivery systems. Recently America Online merged with Time Warner, mixing cable television and Internet services in what both hope will be a profitable new synergy. Similarly, AT&T bought out TCI Cablevision, Microsoft and NBC have marketed strategic products as MSNBC, and Sony has become a market force in the movie industry, video gaming, and consumer video equipment.

They and others envision a significant expansion of "services on demand" made possible by convergent delivery systems such as "video-on-demand." Already the potential of such services has become evident, with explosive sales from Internet shopping, archived technical specs and drivers on demand from most hardware vendors, online financial services emerging from most major banks, online applications and forms for anything from student financial aid to taxes, and endless variations on "name your own price" and electronic auctioneering.

Convergent technologies are also creating opportunities to overcome differences in "time and space." Asynchronous (out of real time) applications such as email allow not only messaging but the transport of formatted data files as attachments for collaborative projects. Web-based collaborative tools such as WebCT or Hotoffice similarly reduce the need for physical meetings. And new synchronous tools such as AOL Instant Messenger have created a "virtual community" of young people around the country who chat with each other before their parents even know what "instant messaging" is! Videoconferencing tools such as NetMeeting have also grown in popularity since the adoption of the H.323 communication standard two years ago. Internet phones could one day threaten even Ma Bell.

It is difficult to project the breadth of new media that could emerge from the "digital soup" of possibilities, or even which ones will ultimately be successful. But applying principles of long-term thinking to our institutional planning efforts will help in gaining good value from convergent products and services in a period of rapid diversification and change. Here are some suggestions:

- Centralize those technology functions that offer economies of scale and foundation support services, while encouraging diversity in end-user applications of technology services.
- Establish and fund minimum core institutional standards in core technical areas to foster interoperability.
- Reduce structural "reinvention of knowledge" by clear communication of standards and processes.
- Develop and leverage information sharing with and among users, our intellectual assets.
- Don't think "computers"... think "information."

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Commentary

Fourteen years ago, I wondered if we subconsciously equated "computers" with "technology," as if the keyboard-based devices we used on our desktops were an end in themselves. Now I have to wonder whether computers haven't become entirely invisible!

Computers have become an integral part of so many things that we use every day that we don't even see them: cars that monitor themselves and can stop themselves to avoid collisions, GPS devices that tell us when to turn right, digital cameras that focus the image and set exposure for us, and "smart" cell phones that have become the portals to our electronic lives. Desktop computers, while still useful, are but one of many form factors (laptops, tab-

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lets, e-Readers) that we use daily to create and consume electronic information.

Connectivity has also dramatically changed our expectations for instant information access. Broadband Internet access from cable companies is now pushing 100Mbps speeds; 4G data access over digital cellular networks offers a comparable experience to the mobile device user; and WiFi access is even offered at McDonald's across the country. This has made it possible to store our information in the Internet "cloud," allowing us to load a Kindle book on our phones and continue reading at the same point when we get home on our tablet. The "Internet of Things" has also entered our vocabulary as devices of all types are becoming available that require connectivity to communicate with us and each other.

Digital communication evolves so rapidly that the meaning of "copyright" is being negotiated by contract or decided in the courts.

Content continues to be a battlefront. Digital communication evolves so rapidly that the meaning of "copyright" is being negotiated by contract or decided in the courts. As the digital TV "off-air" transition wound down during the last decade, cable operators grappled with paying for local stations' digital rebroadcast rights. Internet streaming continues to challenge traditional concepts of content ownership, as recently highlighted in the Aereo decision against unauthorized live streams of TV stations. Netflix popularized a subscription model for "video-on-demand," a harbinger of the demise of DVD rental businesses. Recording and video distributors sought relief from Internet-based file-sharing "piracy" sites, only to have the music industry evolve into electronic publishing models such as iTunes at the expense of CD sales. Money-saving electronic books are now available for most titles, and "apps" for tablets and phones are bargain-priced or outright free.

These are interesting times to live in, at least for the technology enthusiast. Still, we need to remain aware of the human context of technology: texting is not a substitute for conversation; browsing should not replace research; online anonymity should not be a mask for poor behavior. If media are "extensions" of man, they should be used to enhance our humanity rather than undermine it.

