THE EVIDENCE
OF THINGS NOT SEEN
Orthodoxy and Modern Physics
by Archbishop Lazar Puhalo

"Faith is the evidence of things not seen" (Hb.11:1).
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The heavens declare the glory of God; and the firmament showeth his handiwork. Day unto day uttereth speech, and night unto night showeth knowledge. There is no speech nor language in which their voice is not heard. Their sound has gone forth through all the earth, and their words to the ends of the cosmos. In them hath he set a tabernacle.... (Ps.20:1-4)
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This work is respectfully dedicated to
my friend and colleague
DAVID J. GOA
Canadian Philosopher and Educator.
I

INTENT

Utimately, my goal is to encourage theological seminaries and schools to include life sciences and at least elementary or introductory physics in their curricula. It would appear that this is necessary if the Church is going to continue to communicate with society.

Far too often, writers in religious journals present their viewpoints on any given subject as if they represented the definitive "Christian" view or concept of the given topic. In fact, there is a huge spectrum of subjects for which there is no general agreement among the various Christian religions. In particular, there is a wide range of subjects for which there is no "definitive Orthodox point of view." Almost inevitably, the author of such works will be imposing on Christianity (and often attempting to impose on society at large) his or her own general worldly political philosophy. One who is in the sphere of "ultra-rightwing" politics will tend to present a more "fundamentalist" religious point of view, almost always coloured by a Scholastic bent in philosophy. Such writers usually tend to be top heavy in negativism about every phenomenon in modern life, and especially about the elements of human progress. Modern science in particular is often demonized by these thinkers and frequently there is an element of fear and sectarian
apocalypticism in their writing. Politically liberal writers who interject their worldly political orientation into the life of the Church present a different set of problems which do not directly concern us here.

Let us begin by examining the roots of the fear and distrust which fundamentalists and Scholastics have of the physical and biological sciences. We are not going to pretend that we are offering "the definitive" Orthodox view, because the only thing Orthodox Christianity would ask of scientists is that they practise their trade with integrity and refrain from attempting to create theology. In fact, Scholastics and fundamentalists of the "religious right" in general, too often demand the opposite: they would require that science compromise its

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1. In our context, “fundamentalist” refers not simply to those Protestant sects that bear the name, but to advocates of a certain mindset which seeks to interpret Scripture in the most literal way. They consider the details of the Book of Genesis to be a precisely scientifically accurate statement of chronology and cosmology (though many are forced by reality to amend the supposed precision). In actual fact, such fundamentalists have dogmatized science in the context of the medieval Scholastic understanding. Examples of their superstitious fear would be the fraudulent "scientific creationism" which some of them have desperately concocted, or the efforts of fundamentalist sects to have classes in modern biology either banned from the school district, or to have quite obviously faulty and contrived versions of 'creation science' taught as an alternate course with equal time. These questions do not consist simply in the question of the origin of the first humans (literally, Adam and Eve, who are the personal, direct creation of God) but on a vast number of chronological and cosmological questions upon which "scientific creationism" forces often ludicrous conclusions. For a discussion of the Chronology of Genesis, see chapter seven of my *The Creation and Fall*, Synaxis Press, Dewdney, B.C., 1985.

2. As modern "Scholastics," we include those who would treat Orthodox Christian theology as a systematized religious philosophy. Usually, this approach is taken by writers who are under the influence of Augustinian neo-Platonism, with its inherent Platonic mysticism. They will almost inevitably be inclined to the fundamentalist understanding of Scripture, although, being more intellectual in their approach, they may or may not have a better grasp of the metaphorical and symbolic aspects of both the ancient Hebrew and ancient Greek language used in Scripture.
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integrity in an effort to conform its findings artificially to their own particular religio-political doctrines and philosophical viewpoints. This "demand" has clear historical roots.

Aside from exploring the historical development of ultra-conservative fear of science and technology, we wish also to examine, in a general way, some basic concepts which are common to both Orthodox theology and modern (especially quantum) physics. In examining these concepts, perhaps we can further dispel the myth that there is some conflict between Orthodox Christianity and modern science, or that there is some organic relationship between Orthodoxy and ultra-conservatism or the so-called "Christian right." Such an examination would not be complete without looking at modern biology and anthropology, and we will include those two fields in a second book.

In the course of this examination, we hope also to indicate the spiritual and intellectual danger inherent in Scholastic and fundamentalist religious philosophy. Ultimately, we would like to invite the Orthodox Christian reader into a more open, comprehensive and theologically sound view of the physical and biological sciences, of human progress and the uses of technology—all of which are gifts of God Who bestowed to us a mind

3. The persecution of Galileo is a prime example, but the fraud of "scientific creationism" might be considered an example also.
capable of advancing in these fields. We would like to invite you to examine within yourselves how many of your judgments and points of view are formed, not by the tenets of the Orthodox Faith, but by your acquired political orientation. Indeed, how often is your own approach to the Orthodox Faith shaped not by the concept of redemption, transfiguration and theosis, but by the wing of the worldly political spectrum into which you have been moulded, or the worldly, politically oriented social philosophy that has become ingrained in you? Perhaps among these external political and philosophical constraints on our minds, there are many elements which we should be struggling to be liberated from so that we can ascend in our faith, instead of allowing them to shape our approach to our faith.

The word "ignorance" is too often thought of as merely pejorative. This is unfortunate because we lose a dimension of expression in which ignorance is precisely the opposite of pejorative, and so we have to modify the word with adjectives. Clearly, St John Chrysostom was ignorant of the facts when he accepted an idea he had learned in school that humans could not possibly live south of the equator. Nevertheless, it is easy to deduce from his writings that he would quickly have accepted the truth of the matter had it been made known to him. A number of assumptions might have been made in his time, based on existing knowledge, concerning conditions
at and "below" the equator. In fact, the great geographer Ptolemy (whose work was phenomenal for its time) taught that only one quarter of the earth was habitable. He had, justly, great authority in the science of his day and "graduates" of civil academies in the time of Chrysostom and St Basil the Great would have had little reason to question his conclusions. Those assumptions were reasonable enough at that time, notwithstanding the fact that Scripture indicates that man was to have dominion over the whole face of the earth, and not just the portion north of the equator. In this case, ignorance was honest and reasonable. It was not based in an obduracy derived of intellectual insecurity and uncertain faith, nor was it an ignorance sought for and nourished as is too often the case with fundamentalist religious teachers.

Our discussion in this consideration is basically a response to the philosophy of a highly romanticised mystic conservatism and, by extension, a discussion of two developing schools within the Orthodox Churches in America and, to a lesser degree, in Canada. The first of these is neo-Scholasticism (which is common among ultra rightwing thinkers, although it is also part of the sorrowful legacy of 19th century Russian theology); the second is an infiltration of the Orthodox Church in both America and Canada by Protestant Fundamentalism — mainly the result of Ecumenism. Both these schools, if
they are, in fact, separate, are presenting their concepts as if they constituted the valid Orthodox worldview and approach to theology. Our concern about this is not only that these views are shrapnel from the nebula of a much discredited medieval Scholasticism and Augustinianism, but that they corrupt and disfigure Orthodox spirituality with the pox of romanticised mysticism, and distort even the Orthodox concept of theology with a retrogressive philosophy heavily laced with superstition. It is this utopian nostalgia (based, I suspect, in intellectual insecurity and a longing for the safe haven of ignorance) that has caused both schools — that of neo-Scholasticism and that of fundamentalism — to suspect that modern science and technology are demonic enterprises or, at best, a devious international plot against a more comfortable, if somewhat dehydrated, form of Christianity.

Scholastics and fundamentalists are certainly not wrong insofar as they assert that science and technology can be used by people to dehumanize other people. They

4. Contrary to the hopeful fantasies of our messianic Russophiles, Western thought was not alone in this fall into a dreamy, romanticised mysticism. The Russian variety had a harshness that was not always common in the West, but it was nonetheless highly romanticised. Bishop Ierotheios Vlachos and I had a lengthy conversation about the distortion of Orthodox theology and spirituality in Russia during the 17-19th centuries by the influence particularly of Platonistic mysticism. We concluded that a careful and objective study of the well-known collapse of Russian theology during that era would reveal that this sort of mysticism bears a considerable amount of the blame. There is a very great difference between the patristic terms “mystery,” “mystical,” and mysticism (see the last section of this work for a discussion of these terms. For a discussion of the messianic Russophiles see Hare, Richard, Pioneers of Russian Social Thought, Harper, Greenwood, 1975).

5. Or nostalgic utopianism. Both forms of the definition are from Canadian philosopher David J. Goa.
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are in error to suggest that these things in and of themselves could accomplish this. We have seen sufficient proof that, in the hands of humans, religion can dehumanize man, and this has had far more to do with the collapse of the pursuit of Orthodox Christian spiritual life than science ever could have. In fact, the development of modern science has had far less effect on de-churching people than did 17-18th century romanticism and pietism. It is, perhaps, one of history's more peculiar ironies that so many neo-Scholastics and fundamentalists are arguing against modern science in defence of elements of that very 17th century romanticism. History (even in an imaginary golden age of pre-scientific history) has shown us that every enterprise, passion, emotion, philosophy, political presence or event and every idea can be used by man to dehumanize himself and/or any other segment of the population.

The real root of the fear and disdain that Scholastics and fundamentalists have of modern science is actually not expressed clearly in the apology they themselves present against this "demon." The real source of their fear and sense of insecurity is more interesting, and it is urgent for Orthodox Christians to understand it. The seeming conflict between science and religion in the minds of ultra-conservatives arises not from any evil innate in science, but precisely from the atavistic perspective of these groups, formed centuries ago, and the
fact that even their concept of the meaning of theology is seriously flawed. Let us take a brief look back at the roots of this problem and see where the conflict arises. Then we can take a look at the way in which Orthodox Christian theology and modern physics are actually complementary. Whereas Scholastic and fundamentalist religious philosophy are thrown into confusion and insecurity by modern science, Orthodoxy finds much in it that is compatible to its mode of, and approach to, theology.

When I present this subject as a public lecture, at some appropriate point, I usually introduce an example with a hand sized stone. I create two dogmas and a "tale" about the stone. The first "dogma" is contrived by Scholastic methods of reflective reasoning based on antique concepts of the rock. It is stated roughly like this: 

dogmatically, the rock is solid, motionless, impermeable and lifeless, and composed of a solid, continuous single material. It is hard but may be carved or dressed for utilization. There is no motion within the stone and, if thrown, it will fall downward because the earth is its home, and all things tend toward their natural homes. Aristotle would say that it falls faster as it nears the surface of earth, because as objects near their natural home, they move with more exuberance, being nearer home.

The second "dogma" is more limited and, for the sake of argument, we will credit it to the contemplation
of the rock within the framework of some idea of the universe. This dogma, which I would suggest is more Orthodox in concept, is expressed with this concept:

*The rock is a microcosm of the universe.*

Here is the "tale."

*There are two families living in this rock. The first is named the "Leptons." They may be this very minute serving tea. If they are, then they may very well have made a dozen cups with a single tea bag. If they happen to have a muon in the barn, they might add a bit of skim milk to the tea. If they are discussing anything, it is likely a mild conversation about the weather. If Uncle Photon drops in, they may well give him simply an empty cup. The Leptons, you see, are not at all good at strong interactions. They are limited to weak interactions.*

*On the "other side of the tracks," there is a rowdy bunch named the "Hadrons." If they are drinking anything, they might be passing around a jug of homemade potato vodka. Their discussion would likely be an argument that might be quite heated. There is little chance of it being a passive discussion because Hadrons are into strong interactions.*

Now the point. The rock really is in some sense a microcosm of the universe. So far from being a solid, continuous material substance, it is composed of atoms. Within the atoms, subatomic particles are racing around in one or another form of orbit, like so many solar systems tied together in a galaxy. One might metaphor-
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ically describe the rock as a very tight galaxy of atoms. If any of these subatomic particles collide, they may annihilate each other, but then the annihilated particles will reform, so, inside this rock, we see the great drama of life, death and rebirth taking place also. The particles which make up the rock belong to two classes: the leptons, which indeed are capable of weak interactions but not strong ones and the hadrons which are heavier and participate in strong interactions.

We have described (but not defined) our concept of the rock with a fanciful story for a reason. The purpose of stating these two "dogmas" and adding the fable is to create a tension between ways of thinking and ways of "dogmatizing" so that what follows may be clearer. We wish to look at three things that are done with dogma so that we can more fully follow the main thought of the rest of the text.

The first form of dogma is a legislated interpretation of the rock based on reflective reasoning about what is physically evident to the eye and touch. Once legislated, it "closes." By "closes," we mean that it cannot be submitted to a correction of the perceived facts, because a correction of the perceived facts would be considered heresy. The dogmatic statement is concrete and legal, not symbolic or metaphorical, so it is not only absolute but thought to be complete in a physical or material as well as philosophical sense. It was not arrived at by spiritual
experience or by prayerful contemplation, but by the logic of philosophy, and it is not stated as a paradox. It is absolute in a way that Orthodox dogmatic experience can never be. Scholastics within the Orthodox Church have often reinterpreted Orthodox doctrine in just such a destructive way.

Our second "dogma" is simple and direct, but cannot be fully comprehended from what has been said in stating it. It might be explained in symbolic terms or with the use of metaphor, but it clearly "opens" before us and invites us to discover its meaning more fully by spiritual growth and experience. This dogmatic expression would not have been arrived at by logical reasoning, but could only be conceived by experience and contemplation (in the Orthodox sense of *theoria*). It happens that what we know about the rock comes from scientific investigation, but this is not the point here.

The fable presents another problem. It might be said that our dogma, being too spiritual, too complex or too "high" could not be understood by simple people, so the fable was made up as a metaphorical way of describing the teaching. The problem that arises is that in very many cases, simple people will forget or be unaware that they have been given a colourful story as a way of expressing a teaching that they could not easily understand, and they will conceive that there are some families of spiritual entities in the stone. Eventually, this story will be retold.
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enough that people will begin to think that it is actually the dogma, and Scholastic, legalistic minds in the Orthodox Church are guilty of the same error. Later, when someone says, "there are no people or spiritual entities living in the rock. The story is talking about subatomic particles," they will be thought to be heretics who are opposing "the teaching of the Church." In fact, this is not far from what did happen in the Middle Ages. It was believed that the planets, embedded in crystalline spheres, were pulled along their orbits by spiritual intelligences. This was an idea which came from pagan sources, not Christian sources, but it was accepted, with the reinterpretation that it was angels pulling the planets along. There was a crisis for this "teaching of the Church" when this concept was proved to be a false and naive teaching borrowed from pagan philosophers. The same thing has happened in our own time with the metaphorical use of the old Gnostic teaching of "aerial toll-houses."