Remembering Jack Dunsford -
Law Professor and loyal ITEST member
by Chester A. Myers Professor of Law Emeritus
(Reprinted with permission)

John E. "Jack" Dunsford, longtime School of Law professor at St. Louis University and one of the nation's foremost arbitrators and labor law scholars died on April 14 at the age of 86.

A 1950 graduate of Saint Louis University and a 1956 cum laude graduate of the School of Law, Professor Emeritus Dunsford was a fixture at the law school for more than 50 years, where he taught labor law until his retirement in 2008. He was an early and active member of the Labor Law Group of scholars who write labor and employment law textbooks. In addition to a book, "Individuals and Unions," he wrote numerous articles and chapters on labor law, arbitration and the U.S. Constitution and personal freedom, and held the school's Chester A. Myers Professorship. He earned an LLM. at Harvard Law School in 1961.

Professor Dunsford held several leadership positions with the prestigious National Academy of Arbitrators, including serving as president in 1984-1985. In 2000, he was named a fellow in the College of Labor and Employment Lawyers. From 1987-1994, he directed the School of Law's Wefel Center for Employment Law and remained a senior consultant after his retirement. He was the McDonnell Professor of Justice in American Society from 1982-1987.

As Professor Dunford's reputation as a thoughtful and unbiased arbitrator grew, so did his client ist. Over the span of his career, he arbitrated nearly 1,000 disputes for groups such as US Steel and the United Steelworkers of America, the National Football League, Southwestern Bell and the Communications Workers of America, among others.

ITEST is proud to have had Professor Dunsford as an ITEST member for many years. May Jack rest in the peace of the Lord.

A Commentary On Evangelii Gaudium:

Part I of II Parts

By Edward J. O'Boyle, Ph.D.
Senior Research Associate, Mayo Research Institute

Many years ago the German Jesuit Oswald von Nell-Breuning advised that "the Chair of Peter is not a chair in economics." [Mueller 1984, p. 65]. Several years before that another German Jesuit, Heinrich Pesch, asserted that "religion cannot produce grain; it cannot do away with physical evils." [Quoted in Mulcahy 1952, p. 40].

The American Jesuit Thomas Divine [1944, p. 57] affirmed that the task of promoting economic justice "requires not merely a knowledge of the general principles of Catholic moral philosophy but an understanding as well of economic theory and practice which qualify these general principles in the application to any specific pattern of economic conditions." Years later, Divine's Jesuit colleague Bernard Dempsey [1958, pp. 73-74] asserted the same argument.

The American Jesuit Joseph Becker [1991, p. 50; emphasis added] stated that in answering "the call of the popes in their social encyclicals for priests to share in the task of building a Christian social order … [they] were advised … to master one or other of the social sciences -- *lest they do more harm than good."* Every one of these Jesuits – von Nell-Breuning, Pesch, Divine, Dempsey, and Becker -- was a specialist in economics. It appears, however, that in his Apostolic Exhortation Evangelii Gaudium Pope Francis, also a Jesuit but without an academic background in the social sciences, did not get the message.

Our comments address *Evangelii Gaudium* on seven economic issues. In Part I we examine economic gain v. goodness, inequality, profits, freedom, and the market. We discuss private property and subsidiarity in Part II.

ECONOMIC GAIN vs. GOODNESS

In the matter of economic gain vs. goodness, notice the lack of documentation in what Pope Francis asserts in §54.

> … some people continue to defend trickle-down theories which assume that economic growth, encouraged by a free market, will inevitably succeed in bringing about greater justice and inclusiveness in the world. This opinion, which has never been confirmed by the facts, expresses a crude and naïve trust in the goodness of those wielding economic power and in the sacralized workings of the prevailing economic system.

For sure, trickle-down economics is controversial. Even so, it is not without its supporters who call it supply-side economics to distinguish it from Keynesian economics that deals with the demand side.

By letting persons keep more of their earned incomes including profits from successful enterprises, supply-side tax cuts encourage investment in new and additional production facilities, requiring owners to hire more workers, leading to reductions in unemployment, increases in aggregate supply and wages paid, greater consumption expenditures and a boost in aggregate demand. Rejecting supply-side economics in effect reduces interventionist macro-economics to Keynesian economics.

Rejecting supply-side economics in effect reduces interventionist macro-economics to Keynesian economics.

There are without question opportunities in a market economy for evildoers. Several infamous ones come to mind: Bernie Madoff, Andrew Fastow, Michael Milkin, and Dennis Kozlowski. However, other executives demonstrate that virtue and profits are not at odds. Among them are the executives at TOMS Shoes, Hershey, Vanguard,

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Edward J. O'Boyle, PhD

Edward J. O'Boyle, PhD, is a Senior Research Associate affiliated with Mayo Research Institute and a long-time member of ITEST. He is past president of the Association for Social Economics and recipient of the Association's Thomas Divine Award for lifetime contributions to social economics and the social economy.

Hyundai, Merck, and Newman's Own. Additionally the Committee Encouraging Corporate Philanthropy, which has 175 CEO members involving 150 corporations, along with United Way, annually promotes billions of dollars in charitable giving.

Even so, it is not goodness that drives economic affairs in a market economy. It is economic gain. For any routine exchange to take place there must be gain for the parties involved. A transaction succeeds when for both parties what is gotten (use value) is more highly valued than what is given up (exchange value). Economic gain is realized when use value is greater than exchange value.

A transaction fails whenever that condition is not met. No doubt coercion and deception take place in the form of practices such as insider trading, insurance fraud, discrimination, expense padding, counterfeit products, but there are laws and internal company restraints that help contain the ill-gotten gains from such practices.

Supply-side economics does not rely on the goodness of the persons getting favorable tax treatment to institute the investments that in the end lead to more hiring and less unemployment. While goodness may indeed be part of what motivates investor-entrepreneurs, the driving force is economic gain. Pope Francis seems not to understand that. Individual gain is not the problem as he appears to suggest in §61. It is ill-gotten gain.

Pope Francis seems not to understand that. Individual gain is not the problem as he appears to suggest in §61. It is ill-gotten gain.

INEQUALITY

Evangelii Gaudium does not mince words about income inequality. In §53 Francis makes the following bold statement.

> Just as the commandment "Thou shalt not kill" sets a clear limit in order to safeguard the value of human life, today we also have to say "thou shalt not" to an economy of exclusion and inequality… Today everything comes under the laws of competition and the survival of the fittest, where the powerful feed upon the powerless.

This message is repeated at least three times. In §56 he says "While the earnings of a minority are growing exponentially, so too is the gap separating the majority from the prosperity enjoyed by those happy few." Then in §202 he asserts that "inequality is the root of social ills." In §205 Francis calls for breaking down "the wall of separation between the economy and the common good of society." Clearly by "the economy" he means the market economy.

A 2014 study of intergenerational mobility in the United States found that, greater income inequality notwithstanding, nine percent of children born in 1986 to the poorest households compared to 8.4 percent of children born 15 years earlier were likely over time to climb to the most affluent households. [Chetty and others 2014, summary]. These data undermine the conventional wisdom that greater income inequality shuts the door on personal economic advancement.

Data from the Food and Agriculture Organization also provide a challenge to the assertions on income inequality in *Evangelii Gaudium*. On a global basis, undernourishment has dropped from 18.9 percent of world population in 1990-92 to 12.0 percent in 2011-2013. It has been even more impressive in Latin America where undernourishment fell from 13.8 percent to 7.1 percent. Though it still remains very high, undernourishment has fallen even in sub-Saharan Africa. The only region where it has not declined is Western Asia. [FAO 2013, p. 8].

The UN's goal of reducing by 50 percent the proportion of persons living on less than $1.25 a day relative to 1990 was met three years before its 2015 target date. GDP in the southern hemisphere has risen from one-third of world output in 1990 to one-half. Even sub-Saharan Africa has experienced income growth since the turn of the century. More than 40 developing countries have achieved better-than-expected human-development gains notably over the last ten years. [HDR 2013, pp. 13, 26, summary].