Having established this tension, let us continue.
II
THE ROOTS OF THE PROBLEM
THE SCHOLASTIC PARADOX

The dualistic conception of reality as consisting of abstract, disembodied ideas existing in a domain separate from and superior to that of sensible objects and movements became the most characteristic feature of Western philosophical and religious thought. (Menas Kafatos)

By a curious confluence of events, the last vestiges of Orthodox Christianity were snuffed out in Western Europe at a time when the only alternative sources of intellectual influence there were nascent in Spain: the Moslem schools of philosophy which would arise in the Iberia of the Saracens. The great Aristotelian scholars of Islam — such as Ibn Sina (Avicenna), the royal librarian of Bokhara, and his Iberian born disciple Ibn Roshd (Averroës) — were still in the future, but the foundations for their massive influence on Western theology and thought were laid in this epoch, almost ironically by the Arab movement of falsafah which might be called the Moslem Scholasticism. In the 800s, the falsafah had discovered the Hellenistic classics and began to apply both "natural science" and Greek metaphysics to Islamic thought. The scholars (called faylasufs) in this movement

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ranged from the mystic Abu Nasir al-Farabe, who died in the 980s to the rationalist Yakub ibn Isak al-Kindi (d.874) and Abu Bakir al-Razi (d.925) who introduced Gnostic ideas into his system. They were reformers of a sort, and inclined to asceticism and in a curious way are the progenitors of the Christian Scholastics.⁷

In the 800s Charlemagne (742-814) managed to exterminate Orthodox Christianity in Gaul, and his successors carried this through in the rest of Western Europe. They did so, not as a matter of theology, but as a matter of power and control and, in the words of Fr John Romanides, "The incorporation of the episcopate of Carolingian Francia into the Frankish army and its [the episcopacy's] occupation by military officers, whose duty was to pacify the revolutionary Gallo-Roman population, is the key to understanding the so-called Great Schism between Roman and Latin Christendoms."⁸

In fact, Charlemagne desired to be crowned Roman emperor. When the Gallo-Roman bishops refused,

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⁷ The Scholastic movement in Islamic thought was called kalâm. Its history unfolded somewhat differently than in Western Europe. The kalâm school did not seek to legislate knowledge in all fields, but focused almost exclusively on theological questions. Ironically, this allowed for more original thought in that field. It may be significant, when we look at Islam in Iran today, that the Shiite denomination was the main channel for the Scholastic philosophical tradition. The Sunni denomination, on the other hand, rejected and strove against Scholastic rationalism. The Asharite school rejected rationalism and defended its concept of Islamic revelation from Hellenistic rationalism. Sufi mysticism completed the defeat of Scholasticism (Hellenistic philosophical rationalism) in most of the Islamic world. Shites, however, still tend toward the legalistic moral fascism of Scholasticism.

⁸ "Church Synods and Civilisation," Theologia, Vol.63, Issue 3, July-September 1992 (Romanides correctly refers to the Orthodox Church and to "Byzantium" as Roman and Rome, since the Eastern Roman Empire was the only actual remains of the Imperial Roman state).
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reminding him that there was a Roman emperor in Constantinople already, Charlemagne is reported to have responded, "But there is a woman on the throne, therefore the throne is vacant." St. Irene the restorer of the holy icons was on the throne at that time. Charlemagne, through violence and threats, created a schism and crowned himself emperor with the helpless assistance of the Bishop of Rome. Roman Catholicism was literally created by the Carolingian rulers of the Frankish kingdom, based on political foundations laid by Charlemagne and his minister of education, Alcuin of York, and philosophical foundations laid by Augustine of Hippo. The birth of the Roman Catholic Church took place in an inauspicious, shadowy era between the closing decades of the Western Dark Ages of barbarian rule and the beginning of the medieval "awakening." This was an era in which the great intellectual resurgence in

9. The quotations marks around "awakening" do not indicate disparagement. The word "medieval" is too often used as a pejorative, but a study of that time period, kept in proper historical perspective, might do more justice to the "awakening" that did take place, relative to the preceding centuries. The "awakening" period of the medieval era, which led directly into the Renaissance, was indeed a heady and exciting period of intellectual ferment, rediscovery and cultural development to those in a position to participate. It had a savage and dark side, which was really only the continuation of the Dark Ages, but to the degree that genuine humanism — that is, as opposed to the brutality of barbarian societal structure — developed in and from this era, it was also a great advance for humanity, because humanitarianism in its greater sense eventually arose from Christian humanism (that is, a realization of the relationship between God and humanity). The medieval era, with its own "awakening," is the foundation upon which the Renaissance was built. The later period, which is officially called "The Age of Enlightenment," might not have been as exciting as the medieval era, because by the time of the Age of the Enlightenment, so much ground had already been covered. Coming out of a tunnel into some kind of light, especially when it is the light of an early dawn, might be more thrilling than simply rounding a bend in the tracks at midday.
Constantinople\textsuperscript{10} could cast no more than a noctilucent glow toward the West, when the cruelty and savagery of the Dark Ages penetrated the religious philosophy of the West with the rudiments of "juridical justification theology," and penetrated the faithful with dark superstitions and fears that have still not vanished. It was also the era when the Platonism and quasi-Gnosticism of Augustine of Hippo distorted theology in the West into a system of philosophical speculation, and forever separated it from the existential, living theology of Orthodox Christianity.

Western scholars were cut off and isolated from Constantinople increasingly by language, as the command of Greek was lost, and sometimes by Carolingian and later Frankish imperial policy\textsuperscript{12} and by the Arab

\textsuperscript{10} This was an epoch in the Eastern Roman Empire — Byzantium — that would produce the brilliance and Christian humanism of Photios the Great (820–891) and his disciple Nicholas Mystikos (+925), and the scientist Leo the Mathematician, so respected that the Caliph Mamum would offer a treaty of perpetual peace and a sum of tribute equal to about $344,000 for his temporary services as a lecturer in Baghdad. This was the era when Caesar Bardas would reestablish the University in Constantinople, with a full curriculum of seven liberal arts, and tuition would be free to any student who could qualify for admission. Despite the depredations of the iconoclasts during part of this long period, the Eastern Roman Empire did not endure anything like the "Dark Ages."

\textsuperscript{11} One must note that, at the same time, the knowledge of Latin was being lost in the East, and all this exacerbated the problem of communications and interchange of ideas.

\textsuperscript{12} This was by no means a consistent policy of the Frankish kings and emperors. Lewis II, who was King of Italy (and essayed to be Emperor) could bring the matter of his brother, King Lothar II of France, before the Patriarch of Constantinople in the 860’s, in an effort to thwart a decision of Pope Nicholas. It was this act which gave impetus to the council of 867, which, under St Photios the Great, condemned the Latin heresies. Otto II’s marriage to Princess Theophano, the daughter of Emperor Romanos II and niece of John I Zimiskes, brought a certain influence of the East Roman Empire back to the West, though it seems to have had little effect except on the Franco-German concept of empire. Indeed, Byzantine influence in the West did not, from the beginning of the Dark Ages, appear to have had any (continued...)
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control of the Mediterranean. When the Dark Ages did draw to a close and the resurgence of learning began in Western Europe, the new schools would turn toward Spain, toward the Moslem academies, for their inspiration and direction. This development would produce the new movement among scholars called "Scholasticism" or "schoolmen." While this whole series of events had a catastrophic doctrinal and spiritual result in the West, it also provided for an energetic resurgence of learning that would lead, eventually, to great advances in all the sciences and in medicine. Paradoxically, it would also lay the foundations for the huge conflict between religion and science in Western Europe — a conflict that is still being played out in America in the 21st century.

In the system of the newly arising Latin philosophical theology, the "schoolmen" failed to realise that dogma and doctrine,\(^\text{13}\) are only the algorithm for theology, and the artificing and refining of the algorithm became, for them, the very meaning of theology itself. Indeed, it often appears to us that the West in general lost the algorithm

\[^{12}\text{(...continued)}\]

impact outside the highest ruling levels in the West, and this influence was ephemeral.

\[^{13}\text{The holy fathers did not make a sharp distinction between dogma and doctrine. The fathers used the word }\textit{dogma}\text{ as something separate from }\textit{kerygma}. \text{Whereas }\textit{kerygma}\text{ indicates the general exposition of the faith to all, in Orthodox Christianity, the word }\textit{dogma}\text{ is used in a deeper mystical sense, an empirical sense of knowledge of God that was ascertained by experience and }\textit{theoria}. \text{They also use the terms }\textit{theologia}\text{ in the same sense (i.e., }\textit{theologia— God in Himself, or "knowledge of God," as distinguished from }\textit{ekonomia—which includes the Incarnation and everything God revealed for our salvation in Christ.}\]
and ended up developing doctrine by means of iteration or in a heuristic process. In such a circumstance, theology lost its existential power as a vector for the ascent of man in real spiritual transformation and the experiencing of the uncreated energies of God and became no more than a system of religious philosophy and a school of ethics. The concept that theology is a living, healing force, experienced in the very depth of one's being, could not even have occurred to the schoolmen. Doubtless this is why Latin spirituality,\textsuperscript{14} strangled by the dry, lifelessness of philosophical theology and the moralistic religious fascism that it produced with its speculation in ethics, collapsed into romantic mysticism and thus into spiritual delusion (\textit{plani}; \textit{prelest}), as would Russian spirituality during the three hundred year "Latin captivity of Russian theology," until it began to be emancipated by St Antony (Khrapovitsky) of Kiev and his co-workers.\textsuperscript{15}

It is here that we must defend some aspects of the Scholastic movement. Our criticism of it is limited to the theological and spiritual problems that it caused, not to its overall gift of a systematic way of thinking and exploring, nor of its opening up of the knowledge and

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\textsuperscript{14} For further reading, see Southern, R.W., \textit{Western Society & the Church in the Middle Ages}, Viking Penguin, N.Y., 1970.
\textsuperscript{15} St Antony Khrapovitsky (1863-1936) began his struggle against Scholasticism in Russia during the closing decade of the last century, and up until the Revolution in Russia. A number of other scholars and theologians were working in the same direction, although the Scholastics resisted this restoration of Orthodox theology in Russia, often quite aggressively.
\end{flushleft}
method that could lead to authentic science — something that simply did not develop in the Byzantine East. After the 600s is it likely that there could have been little advance toward modern science and medicine in the East. The remaining centuries of the Eastern Roman (Byzantine) Empire were filled with an all consuming struggle for survival. The vital and energetic intellectual movement in the West resulted from the excitement of a rediscovery of the literature that had been preserved, but not used to the best advantage, in Byzantium. Every theological critique of Scholasticism, therefore, should acknowledge its gifts also. We are concerned in this work primarily with the later conflicts that the Scholastic mode of theologising would create between Christianity and modern science.

The translations which began to appear in Western Europe in this era were by no means limited to philosophical treatises, or even to the philosophical science of Aristotle. The works on chemistry of Jabir ibn Hayyan (+ca.785) appeared in Europe in the 12th and 13th centuries. Adelard of Bath translated Al-Khwarizmi’s works on arithmetic and trigonometry (the Astronomical table) in the first quarter of the 1100s, and Robert of Chester, working in Segovia in 1145, translated the work on algebra by the same author. The 12th century scholar of Toledo, Gerard of Cremona, translated medical and chemistry texts by Thabit ibn Kwerra (+901), Rhazes
(+925) and Hali Abbas (+994). Al-hazen's *Optical Thesaurus* was translated in the 12th century and Michael Scot translated Alpetragos' work on the Aristotelian concentric system of astronomy in 1217. Apollonios, Archimedes, Diocles and Hero of Alexandria all appeared in Western Europe in translation during the 1200s. Ptolemy's *Almagest* and the physics of Proclus and Simplicius were translated from the Greek by Gerard of Cremona, Robert Grosseteste and William of Moerbeke during the 13th century. Galen's treatises on medicine had begun to appear by the end of the 1100s. It seems worth mentioning, incidentally, that the Arabs had learned many of the most important aspects of mathematics not from the Greeks but from India, where several great Hindu scholars such as Ariavata in the early 500s, Brahmagupta in the 600s and Bashkara in the 1100s, had mastered much which was necessary for the advancement of science. Because the resurgence of learning encompassed every aspect of intellectual activity, the new schemata of Latin philosophical theology took a form quite similar to the order espoused by some of the stoics, at least as expressed by Zeno (d.264 B.C.). He defined philosophy in three categories: logic, ethics and physics. Scholastic theology seems to have embraced these three as part of its discipline, and this is because theology was, for them, a system of philosophy — at least a theology justified by philosophy; *fides quarens*
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intellectum.

Part of the genius of the Scholastics was, perhaps, their enthusiastic ability to embrace these three categories into their theological speculations. Whatever negative effects it had on Latin and Protestant theology, it contributed greatly to the development of systematized and disciplined thought and intellectual pursuits. One would think that the Scholastics were also much influenced by Aristotle's early concept of "natural theology" as a category of metaphysics  and perhaps troubled by his later concept of it as mythology. It must be remembered that the general scheme of theological study in the West was laid down long before the "awakening" and the era of the Scholastics. Augustine contributed its Platonic and Gnostic roots, while Boethius, who died in about 525 A.D., had already introduced Aristotle into Western thought.  It was through Boethius that rational categories were applied to theological speculations. He introduced, from Aristotle, the three speculative facets of philosophy: natural, mathematical and theological. Both Augustine and Boethius had something to do with shaping theology into a philosophical pursuit, but during the Dark Ages, Boethius was eclipsed by the Augustinians

16. Not only the idea of "natural theology," but also "revealed theology" was, in the West, polluted by Hellenistic philosophy.

17. He was not the first to use the Aristotelian approach. Tertullian (d.circa 221), though much more influenced by the stoics, had done so two hundred years earlier, and so had others, but Boethius was in a position to develop it and influence the process of theologizing in a more significant way.
and Aristotle was virtually lost to Latin thought during this intellectual hiatus. We are not concerned to trace the fine details of the development of Western theology and philosophy here, but we wish to mention that part of the problem in the Western philosophical concept of theology is that the theologians wanted to know and explain far more than can be properly explained. They ultimately wanted to visualize (even when they claimed otherwise) the inner workings of the Trinity and tried (some of them) to turn grace into an observable science with fixed laws of behaviour. The root of much of the confusion which would develop in Scholasticism, aside from a lack of awareness of the uncreated energies, lay in a faulty concept of what would later be referred to as epistemology. All radical dualisms lead to falsehood, often to idolatry. The concept of representative perception which developed, created an idea that the things we experience or apprehend are not the things in themselves but representational mental images. Knowledge of God thus becomes a symbolic abstraction. Since the Scholastics thought of God as the "unmoved mover," and, therefore, conceived of as being always "at

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18. For example, Augustine taught that God is being and that analogy exists between created and uncreated being.

19. And categorised as, for example, actual and habitual grace; prevenient and cooperative grace; created and uncreated grace, etc.

20. I have used the term "epistemology," although the development of this "science" was not a direct concern of the Scholastic era as it was again among later philosophers. Nevertheless, the problem is reflected in the understanding of the "way we know" and "how we know," so I use the term in its later philosophical context.
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rest."

Thus, Western religious thought was coloured by
Augustinian Platonism, until Latin thinkers, following the end of the Dark Ages, discovered the commentaries on Aristotle by the great Moslem physician and philosopher Ibn Sina, better known to us as Avicenna (980-1037) and Ibn Roshd, whom we know as Averroës (1126-1198).

By the last half of the 1200s, Scholasticism was the main system for theologizing in the West. Scholasticism took its name from the universities, the "schools," which at the time were ecclesiastical, or at least controlled by ecclesiastical authorities. The Scholastic movement embraced this interpreted Aristotelianism with a passion, and Aristotelian Realism became the basis of religious philosophy. Where Platonic thought sought to transcend physical reality (and desire) in pursuit of a more abstract, spiritualized ideal, Aristotle espoused rationalistic logic and sought to view nature in the context of physical reality, a concept that was essential to the birth of modern science. The great lights of this

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21. Even if his influence waned, Augustine remained the "master of theology" in the West. His legacy always bore a shade of the afterglow of Manichean Gnosticism, from which its master could never completely escape, and this is also a factor in the shaping of Western religious thought.

22. The reader should always remember that the "Dark Ages" were not so hopelessly dark as legend has it. There were no equivalent Dark Ages in the Orthodox East. During the Dark Ages of the West, the Eastern Roman Empire — Byzantium — experienced a number of cultural and intellectual peaks which seem to have just "burned out."

23. The degree to which this is true is demonstrated in the Statutes of Oxford University. A provision, which was still on the books, at least into the 1600s, provided that scholars who did not faithfully follow Aristotle were to be fined five shillings for every point of divergence, and the same fine for every error against the logic of the *Organon.*
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movement, Albertus Magnus and Thomas Aquinas (1224-1274), set about to use reason to make fine distinctions about everything in the realm of revealed theology: every teaching and dogma of the faith would be ascertained rationally through logic, and defined in minute detail (a process that would ensure a clash between religion and science in the future). For the holy fathers, on the other hand, theology is always paradoxical. Indeed "dogma" is always expressed in paradoxes, and the paradox itself helps maintain a proper perspective, preventing the kind of idolatry into which Scholasticism and modern fundamentalism fell. The paradox also helps prevent us from supposing that we understand more than can be known. They applied these principles to law also and, in fact, combined legal philosophy with religious philosophy to form the dry, legalistic and lifeless theology which bears the name of their movement: Scholasticism.24 The old Roman legal mind came into play in this Aristotelian process also25 and, blending legal and religious philosophy, the Scholastics sought to codify...
the mysteries of faith and the very mysteries of life itself. Introduced into this dialectical process was the principle of First Cause in which some real aspect of efficient cause (causa efficiens) passes into the entity of the effect. From these processes, Scholasticism developed two major errors. The first was a philosophical "system of theology" which was locked into a particular era, with its world view and mindset; and the second was codified and limited "sacraments" which placed limits on the action of grace. Truth, then, is reduced to a rational system, deduced by logic based on the principle of First Cause, rather than on the living encounters of human experience in the realm of faith.

The attempt to systematize theology removes it from its vital, existential role in the growth, transformation and ascent of man — from its actual role in the process of man’s redemption. Here, they superseded the primary dimension of truth, which is human experience of life in faith, with the secondary dimension which is the reflective manner of interpreting the world. When we create such a system, we colonize the primary dimension with the "reflective system." In this case, the system itself becomes idolatrous. One of the problems with the Scholastics was (and still is) that they tend to substitute the truth with the "wording" or "phrasing" of the truth. There is a kind of linguistic positivism in Scholastic formulations. It is as if they believe that language as a tool
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can actually produce "truth." However, language obviously can only "signify" the truth. Truth cannot be derived from a set of facts, but only from meaning. By missing the difference Scholasticism became trapped in reflective analysis and in a literal understanding of "authentic" sources. Attempting to find the truth of life in formulations of any kind results in trapping life in their own inflexible patterns. This is what we often call "ideology" and we must certainly be careful to avoid understanding the faith in such a manner. The antidote to this mistake in theology cannot be subjective individual experience, obtained in a private manner. Even faith, individual and private, can be a false guide. On this ground, one may raise an objection to experience-as-knowledge attained by individual "meditation." However, in the Church we are not alone and we are never isolated individuals. We are "in communion" with one another and with the saints, and with Christ. This "communion," this personal mode of being, can be truly implemented in the Church. The coherence of this experience and its "authenticity" is fine-tuned by the Holy Spirit. This is, moreover, why we always look for the "consensus" of the holy fathers. This "consensus" is not just a technicality or an agreement in wording or concepts, rather it is directly related to the "coherence" brought about by the Spirit. In this sense, "coherence" can be another way of saying experience-as-knowledge.
This does not mean that all individual experience, particularly the experiences encountered by studying nature or meditating upon natural things in faith, is wrong or misleading. Such experiences very often make sense and can help people. God has not left us helpless and without some guidance. We all have a compass — the image of God imprinted on our soul. I think this is what is meant by Apostle Paul when he says that those who do not know the law do according to the law by their own nature. (The law here is a *reflection* of the truth). However the fulfilment of knowledge and coherent experience of the faith can only be trustworthily known in the Church, where Christ is not simply reflected (as through in a mirror) but is present in person.

During this time, the schools became so powerful that, in defining heresy and proper Latin doctrine, the ecclesiastical authorities became dependent upon the professors of the universities, and the schools began to infringe heavily upon the authority of the hierarchs.

As the universities became more and more powerful, ecclesiastical authorities sought to limit their scope — particularly the authority of the scholars. The Latin Church eventually condemned many of the leading scholars in the universities for their "vain search for knowledge simply for the sake of knowledge," and this condemnation rings down to us in words we still hear from neo-Scholastics and fundamentalists. Moreover, in
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the "school" not only clearly religious ideas which varied from legally defined doctrine were considered heresy, but the idea was conceived that authorities could judge heresy in all fields and establish "correct belief" in art, science, law, religious philosophy, and thought in general. 26 This prerogative was eventually taken over by the hierarchy when they struggled to curtail the intellectual power and authority of the universities by fragmenting the curricula and reducing the authority and intellectual freedom of the scholars. 27

In the midst of this era, Roscellinus (11th cent.), Duns Scotus (+1308) and William of Ockham (+1347) laid the foundations of the nominalist movement, which in turn helped lead into the "natural philosophy" which moved toward modern science. Roscellinus, at the end of the 11th century, broke the bondage of Augustine's teaching that individual, material objects were only shadows of an eternal idea. Roscellinus incited the famous debate about

26. It is not that the thinkers of this era were opposed to science per se. They made some great accomplishments, particularly in systematizing thought (see Crombie, A.C., Augustine to Galileo: the History of Science, A.D.400-1650, Harvard University Press, Cambridge, Ma., 1980). The problem was one of control and the desire to shape science according to religious philosophy, and establish dogmas in science which would artificially conform to Scholastic religious philosophy.

27. The problem was not a want of scientific interest in the West, but the fear the Scholastic fundamentalists had of science, which they sought to control artificially and manipulate by Aristotelianism. Byzantium was not all light and progress either. There were long periods in which there was a dearth of creativity in literature and science, sometimes in art also. This happened toward the end of the empire. It was, however, due to the lethargy of an elderly nation bogged down in almost senseless state ceremonial, and not a constraint placed by the Orthodox Faith or the state. Orthodoxy never opposed learning for the sake of learning, and the correspondence between some of the Eastern Roman (Byzantine) churchmen and Arab intellectuals clearly demonstrates this openness.
"universals" and focused examination on individual, material objects in themselves, as what they are in actuality, rather than as symbols or images of an idea. Abelard (1079-1142), the old "rhinocerus indomitus," would take this further still by refuting Roscellinus' contention that "universals" were merely abstractions or names. Ultimately, this liberation from the bondage of Augustinianism turned examination and observation toward particulars and gave momentum to the development toward scientific method and thence to modern science. I suggest that modern science unfolded out of the nominalist movement as it developed. One might suggest that all modern scientists are nominalists (with some notable exceptions such as Newton). The controversies of this era further reinforced the idea that unacceptable academic "errors," including those perceived in the field of science as well as social movements, could be judged as actual "heresies." Dr Herbert Butterfield makes a profound case that the breakthrough in the concept of motion (the gradual passage through the idea of impetus to the theory of inertia) is pivotal in the development of modern science. Of course, the advent of quantification, particularly the quantification of time, also had a powerful impact. Both the development of the


29. The term impetus seems to have appeared in the Scholastic era, however the theory of impetus originated in 6th century Byzantium with the scientist/philosopher John Philoponos, in his critique of Aristotle's theories relating to the motion of projectiles.
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concept of motion and the quantification of time were also sources of the mechanistic view of the universe held in antique physics. It was probably also one of the greatest sources of concern to Scholastic religious philosophers. From a metaphysical point of view "movement" was defined as passing from the potential to the actual, where later science would define "movement" as matter in motion. Both the science and the religious philosophy of the Scholastic era formed a basic idea from Aristotle's "concentric circle" cosmology that the universe is static deterministic. At one level, the Scholastics thought that the heavenly bodies were moved by various forms of spiritual beings — perhaps the archons which Gnostics imagined tended the "toll booths" between these concentric astral planes. The advent of sounder knowledge and truer concepts of motion abolished all such metaphysical and superstitious notions. Modern science would view the universe (as with all nature) as in the process of developing. I would suggest that Orthodox Christian theology sees the universe simply as unfolding according to the eternal will and plan of God. The processes involved in this are not

30. It should not be supposed that this referred to angelic powers in any Christian sense. The idea that the various spheres were physically moved by spiritual intelligences was pagan and pre-Christian. Before they discovered the real cause of the motion of the heavenly bodies, some philosophers and early investigators did, in fact, convert these pagan "intelligences" to angels in their own minds and works simply because they had no other explanations at hand, and had received the idea through Aristotle. It should not, therefore, be thought that earlier thinkers accepted these ideas "stupidly." They were using whatever "information" they had at hand. The problem was the dogmatization of antique philosophical theories and their resistance to the proofs that matters were otherwise constituted.

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matters of philosophical or even theological speculation, which might come into active conflict with scientific discovery. Rather the process is accepted as a matter of faith and trust in God, and made more comprehensible by means of science.

Eventually, Augustinian Platonism reacted to the Aristotelians and it is one more of those curious ironies of Latin Christianity that the great minds of the West in this era spent much time debating which of the two pagan philosophers, Plato or Aristotle, was the best basis for Christian theologizing.\(^{31}\)

Herein lies the basis of the fear of modern science which haunts neo-Scholastics and fundamentalists\(^{32}\) (including the ones who are in the Orthodox Church), and leads them into their unnerved heresy hunting in developments and new theories in the hard sciences.

During the entire era of the shaping of the medieval "awakening" and renaissance, Western theology, as with

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31. Among the odd twists of the early Scholastic era is the contradiction over Averroës. The Scholastics revered this philosopher, who was born and raised in Spain, as the "master" of Aristotelian thought. Nevertheless, Averroës rejected the idea of personal, natural immortality. The Scholastics, in order to preserve their own heretical understanding that man is by nature immortal, laboured much to demonstrate that Aristotle agreed with them and that Averroës had misinterpreted Aristotle on this point. The difficulty of the Scholastics over this subject is likely rooted in the immense popularity of Plato's *Timeus* and *Phaedo* which had informed the Western idea of the relationship between soul and body. I do not recall what the Eastern-born Avicenna thought about this subject, but the Orthodox Christian teaching is that man is immortal by grace, as a bestowal from God, and not by his nature.

32. We specify Scholastics and fundamentalists because not all "religious" people of any Latin, Protestant or Orthodox jurisdiction are in such bondage and darkness. Some Protestant denominations are, in this respect, quite enlightened, as are many Roman Catholic thinkers. However, this writer has observed that often enough, among the Protestants in particular, an opening to modern physics and cosmology often inclines them toward a form of pantheism.
II. The Roots of the Problem

all other intellectual pursuits, was rooted in Aristotle (and Plato). Science, still functioning in the realm of philosophy, was also rooted in the thought of these two philosophers (primarily in Aristotle). Indeed, it was not until our present century that Einstein’s paper on Brownian Motion finally divorced the atom from the philosophical realm of the ancient Greeks. Theology in the West, and especially for the Scholastics, had become a systematic philosophy or "science" of religion and ethics, very much overdefined and in bondage to legalism. As they developed, science and theology were in tandem. Both were, essentially, departments of Aristotelian (and eventually also Platonistic) philosophy. Any breach of this harmony was considered dangerous and heretical. Thus, when Bruno, the brilliant, if erratic, disciple of William of Ockham and Erasmus, dared to venture toward authentic science, and strive for a more accurate knowledge of the solar system, he paid the supreme price. When Galileo made irrefutable discoveries about the solar system that conflicted with the Biblical interpretations of Scholastic fundamentalism and upset

33. I am aware that there have been, and are, especially at the present, "theologians" within the Orthodox Church who have theologized in exactly this philosophical manner (Androutsos, for example). However, part of the purpose of this work is to suggest why that is wrong.

34. Giordano Bruno (1548-1600). Bruno built intuitively on the work of Copernicus. Eventually, the dark ignorance and fanatical fundamentalism of ecclesiastical authorities pushed him into a clearly heretical position, which grew more so as his frustrations grew. Bruno, it must be said, was more a speculative thinker who pursued intuition rather than practising careful science. The Latin Church rightly removed Bruno from communion (because he actually had become a pantheist), but then murdered him on 17 February 1600.
the artificial tandem of a much repressed and suppressed science, he was quickly reminded of Bruno’s fate and forced to renounce truth in deference to dogmatized ignorance. The question of truth was of no consequence; what mattered was the maintenance of this pseudo-harmony.

The pursuit of truth and knowledge could not be manipulated and repressed forever. Philosophy may have been the parent of science but, eventually, science diverged from medieval philosophy, largely because developments in technology (such as telescopes and microscopes) made it possible to actually look at things

35. The nearest incident I can recall in Byzantium was the case of Michael Glykas. He was rightly or wrongly accused of entering into the practice of magic through his interest in the physical sciences. A teacher of hermeneutics, his long life spanned most of the 12th century. In 1159, he was condemned and placed in monastic confinement, where he spent the rest of his life.