Runst's investigation found that persons in the more successful countries of Poland, Slovenia, Estonia, and Czech Republic were politically farther to the right, less inclined favorably toward a strong leader, more supportive of competition, and less supportive of equality than persons in less successful transition countries. Runst also demonstrated that countries in which there was greater support

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for market institutions were less likely to support socialist political parties, were more inclined to back market reforms, and were more successful in transition. [Runst 2014, pp. 85, 97, 98].

True enough, Runst's study was released publicly after *Evangelii Gaudium*. However, more recently Francis has urged the leading executive officers of the United Nations to promote "the legitimate redistribution of economic benefits by the State." [Francis 2014, pp. 1-2; emphasis added].

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PROFITS

By choosing harsh language in *Evangelii Gaudium,* the pope leaves the impression that there is something fundamentally wrong with business owners pursuing profits. In section §56 he says the following:

> In this system, which tends to devour everything which stands in the way of increased profits, whatever is fragile, like the environment, is defenseless before the interests of a deified market, which become the only rule.

The same theme appears in §204.

> I am far from proposing an irresponsible populism, but the economy can no longer turn to remedies that are a new poison, such as attempting to increase profits by reducing the work force and thereby adding to the ranks of the excluded.

Rather than condemning profits out of hand, in *Centesimus Annus* John Paul offers the following conditional approval.

> Profit is a regulator of the life of a business, but it is not the only one: other human and moral factors must also be considered which, in the long term, are at least equally important for the life of a business. [John Paul 1991, §35; emphasis in original].

There is nothing wrong *per se* with profits that represent the gain necessary for the owners to put at risk the monies they invested in their enterprises. Take away those profits and those enterprises collapse and all of their employees, suppliers, customers, along with the owners, are adversely affected.

Limits on the amount of gain in the form of profits are necessary to prevent one party from taking advantage of another and to assure that market exchange serves everyone fairly and effectively. Those limits derive from the duties that economic agents owe one another under the principles of commutative, distributive, and contributive justice.

A competitive market reduces the control that any one seller has over price, keeps the market price close to the cost of production, and allows a reasonable but not undue profit margin. Thus there may be little need for personal restraint. A problem arises when agents are free to act without restraint. Action of this type can occur when the buyer is ill-informed about the market price and overvalues the product or service offered for sale. In such cases, the gain of the seller is ill-gotten because it is based on taking advantage of the buyer. The principle of commutative justice in all such cases informs both parties that the only justifiable gain is one that does not deprive the other party of the gain that is rightfully his/hers.

The principle of distributive justice helps limit ill-gotten gain because in dealing with his/her subordinates the superior is required to assure that what is gotten and what is given up are the same for everyone in the same or similar circumstances. The gain for the employer who pays some workers less than others for the same work is ill-gotten because it originates in discrimination.

Fixing the price of a product or service through agreement with one's competitors violates the principle of contributive justice because the group of firms who entered that collusive agreement deliberately intend to extract from their customers more than their due. The gains from industry-wide price fixing are ill-gotten and in general are condemned by law.

FREEDOM

By mentioning freedom in the context of the marketplace in §57 Francis seems to refer to economic freedom and the market in a language that is not affirmative.

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By mentioning freedom in the context of the marketplace in §57 Francis seems to refer to economic freedom and the market in a language that is not affirmative.

> … ethics leads to a God who calls for a committed response which is outside the categories of the marketplace. When these latter are absolutized, God can only be seen as uncontrollable, unmanageable, even dangerous, since he calls human beings to their full realization and to freedom from all forms of enslavement.

In §74 freedom is mentioned in the context of mass protests, but it is not clear if he means economic freedom, political freedom, religious freedom, or all three.

> In many parts of the world, cities are the scene of mass protests where thousands of people call for freedom, a voice in public life, justice and a variety of other demands which, if not property understood, will not be silenced by force.

In sharp contrast, John Paul spoke more clearly and positively about economic freedom. :

> *Among the many admirable values of this nation*[1] there is one that stands out in particular. It is freedom. The concept of freedom is part of the very fabric of this nation as a political community of free people. Freedom is a great gift, a great blessing of God. [John Paul II 1987b, §3, emphasis in original].

In *Sollicitudo Rei Socialis* John Paul makes the following extraordinary statement:

> …one must not overlook that *special form of poverty* which consists in being deprived of fundamental human rights, in particular the right to religious freedom and the right to *freedom of economic initiative.* [John Paul 1987a, §42; emphasis added].