36. And let us recall that it was only in our own lifetime that the Latin Church finally admitted that Galileo was correct, and pardoned him. I am not certain if they actually “cleared him” of the charge of heresy, but at least they did pardon him for having been correct.

37. In later times, the German philosopher Nicholas of Cusa (1401-60) thought that science could actually help us understand the nature of the Holy Trinity. Using his idea of the “coincidence of opposites”, he was convinced that mathematics, which dealt with pure abstractions, could explain the Trinity. Such was the idolatry of the day.

38. Philosophers were always scientists in one way or another, and doubtless scientists will always be philosophers. Science has diverged from philosophy but has not become divorced from it. See, e.g., Foster, David, The Philosophical Scientists, Marlboro Books, N.Y., 1985. As an example of the interplay, the philosopher Spinoza (1632-1677) began his career as what we would now call a “lab tech.” He was a lens grinder in Amsterdam who worked with optical devices such as telescopes and microscopes at a time when these instruments served for breakthroughs in science. Contemplating the findings revealed through these instruments, Spinoza was given to pondering the relevance of universal macrocosms and microcosms. His writings yielded a great monistic system built on scientific inference regarding the nature of ultimate truth. Doubtless, Baruch Spinoza’s earlier rabbinical studies, which formed a theological mind in him, had very much influence on the development of his philosophy, though he ultimately became a pantheist and was excommunicated by the Synagogue. Later, science would avoid some of the problems thus created by striving to maintain a logical and necessary “values neutral” approach to science.
rather than speculate about them, and because of the
development of the "scientific method." Science was no
longer a prop for Aristotelian and Platonistic religious
philosophy, Scholastic systems and fundamentalist
scriptural interpretation. Meanwhile, since Western
theology had long since ceased to be theology in the
Orthodox Christian or patristic sense, it could not cope
with the breach of its tandem. It remained a slavish
captive of dogmatized philosophy, connected inextricably
to the principles of Aristotle and Plato, and to a crude
fundamentalism. Since science could no longer be
manipulated to affirm such principles, it now began to be
seen as an enemy. The principle of judging scientific
developments considered "not theologically sound" as
heresy had, as mentioned above, already been established
in the Scholastic era. Nevertheless, we must be cautious
in our critique of this era, because it had a profound
positive aspect that needs to be appreciated. Our main
criticism regards the theological distortions and
corruptions that settled deeply into the Western
consciousness in the Scholastic system. This system
shaped the philosophical and religious vocabulary and
mentality in both the Latin and Protestant worlds in a
seriously negative way.

39. In the realm of the natural sciences, the spirit of Aristotelianism prevailed. Aristotle had
written on the essence of natural mechanisms, but he favoured the search for truth in
philosophical processes rather than in experimental ones. It was Aristotelianism that formed
the dogmatized canon of "scientific fact," or at least the canon of acceptable thought.
At the same time, the Scholastic movement restored in Europe a systematic way of thinking about and approaching the cosmos which would never take root in Byzantium. Ultimately, it was the Scholastic pursuit that made the development of modern science possible, while at the same time it set up the future conflicts that would arise between science and religion. Scholasticism must be given credit for the systematisation of thought in a focused way that could lay the foundations of modern science. For all the early accomplishments in medicine and mathematics that unfolded in the Eastern Roman Empire — Byzantium — modern science did not develop there, and the other streams of great intellectual enterprise that had once shown such promise in Constantinople simply faded away. This was due, in part, to the enormous amount of energy that had to be expended on defence against the waves of barbarians, a defence that had to continue in the East long after such matters had been settled in the West. The three great Eastern empires, Byzantium, Persia and the Arabs, sapped so much of each others' energies in mutual warfare that all of them prepared for their own demise and subjugation by the Turks. It was not only these distractions, however, that crippled the scientific and intellectual development in the East. The mindless ritualism of the state government, the subtle legalism within the Orthodox Church and the self-centred and consuming concern with rank and privilege
both within the state and the Church, further hindered
the development of science, medicine and other
intellectual fields in Byzantium. Even to this day, one of
the greatest needs in the Orthodox Christian world is to
be liberated from the shadow of Byzantium. While the
ture apostolic faith has been diligently maintained in the
Orthodox Church, almost all the problems and
contentions that beset the Church today result from our
continued bondage to Byzantium. Paradoxically, the
preservation of sound Christian theology in the East is
the factor that makes possible a genuine and fruitful
dialogue with modern physics.

With due appreciation for the positive aspects of
Scholasticism, let us examine, in the context of our
discussion, the problematic aspects of it.
III
THE THEOLOGICAL RESULTS
OF THE CONFLICT WITH
MODERN SCIENCE

Truth is never harmed by reality. Truth is derived from meaning, not from a collection of facts.⁴⁰

A major confusion arose within Catholic and Protestant circles, grounded in Scholasticism, as they squared off against the advent of science. Scholasticism and its Protestant reworking in rational theological systems were focused on the questions of the philosophical proof of truths they proclaimed. Their theology, therefore, reacted in a spirit of fear and competition to the new science and its knowledge about nature. This formed the re-orientation of these bodies toward science. Initially, they were concerned to buttress their position through arguments based on the first principles of their systems. For Roman Catholic theologians it was a dogmatic theological system, articulated by Thomas Aquinas through his extraordinary marriage of Latin theology with Aristotle. For Protestants, it was a theological system based on the first principle that the

⁴⁰ As an example, the Danish astronomer Tycho Brahe (1546-1601) was a careful and diligent collator and recorder of facts. He made careful observations of the heavens and meticulously recorded the facts he discerned. However, he continued to hold an erroneous cosmology. It was not until his assistant Johannes Kepler (1571-1630) analyzed all these facts after Brahe’s death, and gave meaning to them that any degree of truth could be deduced from them. The same must be said of Biblical and religious truth.
Theological Results of the Conflict

Bible is literally (in some form; opinions have always varied from denomination to denomination) the historical and scientific truth. The result of this is that these theological traditions redirect the Christian concern for the meaning of life to a concern for the correct abstract system of proofs, a doctrinal position based on claims about the validity of first principles. These principles, being essentially philosophical and abstract, seek after truth as if truth is captured by the work of reason, or is an historical or scientific fact.

The tragedy of this long-standing reorientation of Christian thought lies in three areas:

(1) This philosophical position collapses the Christian understanding of human experience into a question of whether or not the experience is "proper." Experience is, by definition, deprived of its mystery, of its unfolding character. Similarly, this philosophical position dissolves the Christian understanding of the human struggle for meaning into an abstract issue. From this point of view, the person who is in the midst of a spiritual struggle simply has not got the right ideas, the right beliefs, and once these are properly imposed as the grid through which their self-understanding is framed, the

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41. Protestantism was certainly indebted to the Scholastics also, as evidenced in the Anselmian theory of atonement.
struggle will disappear.\textsuperscript{42} Here again, we see that the mystery of how we know the world and our experience of it is removed from the equation.

From an Orthodox perspective, human experience and our growth in understanding human experience are the gift of the Holy Spirit. Both our ability to experience deeply and to understand the experience are not simply a matter of fact,\textsuperscript{43} but are far more a matter of revelation, the unveiling of the mystery of being and human life.

\textbf{(2)} This re-orientation of theology also deprives the Scripture of its power to illumine the human struggle. The revelation of the great conversation of the Jewish and Christian communities we find in Scripture (a story of struggle and fulfilment) is set aside for a set of historical and/or scientific matters of fact. Divine and saving truth for Orthodoxy is not a matter of historical or scientific facts but a matter of discerning the meaning of the human struggle to move from purification through illumination to glorification.\textsuperscript{44} Or, to put it another way,

\begin{itemize}
  \item \textsuperscript{42}This is precisely why Protestantism blindly opposes Orthodox Christian spiritual struggle (\textit{askesis; podvig}). The tragedy is that such a view forces people to remain in internal bondage, while seeking to cloak this bondage externally with giddy pietism and hyperbolic “righteousness,” or the rank religiosity of modern Pentecostalism.
  \item \textsuperscript{43}This is an important point. Modern physics is defined as an experimental science instead of a purely rational one. This brings physics close to the workings of Orthodox theology, which is also based on experience and not on rationalism. Since, as Christians, we share some common basis with physics, we need not feel enmity with it, but can use it to approach God, studying the inner workings of His universe.
  \item \textsuperscript{44}Roman Catholic mysticism teaches that illumination comes before purification (see, e.g. John of the Cross, ”The Ascent on Mt Carmel,” in \textit{Collected Works of St John of the Cross}, Tr. Kieran Kavanaugh and Otilio Rodríguez. ICS Publications, Washington D.C., 1991).
\end{itemize}
III. Theological Results of the Conflict

it is the story of our struggle as the people of God to restore our deep presence to God's creation in a life of communion and co-suffering love.

(3) The third tragedy of this re-orientation is the manner in which it deprives the Christian community of its primary vocation to love God's creation as God loves it. It deprives us of the world itself. It replaces this regard for creation with a set of artificial facts about nature and history, facts which historically are shown to be grounded in ideology and philosophical theories, not in the empirical regard for nature, which science may deepen our appreciation of.

When we study the unfolding of Orthodox theology, through its encounter, consideration, and argument with virtually all the significant heresies, we see a golden strand. Orthodoxy is consistently critical of all forms of reductionism, all efforts by human beings to reduce the mystery of life to some comforting abstraction. The Scholastic and rationalistic philosophical systems of Roman Catholicism and Protestantism are seen as participating in such reductionism because: (1) they deprive us of the proper field in which to appreciate the struggle of human beings for meaning; (2) they deprive us of the gift of Scripture as it unveils this struggle and speaks to us of the God of love, Who woos us to the fulness of life; and (3) they deprive us of an understanding of creation, in which we are not only a part of that
creation but, also, through our priestly nature, are called to understand and sanctify it. Mankind has a unifying ministry to the cosmos which can only be fulfilled through that unselfish love which would constitute the proper use of his energies.
III. Theological Results of the Conflict
IV

ORTHODOXY AND
MODERN PHYSICS
The evidence of things not seen

Since the creation of the world, God's invisible qualities have been clearly seen, being understood from the things that were created. (Rm. 1:20)

But what He means is precisely this: He has placed His creation before the eyes of all mankind in order that they may guess at the Creator from His works, as indeed another has said, 'From the greatness and beauty of the creation, in proportion, the Creator is seen'. For when you see the beauty, the scope, the height, the position, the form and the endurance, it is as if hearing a voice and being instructed by the spectacle, you adore Him Who created a body so fair and strange. (St John Chrysostom)

The religious concept of creation flows from a sense of wonder at the existence of the universe and our place in it. The scientific concept of creation encompasses no less a sense of wonder: we are awed by the ultimate simplicity and power of the creativity in physical nature—and by its beauty on all scales. (Cosmologist George Smoot)

I want to clarify one aspect of the next section of this text before I present it.

IV. Orthodoxy and Modern Physics

In Platonistic mysticism all the things we see in our world, in our universe, are but shadows of an eternal ideal. Reality, in this form of mysticism, consists, as Kafatos observes, of disembodied, abstract ideas, existing in a dimension separated from sensible objects and movements.

It is true that, with regard to the Divine and those "things yonder" that pertain to the age to come, we speak in metaphor which cannot be literalised and must not be visualized. On the other hand, those things which we see and experience in our universe are reality, and they were created "very good" (Gn.1:31). Man himself is a psychophysical being (a microcosm of the universe, as St Gregory the Theologian and St John Damascene say47). He is not a "lower, physical form" hosting a "higher spiritual form" (the soul). Neither is the universe dualistic, consisting of a visible cosmos and a hidden "ideal" cosmos. In the end, the universe is not going to be destroyed, but transfigured. It will be transfigured, but it will not be a "different" universe. The fact that not everything in the universe is visualizable in either physics or theology does not indicate some form of dualism. It is important to bear this in mind when reading the following section. When we are speaking of the noetic and of those things which cannot be visualized, we are

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not suggesting that the material world of our psychophysical experience is an inferior entity. Noetic experience is in another dimension, not in another universe. We experience the created in the fulness of our being. Those noetic experiences which are available to those who struggle may include the uncreated light, but those experiences are also psychophysical, experienced by the whole person, experienced within the confines of the created universe — a universe which will be transfigured, not destroyed.

Our quest is for some relationship between Orthodoxy and modern science; but it is a quest for the obvious. One may ask, Who has seen the Holy Spirit descending into the heart of anyone, or observed the presence of Christ in the Eucharist; who has seen the grace of God with their own eyes?

We reply, "Who has seen the wind? Is love not present in the heart because it cannot be physically observed? What man has held in his hand an electron in order to show it to his child? Whose eyes have followed the voyage of a neutrino or thrilled at the beauty of seeing directly the quarks at the heart of an atom? Who will ever see, touch or taste a boson?"

Physics, like Orthodox Christianity, has faith in the evidence of things unseen, gives expression to the ineffable and proves by experience those things which cannot be circumscribed.
IV. Orthodoxy and Modern Physics

1. THE KNOWLEDGE AND UNDERSTANDING OF THE CREATED UNIVERSE MUST INCREASE OUR KNOWLEDGE ABOUT GOD

Since the creation of the world, God's invisible qualities have been clearly seen, being understood from the things that were created (Rm.1:20)

What we are suggesting here is that those of us who do not wish to conclude that the scientific world-view is such that a belief in the active presence of God or Being in the cosmos is effectively disallowed now have good reasons for arguing and, more importantly, believing, that this is simply not the case. (Cosmologist Menas Kafatos)\textsuperscript{48}

I have always been convinced that there is no real conflict between religion and science. (Isaac

I was recently astonished (but not surprised) to read in the works of a Scholastic philosopher in the Orthodox Church, the rather cavalier—and patently false—comment that quantum physics presents the same mechanistic view of the universe as did classical physics. For this reason I have chosen to focus this discussion on quantum physics in particular. We are not going to enter into a discussion of the historical relationship between Orthodoxy and science because the purpose of the previous chapter has been to show the roots of the Scholastic fundamentalist fear of, and "enmity" with, modern science. We certainly include in this those in the Orthodox Church who are locked into those ideologies. We do wish, however, to compare the theological implications of the Orthodox attitude — as opposed to the fundamentalist attitude discussed above — toward science. The reason for doing this is to request that those in the Orthodox Church who have a fundamentalist Scholastic approach to the subject give some more extensive thought to their attitude. It is also my purpose

49. In a personal note to the author of this work. As a parenthesis: I wrote back to Dr Asimov and asked him if, in view of this, he is really an atheist and, if so, why. His reply to me was simply a postcard with a large question mark drawn on it.

50. In fact, as Neils Bohr points out, the principle of complementarity alone forces the abandonment of any mechanistic view in quantum physics. Moreover, David Bohm and John Bell notwithstanding, it also extinguishes the metaphysical dualism of earlier physics. (I must admit that Bohm’s idea of wave function is attractive, but determinism is not).
to encourage Orthodox Christian seminaries to include basic sciences in their curricula.

It is by no means my intention here to repeat the error of antique Western religious philosophy by trying to place science and theology in tandem. Science must always remain a values-neutral endeavour, seeking to discover, to the best of man's God-given ability, the nature of created things. Science studies the nature of the "creature," but does not pertain to worship. Theology is, for Orthodox Christians, an ascent in the realm of grace, toward a knowledge (epignosis) which is a gift from God. Nevertheless, the Holy Scripture clearly tells us that we can know the Creator from the things that were created by Him. What exactly does this mean? In what way does the created universe reflect the Creator and, if the universe has fallen together with man (The whole creation was subjected to infirmity — Rm.8:18-24) and is now in a disordered state of fallen-ness, in what way should this also be known to us from the condition of creation?

The field of science is very broad, so we will take our examples only from the field of modern physics since it has the greatest bearing upon our immediate subject.

Let us bear in mind that the science of physics and Orthodox theology are different levels of knowledge. One and the same God, however, is the author of the physical universe and of our theology. Moreover, there must be some reason why the whole universe fell
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together with man. Recall that what I am trying to demonstrate here is merely the fact that modern physics is not something that Orthodox Christians have to fear; rather it is an intriguing and fascinating extension of our knowledge which could only substantiate basic Orthodox Christian concepts. Insofar as physics unveils the true state of affairs, it will obey the words of Scripture that we can see the evidence of the Creator in the things that are created. Now, since God cannot be represented or conceived of in the realm of the created, in the realm of creatureliness, I will suggest an understanding of the words of Paul that "since the creation of the world, God's invisible qualities have been clearly seen, being understood from the things that were created" (Rm. 1:20). Clearly, God is so wholly "other" than everything else that exists that we cannot hope to even conceive the nature of His essence. God is so far removed from the realm of the creature that we dare not even represent Him in icons...

51. As also modern biology, anthropology and the medical science, but see the Afterword for an example of things in some of these fields that we do urgently need to be concerned about, simply as human beings, not uniquely as Orthodox Christians.

52. Although we would respond if physicists presumed to step into the realm of theology. The problem with the theory of evolution in this regard is that many of the theorists have sought to displace Divine Providence with their renditions of the theory. If evolution is the manner, or part of the manner, in which God created, this is not at all a difficult matter for Orthodox Christians.

53. But I would like to suggest that physics, and quantum physics in particular, ultimately do not offer us reality, but models of reality that we can understand. We may understand the models without ever completely comprehending reality itself. This is so because physicists explore phenomena which they cannot explain even when they comprehend what is going on within them. Theology offers us, first of all, metaphors and types of reality, and after, the experience of reality, even though often we cannot comprehend fully the reality that is being presented to us.
except as He appeared in the flesh in the Person of our Lord Jesus Christ. It is, therefore, perfectly logical that our theology teaches us more about what God is not, and teaches us certain revealed "qualities" of God (i.e., God is love, God is light, God is Creator, God is "fatherly," etc). The "things that were created" also can teach us nothing of the essence of God, so they must be able to reveal only certain "qualities" of the Creator, and that is how I understand ἄδορατα at Romans 1:20. If this is so, then advances in physics must certainly reveal to us these "invisible qualities," because physics is a study of those things that were created. Moreover, if physics, when it comes upon true facts, is doing this, then what it reveals must, most assuredly, reflect principles of Orthodox Christian theology. Otherwise, either the apostle is wrong in declaring that the invisible qualities of the Creator are made known by the things that were created, or else our theological principles must be wrong. I suggest that neither of these alternatives is possible. Just in passing, it is interesting to me that the transformation from the "old physics" to quantum physics was brought about by the study of light. For those who are interested,

54. "But what he means is precisely this: He has placed His creation before the eyes of all mankind in order that they may guess at the Creator from His works, for, 'the heavens declare His handiwork.' How do they declare it? Voice have they none, neither mouth nor tongue; how then do they declare? By means of the spectacle itself. For when you examine the beauty, the scope and the height, the position, the form and the endurance, it is as if hearing a voice and, being instructed by the spectacle, you adore Him Who created a body so fair and strange." (St John Chrysostom, citing Romans 1:20 in his Homily on the Statues, 9.4).
I would like to suggest that the critical events in this were Einstein's paper on Brownian Motion, which divorced the atom from the philosophical realm of the ancient Greeks and brought it into pure science, and Einstein's solution to the problem of variant electron displacement by rays of light of different spectra. It was this last event which, as far as I can recall, helped to firmly establish the idea of light energy as quanta, although Planck's work with black body radiation in 1900 had already originated the realisation of energy as quanta. Perhaps, to be more exact, Planck borrowed the idea from Boltzmann, who had suggested that matter was incontinuously formed by atoms and thus there was no reason why energy was not emitted incontinuously. What makes Einstein's quanta so important is that, unlike Planck's equations, they had actual effects on particles (electrons). The concept of modern quantum physics developed very much from the study of created light and energy. Orthodox theology is concerned not only with the experiential knowledge of the uncreated light and energy of God, but with an understanding and proper use of created energy.

If Orthodox Christian theology is true theology and a true understanding, insofar as man is able to understand about God, then every true advance in scientific knowledge should in some way reflect the truth of Orthodox theology. Since one deals with the creature and the other with its relationship to the Creator, science
should reflect some fundamental concepts present in Orthodox Christian theology, but should have no pretensions of approaching a knowledge of the Creator beyond what Scripture has promised, that we can know the Creator by the testimony of His creation.\textsuperscript{55} It is clear that the created cannot reveal the Creator, but that it can only testify of Him insomuch as He Himself has designed this. The universe is mutable and passing. It has a beginning, and it shall surely have an end as we know it. It will not end in annihilation, but in transfiguration, just as the bodies of the risen will be transformed.

2

THE NATURE OF THEOLOGY

I think this idea quite fills all that we have already said. When God speaks of a place, He does not mean a space which can be quantitatively measured, but rather by using the analogy of a measurable surface, He is guiding the reader to a reality which is infinite and without limit. (St Gregory of Nyssa)\textsuperscript{56}

Quantum physics may no longer be an adequate

\textsuperscript{55}. One is reminded here of the words of the great physicist Niels Bohr: "It is wrong to surmise that the task of physics is to find out the essence of nature. Physics concerns only what we can discern about nature."

term, since its newly unfolding development merges quantum and relativistic theory. I would prefer the term *Microphysics*. Microphysics is the study of the fundamental relationships of physical reality. What is interesting about it in the context of this discussion is its approach to the understanding of interaction processes rather than to the observation of entities. We will shortly see a similarity between this and the Orthodox approach to theology, and then we will explain the point of the comparison.

As we mentioned earlier, the nominalists advanced the development of science by refocusing investigation upon particulars rather than abstractions. This idea was gradually clarified and refined, and rapid increases in the understanding of macro level reality followed. Ultimately, however, all physical reality arises from the micro level. In order to comprehend micro level reality, the method of investigation had to refocus once more. This refocusing has taken several decades as three important facts became clear. It was first necessary for physicists to realise that they could not be external observers at the quantum level. The very act of observation and quantitation (measurement by whatever definition) interjected the observer into the process he was observing and
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interacted with that which was being observed.\textsuperscript{57} The second realisation is that quantum and relativity theory cannot be treated in isolation in the understanding of micro level physics. It is necessary to engage the two together for successful investigation of the micro world. If relativity does not function at some level, then an explanation for this needs to be found. The third transition, and the main aspect of the refocusing, has been away from the attempt to study and analyze particles as specific material objects, and away from the concept of entities as material structures, and toward the observation of interaction processes, in which the distinction between energy and matter is not so sharp, or is even indefinite.

The Western Approach to Theology

From the time of Augustine and Boethius, through the Scholastic era, theology in the West was reshaped into a philosophical system for legislating doctrine by means of logic and the rational reflective process. Since doctrine had the status of legislation, it required obedience or conformity, not comprehension. Dogma came to be understood as a major and critical point of legislated doctrine. Such a concept led, on the one hand, to a feeling that theology was, in fact, an ongoing philosophical

process by which doctrine could continue to be
developed and redeveloped by a process of updating and
modernization as society changed and developed. This
concept has been used extravagantly by liberal or
"modernist" movements. Equally negative has been the
concept that theology is static, having defined once and
for all every aspect of necessary knowledge. Theology,
being the system by which knowledge is legislated,
cannot be seen as an experiential, existential process, but
only as a reflective rational process of philosophy.

The Orthodox Approach to Theology

From an Orthodox Christian point of view,
theology produces doctrine on three levels.\footnote{58} The first of
these is to facilitate \textit{kerygma} or "preaching." In this case,
document is a generalized statement which gives a first
level explanation of Scripture, etc. It is not thought to

\footnote{58} I have arbitrarily defined these "three levels," because I want to structure and limit the
discussion that follows, but some readers will recognize them as coming from St Gregory of
Nyssa in his 11th \textit{Oration on Song of Songs}. Here, he says: "Moses, in his vision, first
encountered light; afterward God spoke to him in a cloud. But when Moses ascended higher
and became more perfect, he saw God in the darkness. Now the doctrine we are taught is
thus: \textit{[the numbering is mine]}\footnote{56}

\[1.] \text{Our initial withdrawal from error and wrong ideas of God is a transition from darkness}
to light. \[2.] \text{Then comes a closer awareness of hidden things...And this awareness is a kind}
of cloud which overshadows all appearances and slowly guides and accustoms the mind
toward what is hidden. \[3.] \text{The mind progresses through all these stages and goes on higher...and enters within the secret chamber of divine knowledge and here she is cut off on all sides by divine darkness. Now she leaves outside everything that can be apprehended by sense or reason, and the only thing left for her to contemplate is the invisible and incomprehensible. But God is here, as Scripture tells us: 'Moses entered the dark cloud wherein God was' (Ex.20:21).}
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convey any fulness of meaning, but offers a framework to deliver one from error, prevent false concepts and to move the reader toward another level. The second level is a response to challenges to the faith, such as a denial of the resurrection of the body, the teachings of Gnostic dualism (as in the case of the refutations of Manicheaism by several of the holy fathers), etc., and this draws forth deeper understanding and an overcoming of sensual concepts. Many of the canons of the Church have the same basis. At this level, the vital, living theology of Orthodoxy is establishing an algorithm, framework or matrix for an ascent toward the full experience of the Orthodox Christian life, a life of spiritual growth and transformation — toward theosis. On another level, theology produces doctrine which is based on the encounters of human experience in a life of faith. Without this experience, the holy fathers would not have set forth doctrinal statements about the uncreated light, and this is the sort of "doctrinalizing" that produced the Philokalia.

The Orthodox Christian life is a wholly creative, progressive existence which, in Lossky's words, is a "renunciation of, and moving away from, all that is fixed and stagnant, and reaching out toward the final consum-
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"mation," toward what is perfect, complete and eternal. It is impossible to discuss or to apprehend this creative progression in terms of non-Orthodox philosophy or philosophical concepts, for they themselves are merely human systems of thought, caught in the realm of creatureliness, unable to contemplate anything else except things like themselves — that is, things finite and created.

The theology of Orthodoxy, then, is a living, creative force precisely because it is inseparably bound up with the mystical-ascetical life — that is, with the very real struggle actually and fully to live the theology. Whereas, in the West, an individual theological writer strives to be creative by giving new forms and expression to philosophical theology, in Orthodoxy every single practising Orthodox Christian progresses corporately in the Church by yielding to the creative power of the Holy Spirit, allowing divine theology to give new forms and expression to his own being. In Western philosophical theology, creativity in theology consists in a dialectical exercise; in Orthodox Christianity, it is a transfiguration and deification of the entire, unified being of the individual. This is most clearly expressed in the respective concepts of salvation. In Western Christianity, salvation

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60. "Mystical" is not to be construed as common mysticism. "Mystical" indicates "hidden" and relates to things which are beyond our comprehension until we are aided by God’s grace in experiencing things which we cannot comprehend by the processes of human reasoning. We will discuss later in the text the way in which the Orthodox life is mystical.
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is viewed as a legal process, a punitive event carried out between a vengeful father figure and a dutiful son (making God the supreme example of the child abusing father). In Orthodox Christianity, salvation is realised as a living, vital process, one in which the response of man to the co-suffering love of Christ leads to purification and illumination and, ultimately, to glorification and theosis.  

What we call "theology" and what we call "Orthodox Christian spiritual life" are one and the same thing because our theology does not focus on doctrine as a legislated point, a philosophical posit or logical "entity." Orthodox theology is not concerned with static "facts," rather it is concerned with interactive processes. There can be no better declaration of this fact that the words of our holy and God-bearing father, Gregory of Nyssa:

Seeing that you have stretched forth that which is before you with a great desire, and you never

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61. i.e., an "ontological process."