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In *Centesimus Annus* John Paul alerts us to the centrality of freedom to human nature and warns about the suppression of self-interest.

> The social order will be all the more stable, the more it takes this fact into account and does not place in opposition personal interest and the interests of society as a whole, but rather seeks ways to bring them into fruitful harmony. In fact, where self-interest is violently suppressed, it is replaced by a burdensome system of bureaucratic control which dries up the wellsprings of initiative and creativity. [John Paul 1991, §25].

The state, John Paul argues, is to be guided by subsidiarity to assure economic freedom and solidarity to defend the weak, limit the autonomy of the parties who determine conditions in the workplace, and provide basic support for jobless workers. [John Paul 1991, §15].

John Paul re-affirms the Church's commitment to freedom as a necessary condition to assure the "transcendent dignity of the person" [John Paul 1991, §46]. Even so, he recognizes that freedom in economic affairs is not absolute. Economic freedom, he asserts, is only one element of human freedom. When economic life becomes absolutized, that is

> when man is seen more as a producer or consumer of goods than as a subject who produces and consumes in order to live, then economic freedom loses its necessary relationship to the human person and ends up by alienating and oppressing him. [John Paul 1991, §39].

It is a pity that there is no room in *Evangelii Gaudium* for economic freedom especially since John Paul spoke at great length about it in two encyclical letters. One suspects that Francis could not find a way to reconcile economic freedom with income inequality. It could have been done, however, if he had paid more attention to the evidence on global hunger and poverty, intergenerational income mobility, and the experience of transitional countries in central and eastern Europe.

THE MARKET

The market comes under heavy attack in *Evangelii Gaudium.*

> The culture of prosperity deadens us; we are thrilled if the market offers us something new to purchase. §54.

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This imbalance (income inequality) is the result of ideologies which defend the absolute autonomy of the marketplace and financial speculation. §56.

If every action has its consequences, an evil embedded in the structures of society has a constant potential for disintegration and death. It is evil crystallized in unjust social structures, which cannot be the basis of hope for a better future. §59.

Today's economic mechanisms promote inordinate consumption, yet it is evident that unbridled consumerism combined with inequality proves doubly damaging to the social fabric. §60.

We can no longer trust in the unseen forces and the invisible hand of the market. §204.

Two central questions are addressed through markets. Who determines prices? How do markets allocate resources?

To evaluate the validity of these attacks, it is necessary to understand how markets work. Two central questions are addressed through markets. Who determines prices? How do markets allocate resources?

Formulating the first question in terms of "who" directs one's attention to the human beings who are interacting in the marketplace and the workplace -- buyers and sellers, employers and employees, producers and resource holders. Strictly speaking, economic decisions are made not by markets but by economic agents, by living, breathing, existential actualities.

Markets operate systematically and automatically to produce the conditions whereby buyers and sellers are brought to agreement. Whenever the price rises above the market price, the resulting surplus sends a clear signal to sellers to lower the price until he surplus is eliminated. Similarly, whenever the price falls below the market price, the resulting shortage signals sellers to raise the price until the shortage is eliminated.

As to the second question, markets allocate resources through the "pulling force" of prices and the "pushing force" of unmet need. We flesh out the meaning of that assertion with the example of two producers. Producer A faces a shortage market for the product that he/she is producing, while Producer B confronts a surplus market.

The resources discharged by Producer B who faces a surplus are attracted to Producer A who is hiring and is paying more for the resources he/she requires because he/she is facing a shortage. This is the way in which mainstream economics explain the allocation of resources in a market economy: the pulling force of prices draws resources away from producers where they are in excess supply and toward producers where they are in short supply, thereby simultaneously remedying Producer B's surplus market condition and Producer A's shortage market condition.

Mainstream economics, however, overlooks the pushing force of unmet need whereby redundant workers and other idle resources are pushed away from producers where they are in excess supply and toward producers where they are in short supply by the hardship and unmet need brought on by their idleness.