62. The renowned Western theologian, Karl Rahner, gives a fairly accurate assessment of the general basis of this spiritual difference in these words: *The East thought in terms of a dynamic saving history and an ascending order of things, beginning with the economy of the Trinity and closely bound up with soteriology. Redemption is regarded in the East as a real ontological process that begins with the incarnation, discloses the immanent economy of the Trinity, ends with the divinization [theosis] of the world and first proves its triumph in Christ’s Resurrection. In contrast, Western theology regards the incarnation of The Logos almost exclusively as the means of constituting a fit agent capable of making satisfaction for sin. Though aware of the divinization [theosis] of the world, it lays much more stress on Christ’s atonement for sin on the Cross and on forgiveness. Rahner, Karl. *Theological Dictionary*, Herder, Freiberg, 1961.
experience complete satiation in your progress, nor are you aware of any limit to the good, as your longing calls you on to ever more and more: here is a place that is so vast that he who runs in it will never be able to reach the end of his course. And yet from another point of view, this course has stability; for God said, `I will set you on the rock' (Ex.33:22). But here we have a very great paradox: motion and stability are identical. For usually speaking, one who is rising is not standing still, and the one who is standing still is not rising. But here, one arises precisely because he is stationary.\textsuperscript{63}

What is it that makes him stationary? That "matrix" or "framework" which was established as a grid — that vital and living doctrine drawn forth from the active experience of the holy fathers and mothers of a life in Christ, a life impregnated by the Scripture, and the mystical experience of grace. And what is that "ascent?" It is the active participation in the theological life of the Church, in which the whole experience of the Body of Christ, from the Old Testament prophets through the apostles and all the saints of all ages, interacts in the process of our own lives and struggles to bring us in an ascent from "glory to glory by the Spirit of the Lord," toward the ultimate goal of our "high calling in Jesus

\textsuperscript{63} Life of the Prophet Moses, Paulist Press, N.Y., 1978.
Christ" — to be "partakers of the divine nature." (2Cor.3:18; Phil.3:14; 2Pet.1:4)

What, precisely, is the connection we are suggesting between the processes of modern physics and the processes of Orthodox theology? First of all, the processes of Orthodox theology are revealed in the life of grace, the life in Christ. They lead us to truth by means of the experiencing of truth. This is accomplished, not by dry, legalistic "facts" but by entering into the interactive processes within the whole Body of Christ. The lives of the saints and martyrs, the holy fathers and mothers, are not remote from us, but impact upon us and our struggle. The quest for an understanding of the things created by God turns out to require a similar concept, although, obviously, on a radically different level and dimension. Modern physics, at least at the quantum level, cannot be "done" except by interjecting into the interactive processes of that which is being "studied." In fact, this affects the general point of view and philosophy of the physicist and ultimately has an effect on the way people reason in general. It is possible to utilize this fact in a positive way in expounding the Orthodox faith to those outside the Church. Moreover, should it be thought strange that both pursuits which are helping us to approach an understanding of the "hidden qualities of the Creator" should have something in common in their approach? Orthodox theology understood and practised
this concept long before the mind of science perceived it, and that is normal also. The connection between the two: the processes of science and the processes of our theology are not identical in essence but in a real sense, they are related in concept. Could it really be otherwise when modern physics is a careful study of "the things that were created," in view of the fact that God has promised us that such a study would reveal to us "the hidden qualities of the Creator?"

If there were no other conclusion to reach from this comparison, it would be enough for us simply to realise that modern physics — modern science in general — is not a devious plot which must be feared by Orthodox Christians. I believe that much more profound conclusions may be reached and I will attempt to express those conclusions in the following sections of this work.

3

THE PROBLEM OF VISUALISATION
IN ORTHODOX THEOLOGY
AND MODERN PHYSICS

As we plunge into that darkness which is beyond intellect, we shall find ourselves not simply running out of words, but actually speechless and
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unknowing. (St Dionysios the Areopagite.)

In quantum physics we have no framework for correlating the mathematical symbols of it with the concepts of our language, nor can we satisfactorily discuss atoms in normal language. (Werner Heisenberg).

The sixth century B.C. philosopher Pythagoras incorporated concepts received from India, via Persia, as well as from Egypt into his system. He synthesized an idea that the human soul was a fallen divine essence — a sinful deity — which had been imprisoned in a material body as in a tomb. Like the Hindu thinkers, he believed that the soul was thus destined to a cycle of re-births. This soul — the soul of each human — could be liberated by a series of purifications and then come into harmony with an "ideal" universe, the theoretical universe of concentric circles which the philosophers conceived. For many of the pagans, this process would include a passage through tollgates in each of the consecutive spheres until the liberated soul reached the highest ideal.

64. On The Mystical Theology, §3.

65. For the philosophers, at least the Eastern ones, this was understood as a metaphor for human aspirations. Among the pagans and the Gnostics, it was transmuted into the concept of "aerial toll houses" through which a soul must pass, being judged by fearsome archons at each gate or booth. This was especially well developed in Mandeian Gnosticism. Curiously, this idolatrous notion has recurred in a neo-Gnostic movement within the Orthodox Church in our century. It is related to the idea that the planets and other heavenly bodies are pulled (continued...)
Plato (ca.430-348 B.C.) developed such earlier ideas into a more refined and sophisticated system. What interests us here is his concept that the material world of our senses is but an echo or imitation of the reality of the ideal and eternal forms of the divine "jurisdiction," or, as he suggests in his parable of the cave, reflections of eternal reality moving like waves of shadow on the wall of a cave.

What concerns our subject is the implications of all this for later religious thought. Plato had a lofty conception of what all this means, and he may even have intended for it to evoke aspirations and the effort to purify the intellect. Over time, and particularly in the medieval era these concepts were literalised in a peculiar way — perhaps the very reverse of what Plato intended. Looking briefly at the problem, the notion evolved that if the material universe is a shadow, reflection or imitation of the ideal forms of eternal reality, the eternal reality must be a subtle form of the material world. Thus, "things yonder" were visualized and given concrete, physical, material form (often not at all subtle) even when the descriptions of them were metaphors for psychological

65. (...continued)
through the ethereal spheres like wagons being pulled by horses, by archons or "spiritual intelligences." This latter teaching was also once defended as the "ancient teaching of the Church" and, indeed, it might even be defended by a selective and predisposed reading of some of the hymnology of the Church.
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In this regard, let us look at one important result of this artificial "tandem" between religious philosophy and what we could now call "the old physics." In classical physics, the physics which still bore the influence of Aristotle and Plato, and the medieval era, every phenomenon was visualizable. The influence that this type of philosophical physics had on theology is interesting. It actually helped paganize the Western view of God. God was conceived of as being also visualizable, and therefore, He was anthropomorphized and, like the pagan Greek gods, had foibles and passions common to fallen humanity (vengeance, juridical justice, the need for satisfaction, etc.). This new Western god was also often either divorced from or set in opposition to creation. This anthropomorphization is why heretical Christianity felt able to depict God the Father in art, whereas, Orthodoxy considers depiction, iconographic or otherwise, of God the Father (which would be a depiction of the Essence of the Trinity) to be idolatrous.

66. Interestingly enough, if some of these concepts had been freed of their metaphysical dimension, they could have provided insights into the nature of particles. Energy travelling near the speed of light can become matter. The mass of a particle is stored energy.

67. This is reflected in Augustine of Hippo’s heretical notion that the Old Testament theophanies were appearances of God the Father, and the idolatrous teaching that the divine light and energy seen and experienced by the prophets, were created phenomena.
and heretical. The problem in physics occurs when one attempts to visualize micro level phenomena in terms of macro level conceptualizations. The same problem occurs in the theological life when one attempts to visualize that which is unseeable and ineffable on the level of the clearly visible — not merely do they distort that which is said to be *apophatic* by visualising it as *kataphatic*, but they seek to seize upon what forever remains a mystery and render it common.

It was this very tandem which conspired to form the grossly heretical and neo-pagan concepts of God and of atonement that are common to all of Western Christian religious philosophy—Latin and Protestant. Both the old physics and Western theology were *kataphatic*, and therefore, of necessity, Western theology passed over the

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68. I am aware that there were depictions of God the Father in the East before they appeared in the West. There are 9th and 10th century illuminated manuscripts, as well as frescoes in the East with God the Father seated, Christ in his lap. This "type" is called the "synthronos," and was a corruption of a "type" which depicted The Ancient of Days (God the Word) with humanity seated on His lap. Ironically, this type of painting has the Holy Spirit portrayed as a dove, held in the hands of the "Son," and it appears to portray a heretical doctrine of the procession of the Holy Spirit from the Father and the Son. Among these are an illumination of the 10th century in Dionysiou Monastery on Mt Athos and a fresco in the Church of the Panagia Koumbelidiki in Kastoria, dating at least from the 13th century. These occurrences are interesting, but they are certainly no justification for portraying God the Father.

69. *Apohastic* indicates a "negative theology," in which we realize that we cannot actually know the essence of something, but that we can know only certain revealed qualities. It refers particularly to our knowledge of God and the complete unknowability of His essence. *Kataphatic* is the opposite. The idea of kataphatic theology is reflected ultimately in the misunderstanding of the dogma of the Trinity and the *filioque* in the heretical version of the Symbol of Faith (Creed). The idea of kataphatic doctrinizing about God led to the "giant human" concept of God the Father, the Western Christian idolatry which produces a neo-pagan god with all his savage and often disgusting qualities, reflected in the Western doctrine of atonement. I am not suggesting a relationship between the apophatic principle in Orthodox theology and some principle of modern physics. The correlation is in the concept of visualizability.
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line of idolatry. It was also from the Platonist linguistic theories of Augustine and from some of the early nominalists that the patent "magic formula" concept of "sacraments" was defined, finally displacing in the West the Orthodox Christian realisation of "holy mysteries," which very much depend on synergistic expressions of genuine faith and the incomprehensible working of divine grace. It was from this flawed environment also that the West transmuted metaphor and allegory into visualizable reality and developed its heretical notions of the nature of hell (it actualized, in its own mind and teachings, the pagan myths of the underworld, and replaced the truth with a perverted metaphor, largely because thinkers visualized the metaphor and so accepted it as physical reality), and in the same way, corrupted the concept and meaning of heaven and hell, and of the so-called "partial judgment" and the Last Judgment.

Western Christianity, whether Latin or Protestant, became so penetrated with pagan ideas largely because of

70. In fact the Italian scholar Lorenzo Valla, during the Renaissance recovery of the Greek Scripture and Greek patristic literature, also called the concept of "sacrament" into question and insisted that it was not equivalent to the Greek concept of "mysteries." See the entry on Valla in Renaissance Philosophy of Man, ed. Ernst Cassirer, et al., University of Chicago Press, Chicago, 1948.

71. I suggest that this happened largely because of the Scholastic’s penchant for codifying. It is difficult to codify or give legal definition and form to a metaphor while it remains such. In fact, metaphor should (and typology certainly does) both open and close at the same moment. No doubt during the Dark Ages metaphor was too subtle for most minds, and in that harrowing and frightening era, hell and wrath must have seemed not only quite physical, but even tangible.

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this principle of visualizability (which stemmed in part from Augustine's idea of the analogy of being), this need to transmute metaphor into visible realities (even if many of them were said to be invisible in this life, they were, nevertheless, made quite visible in the minds of their adherents, as was God). Metaphor is thus perverted and an idolatry is created because it has been forgotten that metaphor sets up an intentional dissonance that reminds us not to literalise.\textsuperscript{73} Moreover, the Scholastic process conceived that there had to be a one-on-one correspondence between every point of codified doctrine and spiritual reality, and this also lead to a form of idolatry. So also, in Aristotelian science, every theory was thought to have a one-on-one correspondence in physical reality. It was supposed, therefore, in both antique physics and Scholastic theology, that reality could be rationally determined, codified, linguistically defined and visualized in a constant form.

Scientific physics departed from this philosophical milieu\textsuperscript{74} and came, by stages, to the point of \textit{quantum}

\textsuperscript{73} I would like to suggest that, in our context, this breakdown occurs with Scholastic attempts to codify the mysteries of life, the eternal and the divine.

\textsuperscript{74} As an example of this tension, we may look at a central question in mechanics: Aristotle taught that the speed of a moving body is proportionally related to the force that moves the body. Consequently, he said, no object can be moving unless it is forced to. This approach, since it attributed to what on the surface appeared obvious, the validity of a natural law, became practically doctrinal and cast a shadow over physics until the appearance of Newton's \textit{Principia}, where Newton correctly related the force to the acceleration instead of speed.
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Physics, in which practically nothing is visualizable, but the clear evidence of reality can only be expressed symbolically by a mathematical formalism, rather than metaphorically or allegorically.

This idea of visualization requires some comment. We have a certain tension between the micro and the macro levels of reality in physics and between the created and the uncreated, the noetic and the sensually visible in theological experience. The created universe we experience is reality—macro level reality, and we see it and verbalize it in language which is a combination of symbolic, metaphorical and concrete. Nevertheless, the macro world is composed of the micro. If we looked at this in terms of picture rather than image, we might conceive the picture as a half-tone with a very tight dot-per-inch configuration — so tight that it appears to the eye (and is expressed verbally) to be continuous tone. What we see at the macro level is visualized, and by this I mean that what is seen is linguistically interpreted. I am suggesting that seeing involves the reception of an image, while visualization involves interpretation in the realm of linguistically based assumptions. On the other hand, we

75. This is discussed at length by Drs Menas Kafatos and Robert Nadeau in The Conscious Universe, Springer-Verlag, NY, 1990, Chapter 1. The classical concept actually shadowed into the Einstein-Bohr debates over the completeness of quantum physics. For Einstein, as Kafatos mentions, every point in physical theory had to have a counterpart in physical reality. As I understand it, this would imply a means by which one could visualize essence. This was one of the points that the experiments testing Bell’s Theorem responded too, and proved Einstein to have been in error. It occurs to me that there was more than a hint of the Aristotelian in Einstein’s ardency.
also visualize what we cannot see, but hear — or hear about. In this case, what we hear is also interpreted in the realm of visually based assumptions, and the two — linguistically and visually based assumptions — are not separate. It is a combination of the two which constitutes "visualization." We interpret within the framework of our visual experience. For example, my first concept of the wave function of a particle is that it constitutes the bow shock and wake of a dense moment of energy moving in space-time. Doubtless, this perception is induced by a visualization of the word "wave." Whenever we visualize or visually interpret in the quantum level, we distort and perhaps even falsify reality. Precisely the same thing occurs when we visualize the uncreated in terms of our created, macro level reality, which is the only frame in which we can visualize and linguistically interpret.

As an example, in physics, the photoelectric effect can be examined only by visualising the waves of electromagnetic radiation as particles, which we must then name, so we call them photons. Electrons, on the other hand, must be conceptualised as waves in the context of electron diffraction. However, these necessary conventions which, while explaining a state of affairs, are

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76. In fact, the wave is more or less a matrix of probability. The peaks of the wave reflect the probability that a particle will be in that location, whereas the valleys indicate an improbability. Of course, the matter is somewhat more complex.
not actually true.

The same problem arises when we visualize that which is unseen and that which does not yet exist. In each case, visualization distorts and linguistic expression is always metaphorical, never concrete, never complete. In a similar context, the great physicist Werner Heisenberg says of quantum physics that we have no framework for correlating the mathematical symbols of it with the concepts of our language. nor can we satisfactorily discuss atoms in normal language.

The character of our visual experience dominates our descriptive apparatus, thus the breakdown in the classical description of reality observed in relativistic and quantum phenomena occurs precisely because, in these two regions, we are moving out of the range of normal visualizable experience. It is for just this reason that linguistically based assumptions lead to errors in our understanding of the divine and the eternal, the nature of heaven, the nature of hell, and the relationship between body and soul in human beings. Linguistically based assumptions are derived from the presumption of visualizability. Language develops on the matrix of vision and is a developed system of imitation of, and metaphor
Idolatry, I surmise, can arise from the impulse to linguistically describe and define the unseen. This impulse results in metaphor or allegory. When the metaphor for the unseen is visualized, some form of idolatry results, and this is just what St Gregory the Theologian warns us against when he says, "Every concept of God is merely a simulacrum, a false likeness, an idol: it cannot reveal God Himself." 

In Orthodox Christian theology we are preserved from this idolatry by the concept of apophatic or "negative" theology, according to which we can never describe or define anything that God is, but only circumscribe our understanding of Him by saying what He is not — thus we cannot describe or visualize anything of the essence of the Deity, even though we know God in Jesus Christ and have an intimate relationship with Him.

77. It is more complex than that since warning cries, food communications and sexual attractions are all part of the use of language and of its origins. We will not even begin to discuss the evolution of abstract concepts in language. In Cratylus Plato calls words "an imitation of that which it imitates," and Aristotle refers to words as "imitations" (Rhet.3:1) but they had a mystic concept that words conveyed essence and not simply names, and that concept based in mysticism is heretical. The new-Pythagoreans and Augustine of Hippo attached a mystical significance to language. The heretic Eunomius accused St Basil the Great of "atheism" because St Basil accepted the human origin of the names of created things, while Eunomius considered words to be of divine origin and also attached a mystical significance to language. At its most basic level, I wonder also, if syntax and grammar are not rooted in a verbalization of how things are seen and the order in which they are cognated. There is another form of language which we must discuss later: the language of silence and of inner prayer — the language of paradise and of the world to come; the language of Rm.4:26 and 1Cor.14:15.

78. Against Eunomius, Discourse 3.
by means of His energies.\textsuperscript{79} In this regard, the words of Abba Isaak the Syrian are extraordinarily important when he says: "\textit{Speech is the language of this world, but silence is the mystery of the age to come,}\textsuperscript{80}" by which he also precludes the visualization of "things yonder." We are further protected against idolatry by Abba Isaak when he says of Apostle Paul: "\textit{Indeed, he wrote that he saw divine visions and said that he heard words, but was unable to describe what were those words or the figures of those divine visions. For when the mind in the spirit of revelation sees these things in their own place, it does not receive permission to utter them in a place that is not their own. Even if it should wish, it could not speak of them, because it did not see them with the bodily senses. Whatever the mind receives through the senses of the body, this it can express in the physical realm. However, whatever the mind perceptibly beholds, hears or apprehends within itself in the realm of the spirit, it has no power to express. For this very reason the blessed Paul by one word closed the door in the face of all theoria and the exclusion thereof be anchored in silence, where even if the mind were able to disclose that which belongs to the realm of the spirit, it would not receive permission to do so. For he said that all divine visions}
which the tongue has power to disclose in the physical realm are phantasies of the soul's thoughts, not the working of grace."

St Dionysios the Areopagite also says, "As we plunge into that darkness which is beyond intellect, we shall find ourselves not simply running out of words, but actually speechless and unknowing."

This is interesting, because it shows us that the ability to visualize in material terms and to describe in language are interrelated, and that noetic things are subject to neither. For whatever visual and concrete concepts or ideas one has about the nature of heaven, hell, the Divinity, the partial and last judgments, and all things "yonder" are without fail delusion and phantasy. According to St Gregory Palamas, this is also the mystery of Apostle Paul's words that when he had his noetic experience, he did not know whether he was "in the body or out of the body." St Gregory does not allow the concept of "out of body experiences" but says of Paul: "He beheld, he says, `whether out of the body I know not, or within the body I know not'. That is to say, he did not know whether it was the intellect or the body that was seeing. For he sees, but not by sense perception, and yet [he sees] like sense perception sees perceptible things, clearly and even more clearly than sense perception. And he sees himself that, by the ineffable

81. Epistle to Symeon of Caesaria
82. On The Mystical Theology, §3.
sweetness of that which he sees, he is apart from and caught away not only from every material and noetic thing, but even from himself.\textsuperscript{83}

This is the point that neo-Gnostic writers do not grasp: "whether in the body or out of the body" does not at all indicate an "out of body experience," but rather precludes all visualizability or language based description of the experience and the vision. Those who have such experiences do not take flight from the creation but from the world's perception (images and words) of creation. For, one who has learned that the word and the silence are one and has glimpsed the energy of creation has an increased capacity to love God and minister in co-suffering love to creation. He may be able to heal the wounds of perception, the broken images of life which skew our regard for creation. Reality does not consist in abstract, disembodied ideas, but in that which we experience. What we ultimately experience is that creation is good, even if man does bad things with it. I will suggest that visualisation in the realm of quantum mechanics might lead to similar distortions of the real state of affairs, and that mathematical formalisms are an expression of speechlessness.

Visualization of "things yonder" and of the Divine and of all eternal mysteries is a form of reductionism. In fact, however, I would suggest that in the transformation

\textsuperscript{83.} The Triads, 1.3:5; 21
and emerging psychology of our visual conceptualization, our visualization of words reduces our world to a picture, and that, already beginning with the movement from symbolic to "realistic" art during the rise of humanism, man began to conceive the passion of the moment to be reality. Ivan Ilich, in a paper not yet published, expresses the modern visual conceptualization as "show," and will suggest, as I understand it, that "show" absorbs us and makes us passive in that we are not really in the picture, but are, perhaps, manipulated by it. Our conception of reality may now exclude us from it and make us only passive observers of it. I suspect the holy fathers had some idea of this, and that the structure of correct Orthodox iconography has an antidote to this built in by revelation.

Authentic science, in order to become such, had to separate itself from the prison of dogmatized philosophy and become a "values neutral" process in order not to be clouded by preconceptions, and so willingly or unwittingly distort truth to fit preconceived philosophical posits. This brought it into conflict with that

85. Just how necessary this is may be seen from the astounding error of Einstein. He really was one of the fathers of quantum physics, but to the end he refused to acknowledge his child because certain of his own inevitable conclusions conflicted with a beloved philosophy he had about the nature of the universe. He was wrong, and probably even suspected (perhaps knew) it, but he remained unable to accept the truth that he himself had sired. His philosophical concept of the universe was just too powerful and, I dare say, too poetic, for him to give it up. It was only when Einstein studied Hubble's observations that the universe is expanding (continued...)
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theology which was still in bondage to the old Scholastic Aristotelian and Augustinian Platonistic philosophy, and to fundamentalism of one sort or another. It is not that modern science, and physics in particular, are actually demonic or an "international plot;" rather, the problem is that the whole scheme and concept, the entire fabric of Western theology and Scriptural interpretation, are profoundly in error, irreparably flawed. This is why, in its present form, it cannot face and survive truth, and so must make a desperate, last-ditch attempt to demonize it. 86 We have a sufficient number of such fundamentalists in the Orthodox Christian world today.

4.

PARADOX AND INEFFABILITY

85. (...continued)

that he would accept his own equations, which concluded that the universe had a fixed point of beginning. I do not recall whether he ever accepted the implications of non-locality ("spooky actions at a distance," he called the concept) and complementarity, which were ultimately proved by the testing of Bell’s Theorem after 1965. See the discussion of this, and the famous EPR experiment response of Einstein, et al, by David Albert in Quantum Mechanics and Experience, Harvard University Press, Cambridge, 1994, (pp.61-69).

86. We are well aware, on the other hand, of the problem of scientism (a nineteenth century popular movement which remains common down to our own day) which posits that science is the only method for obtaining knowledge or, in a more modest version, that science is the only method we presently have that is a reliable source of knowledge. Some of the rather negative and fearful reactions to science are properly reactions to scientism. Scientism is the argument that science is the only method for obtaining knowledge, or, in its somewhat more modest versions, that science is the only method we presently have that is a reliable source of knowledge. For my part, I would agree that science is the most appropriate method we have for understanding the world of nature. It has the great benefit, and one that I think is in full agreement with Christianity, of exposing superstition. The ability of science to demystify the natural world is itself a wonderful gift. It frees us to observe and understand the real marvel of creation without constantly projecting onto the natural world our own unresolved fears and desires. No scientist who has risen above the status of a technical manipulator of scientific data would ever claim more for the scientific method than its capacity to help us understand nature.

77
IN ORTHODOX THEOLOGY AND QUANTUM PHYSICS

So soon as I conceive the One I am illumined by the splendour of the Three: As soon as I distinguish Three, I am carried back into the One. When I consider any of the Three, I think of Him as the whole...I cannot grasp the greatness of the One so as to attribute a greater greatness to the rest. When I contemplate the Three together, I see but one torch, and cannot divide or measure out the undivided light. (St Gregory the Theologian)

There is another area of convergence between Orthodox theology and quantum physics. This convergence arises from the clear fact that not all truth, not all reality can be discovered or defined rationally or by logical means, nor can it be expressed accurately in human tongues.

We touched on this elsewhere, but we must look at it again briefly. Earlier, I mentioned the fallacy, cited by Kafatos, of surmising that in physics every point of theory must have a one-on-one correspondence with physical reality. The equivalent theological fallacy is the idea that every point of dogma and/or doctrine has a one-on-one correspondence in spiritual reality — indeed,

87. See Kafatos in the select bibliography.
fundamentalists would conceive that dogma and doctrine have a one-on-one correspondence in physical reality. The first fallacy arises in classical physics, which was based in Aristotle, while the second arises in Scholasticism, which is also based in Aristotle. To understand this matter, we must first look at the nature of dogma in Orthodox Christianity, and then mention the equivalent aspect of physics.

We discussed the Western, Scholastic concept of dogma in some detail earlier, and we will discuss the Orthodox concept in more detail later. It is important at this point to understand the difference Orthodoxy places between kerygma and dogma. Kerygma is the general exposition of the faith. It deals with surface matters and serves as a doorway into the revelation of Holy Scripture. For this reason, kerygma is often translated into English as "preaching." The knowledge and understanding which it presents may be seen as introductory. Dogma is another dimension of knowledge.

Orthodox theology is intentionally paradoxical. God has clearly revealed Himself to us and is intimately known, yet He is, has always been and will always be totally unknowable. We may never know His essence but we both receive and know His divine energies. God, Who is known to us, is unlike anything we know or could possibly know. He exists, but in a manner which cannot be called existence. Perhaps the most startling paradox of
all is the Incarnation itself.

In the Orthodox context, dogma has no relationship whatever to the Western concept of codified and defined doctrine. Dogma is not something learned or defined by any rational process, nor is it comprehended by logical processes. It is a reflection of faith, it is not the Faith itself. Dogma is that which the holy fathers have apprehended in a vital, living experience with God; it is a mystical process, and in the end it can only be expressed symbolically. We know in silence and express that which is experientially known symbolically, primarily in the divine liturgy. Dogma is not uncovered by rational expositions of texts of Scripture nor by any process of reason. Dogma is discerned by theoria, by which we do not mean simply "contemplation." Theoria, in the Orthodox Christian concept may only be defined as prayerful-experiential-contemplation in a deeply surrendered life in Christ, which ends in revelation. Dogma is a spiritual process, one might say a product of holiness. God — even the divine energies which we can know — cannot be known from a text, a set of doctrines or a "theological system." God can only be known from a

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89. The Orthodox Christian concept of theoria in spiritual experience must always contain the understanding of a revelationary vision. Theoria in the theological context is a prayerful contemplation that comes to such a vision.
vital, living experience. Even so, dogma, and all doctrine, are no more than a framework — a hint and shadow of reality. Thus, there is no one-on-one correspondence between every point of theology and spiritual reality (and certainly not physical reality). Dogma is the apprehension in the depths of the soul of ineffable mysteries, things which cannot be uttered by the human tongue. It is vital to understand that dogma and the effects of dogma are the expectation of all Orthodox Christians, not merely for some mystic elite, though, alas, few even seek it.

Something similar pertains to quantum physics and though it is on a different plane and dimension, the principle is the same. In physics, the explanation of inexpressible reality is mathematics,\(^90\) in much the same way that liturgical worship serves as a symbolic opening up of ineffable mysteries of hidden reality.

Theory in quantum physics is also paradoxical. As an example, almost anything we say about atomic and subatomic particles — the actual "stuff" of existence — no matter how true, remains untrue. We see objects as solid bodies, and we conceive them as being indivisible, material "things." Yet objects have mass only because they are a form of energy. The "stuff" of which all things are made is immaterial material. They are particles, but

\(^90\) To be more correct, the explanations in physics deal with models or constructs which represent reality, but which are not actually reality.
they are fields of energy. They are particles, but they are waves. Whichever paradox we choose, following the principle of complementarity, both paradoxical descriptions are partly accurate and partly inaccurate—but both are completely true. At the quantum level, which is the basis of physical reality, we must completely rethink the meaning of material, particle and entity. When we measure one thing about a particle, we automatically exclude knowledge of any other thing about it. Nevertheless, the field of every single particle interacts and has unity with the field of every other particle in the universe. Clearly, then, there can be no one-on-one correspondence between every point of theory and physical reality. At this level, the physicist is operating in the realm of a different form of theoria. More surprisingly still, all this has no real metaphysical dimension, but is simply the state of affairs. We believe that it is so because "Jesus Christ is the wisdom and power of God, creating and sustaining all things," and so there must be something ineffable about being and yet some bond of unity and interaction in all things.

It is evident to me that there are aspects of reality in every dimension which can be ascertained by differing types of theoria, but which cannot be expressed in concrete, logical or rational terms. These aspects are expressed paradoxically and symbolically. All theology is paradoxical and all dogma is symbolically expressed. God
is outside and "other than" all these things, nevertheless, both the process of dogma and the process of physics open up our understanding, our apprehension, to the "invisible qualities of God" (Rm. 1:20). How they affect us, our hearts and our being is a matter for us to determine. And here again, we have a coordinate between the concepts of Orthodox theology and quantum physics. We have said that our theology is "experiential." We just mentioned the two kinds of *theoria*: that which pertains to the ascertaining of dogma, as we described above, and that more ordinary kind which is innate in the processes of modern physics. In both cases, *theoria* is a tool, not the goal; but in the Orthodox context, *theoria* presupposes the action of divine grace. In physics, the process is experimental, and *theoria* is informed contemplation of the results of experiments, aided in a great part by intuition. Its guidelines are quantum and relativistic theory. In Orthodoxy, the process is experiential and this kind of *theoria* is involved in both the experience and the contemplation of the experience.\(^91\) Its guidelines are Scripture and the sacred tradition of the Faith.