Command economies allocate resources and determine prices through central planning boards that allocate resources and set prices for those goods and services regarded as most needed. The central planning board substitutes the judgment of public officials for the judgment of private economic agents pursuing their own self-interest. Command economies and market economies are alike in that they depend on human judgment: the judgment of public planning agents, the judgment of private economic agents. They differ in that participation in command economies involves a handful of "experts" who know best how to allocate resources and set prices. Market economics are constructed around much greater participation by ordinary persons who know best what they need and want and express those needs and wants by interacting with others. Market economies affirm the principle of subsidiarity, command economies do not.

Market economies affirm the principle of subsidiarity, command economies do not.

By attacking the market system and offering no suggestions to reform it, Francis appears to favor the judgment and decision-making of public planning agents over private economic agents.

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End Notes

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Climate Change Reflects Natural Cycles

By Patrick J. Barosh, PhD

"Climate change is a socialist plot." "We're experiencing our warmest weather ever." "Lower Manhattan will be flooded by rising seas by 2050." These and other extreme statements are being tossed about while science suffers.

The fact is, climate and sea level are always changing. This is a fundamental tenet of the science of geology. The national recognition of climate change in the last dozen years is akin to discovering that the sun rises in the east; proposals to stop it amount to requiring the sun to rise in the west.

The national recognition of climate change in the last dozen years is akin to discovering that the sun rises in the east;

We live on a very lively planet with an every-changing climate. This is related to various solar cycles and flares, polar wandering, continental plate movement, seas opening and closing, mountains rising and eroding away, volcanic eruptions and additional factors.

A particularly wild roller coaster ride of climatic fluctuations started 1.8 million years ago during what is commonly called the Ice Age. A remarkable record of sea level change from the last group of glaciations to the present is well preserved in the Boston region and shows the level varying between minus 200 feet to plus 25 feet.

The last glacial ice started receding northward from just off shore of Rhode Island 18,000 years ago, when the coastline was about 90 miles south of the present one.

Our climate has been warming and the sea rising since, but there have been many ups and downs. The last time it warmed up, reaching temperatures higher than today, was between 800 and 1300 AD. This did not bring on a natural catastrophe. Instead, an apparently calmer Atlantic aided the Vikings to launch coastal raids and establish farms on Greenland. Better grass in Asia helped the advance of

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Genghis Kahn's cavalry. Grapes grew father north in New England.

That warming did, however, cause a severe drought in our Southwest that resulted in the abandonment of many pueblos. This was balanced by increased farming in the Mississippi Valley and the rise of Indian cities. No mention is made of the great inundations of coastal European towns. The climate again turned cold, and we are now coming out of the "Little Ice Age" of the 19th century Europe, but we have yet to reach the high temperatures of many past warm times.

In the 1970's, there was concern that we were reaching the tipping point toward another ice age, a view still held by some, and Congress even wrote this concern into laws for storage sites for radioactive waste. This also was the time studies of the atmosphere showed changes in composition that were considered to influence the climate. Comments on this influence then and at present demonstrate a very limited understanding of natural climate cycles.

Now climate change is attributed to humanity's production of "greenhouse gases," and we are told drastic measures must be taken to stop it. But we cannot stop the significant amounts of these gases that arise from volcanic eruptions and other natural sources. Just last summer, a carbon dioxide vent opened near the Rome airport. We certainly alter local climates, as testified by Los Angeles and Beijing smog, the spreading Sahara Desert and massive deforestation, but we can hardly be held accountable for the constant changes of nature.

Sea level rise accompanied glacial retreat in New England, although many are just becoming aware of it and think it is a recent phenomenon. The Pilgrims would have soon learned about the rise from submerged tree stumps and trees along the shore. A hundred years ago, deeply submerged Indian fishing weirs were found in subway construction in Boston. The rate of the rise was calculated and considered in the construction of the first Charles River Dam. There and other studies done then showed the same rate of rise in the previous century as is currently measured by tidal gauges. However, it appears variable along the coast because the land is also moving in different ways, mostly downward; a factor not considered at present.

Although climate changes are natural and cannot be stopped, we need to take measures to mitigate the damage…

Although climate changes are natural and cannot be stopped, we need to take measures to mitigate the damage, using past sea-level rise rates and hurricanes as guides for the future. The movement of beaches and erosion of coastal bluffs should be fully recognized. This is a political, not a scientific, problem. The need is to better enforce coastal zoning to resist shore line development with subsidized insurance, moving infrastructure inland rather than rebuilding it, discouraging sea walls and armored shores that cause more problems, and limiting rebuilding of destroyed shore buildings.

The Earth has been through many warm periods that end with a cooling, which may continue to a glacial advance. Now *that* is something to worry about.

Author's July 23, 2014 letter to ITEST: "I became interested in sea level changes in the mid 1970s while a Research Professor at Weston Observatory (for earthquakes) at Boston College. I directed a large study on the cause and hazard of earthquakes in the northeastern United States for the Nuclear Regulatory Commission and found a relation between earthquakes and subsiding areas; the relative variation in sea level along the coast was a way of measuring local subsidence. I have followed this subject since and more recently studied the changes around Boston with the various glaciations and those leading to the present. Much of this is in Barosh, P.J., and Woodhouse, D., 2013, A city upon a hill: the geology of the city of Boston & surrounding region: Civil Engineering Practice, Journal of the Boston Society of Civil Engineers, v. 26 & 27, 2011/2012, 480 p."

Patrick J. Barosh, PhD

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"The Scientific Legacy of the Twentieth Century"

Reflection shared by Pope Benedict XVI with members of the Pontifical Academy of Sciences at the plenary session of the meeting in 2010.

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"The history of science in the 20th century is one of undoubted achievement and major advances. Unfortunately, the popular image of 20th century science is sometimes characterized otherwise, in two extreme ways. On the one hand, science is posited by some as a panacea, proven by it notable… achievements in the last century. Its innumerable advances were in fact so encompassing and so rapid that they seemed to confirm the point of view that science might answer all the questions of man's existence, and even of his highest aspirations. On the other hand, there are those who fear science and who distance themselves from it, because of sobering developments such as the construction and terrifying use of nuclear weapons.

"Science, of course, is not defined by either of these extremes. Its task was and remains a patient yet passionate search for the truth about the cosmos, about nature and about the constitution of the human being. In this search, there have been many successes and failures, triumphs and setbacks. The developments of science have been both uplifting, as when the complexity of nature and its phenomena were discovered, exceeding our expectations, and humbling, as when some of the theories we thought might have explained those phenomena once and for all proved only partial. Nonetheless, even provisional results constitute a real contribution to unveiling the correspondence between the intellect and natural realities, on which later generations may build further.

"The progress made in scientific knowledge in the 20th century, in all its various disciplines, has led to a greatly improved awareness of the place that man and this planet occupy in the universe. In all sciences, the common denominator continues to be the notion of experimentation as an organized method for observing nature. In the last century, man certainly made more progress if not always in his knowledge of himself and of God, then certainly in his knowledge of the macro- and microcosms than in the entire previous history of humanity….For her part, the Church is convinced that scientific activity ultimately benefits from the recognition of man's spiritual dimension and his quest for ultimate answers that allow for the acknowl-edgement of a world existing independently from us, which we do not fully understand and which we can only comprehend in so far as we grasp its inherent logic. Scientists do not create the world; they learn about it and attempt to imitate it, following the laws and intelligibility that nature manifests to us. The scientist's experience as a human being is therefore that of perceiving a constant, a law, a logos that he has not created but that he has instead observed: in fact, it leads us to admit the existence of an all-powerful Reason, which is other than that of man, and which sustains the world. This is the meeting point between the natural sciences and religion. As a result, science becomes a place of dialogue, a meeting between man and nature and potentially, even between man and his Creator.

"As we look to the 21st century, I would like to propose two thoughts for further reflection. First, as increasing accomplishments of the sciences deepen our wonder of the complexity of nature, the need for an interdisciplinary approach tied with philosophical reflection leading to a synthesis is more and more perceived. Secondly, scientific achievement in this new century should always be informed by the imperatives of fraternity and peace, helping to solve the great problems of humanity, and directing everyone's efforts towards the true good of man and the integral development of the peoples of the world. The positive outcome of 20th century science will surely depend in large measure on the scientist's ability to search for truth and apply discoveries in a way that goes hand in hand with the search for what is just and good."