There may be a tendency to see *theoria* in the Platonistic perspective. However, St Athanasios the Great, when he expressed the doctrine of "creation ex

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\(^91\) In fact, the parallel between the two types of *theoria* is more complete than indicated. The first is *subjective* experimentation while the other is *objective* experimentation. What makes them radically different is the presence of the Holy Spirit in Christian *theoria*. 
nihilo" (that all things were created from nothing), made
a radical break from the Platonist tradition and began the
systematic refutation of the Platonist concept of *theoria*
and of *divinization*. The Platonists and neo-Platonist
tradition held that the soul was pre-existent and naturally
immortal, but imprisoned in the body. By *theoria*, which
for Platonists was as much akin to meditation as to
contemplation, the soul could attain *divinization*, by
which they meant that it could return to its original state,
free of the body. St Athanasios the Great makes it clear
in his *On The Incarnation* that both soul and body
belong to the realm of created things and that both are
created "from nothing." *Theosis* is possible because of the
Incarnation: God united our nature to Himself. Thus,*theoria* pertains to the whole person — *body and soul
together* — not to a disembodied soul or ghost, and it
comes about as a result of God's grace. *Theosis* is not the
result of *theoria*, but rather is attained by our cooperation
with God's grace in reshaping our psychophysical lives —
body, mind, soul, spirit, heart, conscience, or whatever
designation we wish to give to our inner person — to the
life of Christ, attaining the restoration of the clear
likeness and image in which we were created. St Maximos
the Confessor makes it clear that, "the whole person
should become deified by the grace of the Theantropos,
becoming a whole person —soul and body by nature, and
becoming a whole god — soul and body by grace.”

It appears that in both modern microphysics and in Orthodox theology, there is no separation of the observer and the observed. The observer in both instances is not extraneous to that which is being observed, rather he is a participant in it at different levels of experience. He is part of the process and state of affairs he has interjected himself into by becoming an observer, by seeking to understand and quantitate it. In the case of Orthodox theology, the "observer" has intentionally involved himself in the hope of becoming a part of it, a part of the vital stream of the living theology of Orthodoxy, and being changed by it. In the case of modern microphysics, the observer impacts directly on the object of his observation and actually becomes part of the process being observed — and this is inevitable.

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92. *Ambigua*, P.G. 91.1088c.
A. Models of Reality as Sources of Conflict

Reality at all levels and in every dimension is a mystery. I will not suggest that the world which we experience with our own senses is not reality; nevertheless, what we perceive is the surface of reality, which is penetrated only with great effort over time. The more deeply we penetrate into this perceived reality, the greater the mystery becomes.

It is my proposal to demonstrate that almost all the apparent conflicts between science and faith arise from models of reality and not from reality itself. The resolution to such conflict may arise from a re-examination of the models of reality we hold which are based on obsolete information. The Church fathers should perhaps be given credit for having the integrity and intelligence to have restructured their understanding of the history, geography and the nature of the earth and the universe, if they had had access to the technology and information which is at hand in our century. The holy fathers were open to the learning and experience of the world around them, and utilised that learning themselves. There is every reason to surmise that they would utilise our own

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93. This section was originally an abstract for a presentation at an international congress on Orthodoxy and Science in Romania, October 2005. It appeared in the Journal of the Romanian Academy of Science, NEW PARADIGMS, (Fall, 2005).
contemporary exploration and learning to reshape many of their own *models of reality*. The reshaping of our *models of reality* does not contravene our basic dogmatic understandings about God as Creator and Redeemer. In fact, the discoveries of the past century only open us up to greater wonder at the beauty of the universe, along with its fragility: this can open to us also a greater appreciation of the presence of God and His role in the sustenance of our universe. We need not limit the role and plan of God by the boundaries of our own finite understanding and wisdom, but can open up our minds to the beauty, the vastness, the fragility and the dimensionality of the universe, as a way of increasing our faith and love-relationship with God.

When we become rigid and frozen in our *models of reality*, particularly when based in literalistic understandings of Scripture and the non-dogmatic statements of the holy fathers about science and history, then we deprive ourselves of reality itself, and close ourselves off from a more full discovery of God's presence, even though He is "everywhere present and fills all things."

Modern physics and cosmology have become "super-star" subjects. There is, however, an admirable and dignified modesty among physicists who acknowledge that they offer us only *models of reality*, rather than reality itself. When Nils Bohr said that "the purpose of science is not to know the essence of nature, but to discover what can
be known about nature," he reminded us that science is a method of exploration, not the final arbiter of facts and understanding. Science is not an alternative to revelation.

This same dignified modesty is expressed in the Orthodox Christian concept of apophatic theology. Apophatic theology also acknowledges that doctrinal and poetic formulations are secondary worlds, models. They are more or less adequate in helping us give words to and have concepts for our encounter with ultimate reality. Since no one can know or comprehend the essence of God, even the dogma of the Trinity must be understood as a secondary world, a conceptual framework of enormous importance and clarity that is the best we can do in the framing of language for the experience of the ineffable, but it is, nevertheless, a model of reality. When we assume that we have a concrete definition of the Divine, we step onto the path of those who built the Tower of Babel. We will examine later the problems created in Western Scholastic theology when philosophical theologians attempted to present such models as facts which are legally definable, adequate and comprehensible by reason.

In a similar context, physicist Werner Heisenberg says of quantum physics that we have no framework for correlating the mathematical symbols of it with the concepts of our human language, nor can we satisfactorily discuss atoms in normal language. The evidence of reality upon which scientific exploration builds models of reality
can only be expressed symbolically by a mathematical formalism, which might be the closest one can come to expressing a metaphor for the great mysteries that are encountered but not resolved.

In order to better understand the essence of this discussion, let us first explain the meaning of models of reality. Perhaps the best way to do this is to look at history's most famous clash between models of realities.

In the year 1500, the general model of reality for our universe was neat, tidy, dogmatic — and completely wrong. It was generally acknowledged that the earth was the centre of a harmonious system of concentric circles. These circles, diaphanous crystal rings, were delineated by the heavenly bodies that rotated in perfect circles around the earth. The sun rotated around the earth, as did everything in the universe. There could be no essential change within the region of the harmonious spheres. Earth did not move. Both the greatest of the philosophers and Holy Scripture agreed: Earth does not move, and the sun rises and sets as it moves in a perfect circular orbit around the earth.

This system was not thought to be a model of reality. It was held to be reality itself — reality so concrete that it could be a dogma of faith.

Then, however, an insignificant science-oriented monk somewhere in north central Europe had the outrageous temerity to offer a radical revision to this venerable model.
Not only is the earth not stationary, he asserted, not only
does it, like the other planets, rotate around the sun, but
their orbits are not perfect circles. Father Nicholas
Copernicus had the good fortune to live beyond the reach
of the Inquisition, but his writings were received with
sufficient outrage, and suppressed.

When, however, Galileo pointed his crude telescope
toward the heavens, the old model of reality about the
universe was doomed. Not only was Copernicus correct,
but his understanding of the new model was only elemen-
tary. Indeed, he had only presented a more accurate model,
but by no means a complete model.

The conflict that had arisen by the clash of these two
models of reality was enormous. It had already cost the life
of Giordano Bruno, and came close to claiming the life of
Galileo.

Let us carry our example a step further. Copernicus
and Galileo also gave us only models of reality. In fact, the
sun is not stationary either, nor is it at the centre of the
universe. It races through space at an enormous speed, in
one of the tentacles of a massive spiral galaxy, which itself
is hurtling outward from some unknown point to some
unknown destination. This also is a model of reality which
may be added to and augmented by yet more discoveries.

This historical example demonstrates both the meaning
of "models of reality," and of my thesis that models of
reality, and not reality per se are the sources of all the
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apparent conflicts between Christianity and modern science. Lest scientists judge too harshly, let us recall that the great physicist Boltzman was driven to suicide (in 1905) at least in part by the ridicule he endured from other scientists for espousing atomic theory. Atomic theory strongly contradicted the *model of reality* held by most physicists of his day.

How does the massive new information we have encounter *models of reality* shaped by an antique understanding of relevant sections of Holy Scripture? I would like to invite you to think together with me about how we might resolve the conflicts — sometimes bitter conflicts — between the new information which forms scientific *models of reality*, and *models of reality* drawn from a simplistic reading of the Bible.

An Outline of the Main Points
of Our Consideration

1. Metaphor is integral to language, and the language of Scripture is rich in metaphor.
2. There are serious problems and loss of meaning when one literalises metaphor.
3. All tribes and societies throughout history have used stories to transmit their understanding of the meaning of life. It is a singular curiosity of our modern era that these stories are often presented, not as landscapes of meaning,
but as concrete fact, history and science.

4. Challenging models of reality formed by the literalisation of metaphor and simple narratives is inevitable, and sincerely believing persons need to be clear about the language of meaning that constitutes the purpose of a story, and not become party to the reduction of that story to history or science. We should also be open to changes in our models of reality.

5. Testing models of reality with regards to cosmology, the creation narrative and man's history:
   a. Science: the scientific method.


7. Science and Christianity: The challenge of living harmoniously with one another.

   Here, we are speaking of those subjects where science and religion may overlap. There is a range of subjects in which there is no such overlapping. For example, science can say nothing about the Holy Trinity, the Resurrection of Christ and the Ascension.
B. Metaphor and Simple Stories

Simple stories told for simple people are intended to convey meaning. They are not concerned with scientific facts or chronological accuracy. They will often contain sophisticated psychology in narrative that appears naive on the surface. Although the stories appear simple, the meaning they convey may be complex and surprising in its depth.

Metaphor, which is very rich in older languages, conveys meaning by means of interlocking imagery. It is not "concrete" language. It has a fluidity that can convey textures of meaning which more concrete language cannot. Metaphor also contains an internal dissonance that warns one not to literalise it.

At the very least, literalising a simple narrative story or a metaphor creates a false model of reality. In relation to scripture and theology, when we literalise a metaphor, we create an idolatry.

Let us look at the creation narrative in the book of Genesis, for example. The details and processes of the creation of the universe, our solar system and our earth are extremely complex. Indeed these matters are so complex and difficult to comprehend that the best scientific minds in history with the finest technology are only now unfolding the details, though with difficulty.

Why would the scripture attempt to explain all this
vast complexity — so complex in many details that it exceeds human language and requires mathematical formulae to express it — to a wandering tribe of Hebrews who were not yet literate? Instead the narrative presents a simple story, but one filled with meaning and revelation. Moses had to come down from Sinai with the ten commandments; it would have been of no value for him to have returned with the Periodic Table of the Elements.

It is not surprising that ancient peoples formed a *model of reality* based on a more or less concrete and literal interpretation of the Genesis narrative; what is astonishing is that anyone in the 20th and 21st centuries would hold such a *model of reality* when it is so clearly false. The first tragedy in this is that it results in a loss of the actual meaning of the story. The second tragedy is that such a disproved *model of reality* sets up an unnecessary conflict between religion and science, which undermines the faith of many who desire to believe.

The creation narrative, from the beginning up to the time of the holy prophets Sarah and Abraham, condenses an enormous time and a vast prehistorical oral tradition into a simple narrative. This entire narrative is about *meaning*, not historical or scientific detail. We must remember that we derive our theology from *meaning*, not from supposed *facts*. Facts do not constitute *truth* even when they are accurate, only *meaning* can provide a basis of truth, and both the meaning in scripture and the truth of that meaning are
revealed to us by the Holy Spirit. The same might be said of science. Brahe was a careful, encyclopaedic recorder of observed astronomical facts, but still held an erroneous model of cosmology. His facts were of little value until his assistant, Kepler, interpreted them after Brahe's death. Only when the "facts" were given meaning did they become of value for knowledge and understanding.

"Truth" is founded on meaning, while *models of reality* are based on supposed facts. More clearly, *models of reality* are derived from a presupposition of the accuracy of a given set of what appear, at least on the surface, to be facts — really, suppositions which have emerged in a given era of time.

For Orthodox Christians, spiritual and theological truth is derived from meaning, illumined by grace. Revelation, in the Christian sense, is also about meaning: a way of integrating meaning into the events in life. This too (understanding revelation) must be illumined by divine grace. If there is, therefore, any claim to immutable truth, it is a subject of spiritual experience rather than rationalistic reflection on a given set of surmised facts. Models of *reality*, being based on surmise and supposition about what are presented as "facts" in a given era, are malleable and subject to revision and change when some or all of the

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94. I have purposely avoided the use of the word "philosophy" and "philosophical," because the context might not be understood, and one might think either that we are degrading philosophy or elevating it to too high a level. Philosophy, to cite David Goa, is part of the "great human dialogue." We will discuss it later.
bases of the information that informed these "facts" are disproved or displaced by later discoveries and newly emerging sets of information relating to the same subject.

This is where the crisis arises for fundamentalism and Scholastic based Western theology in general. Fundamentalist interpretations of Scripture consist in *models of reality* which are based on supposed facts, with little comprehension of meaning. It is these *models of reality* which many religious thinkers bring into conflict with the *models of reality* generated by physics and other fields of science and medicine.

C. Axial II

Karl Jaspars appears to have coined the expression, "axial period" to describe the great philosophical developments in the ancient world. He applied it to the long era between about 800 and 400 B.C.\(^9^5\) During that era, an enormous revolution in human thought and understanding took place. A radical shift in the paradigm that informed human thought and society occurred. At first, the transformation moved almost with the gradualness of the shift of the magnetic poles, but then it erupted into a great flowering of philosophy and systematic ethics. This era began at about the time Prophet Isaiah was illuminating the revelation of God in Israel. It was the epoch in which the

\(^{95}\) I do not recall his actual delineating dates, but it was during approximately that era,
Azeri prophet Zoroaster revolutionised religion in Persia, Confucianism developed the system of ethics in China and the Milesian Greeks began to speculate about the nature of being. During this period, too, the Buddha began to explore the problems of human suffering. The great thinkers of this era began to consider the actual meaning of myths and taboos, and to transpose them into systems of meaning. This process had, in fact, begun with the great lawgivers of history who attempted to systematise human experience into the structure of civil society, binding it together with legislation that took account of the purpose of the myths and taboos.

It was during this era that the quest for an understanding of the roots of good and evil advanced a general moral philosophy. It was evident that people could keep any set of laws to the letter and still do evil things to others. Law was not the solution; it remained only a mechanism for controlling and mitigating behaviour within a given civil society. Neither the moral concepts that were developing, nor the legal concepts were by any means universal.

During this great axial period, theology began its long journey toward development. Philosophy was rivetted on cause and effect, and later spent great energy on the question of how we learn and know. The paradigm shift of this first axial period consisted in a movement away from unexplained myth, and into the realm of philosophy. The development of both philosophy and theology were part of
the same stream. Within this stream, myth was converted to a systematic concept of ethics and social morality and the philosophers, both secular and religious became the dominant practitioners who formed the grid of thought, beliefs, and structural changes in politics and governments and our concepts of humanity, the world and the universe.

I will contend, with Robert Solomon, that we are in the midst of a second great axial period. It appears to me that a major paradigm shift is underway, and that it began already in the 1600s, but gathered its real force at the beginning of the 20th century. I want to suggest that this shift has been, in some small way, motivated by the fact that the question of what we know is overpowering the question of how we learn and know. The old preoccupation with a metaphysical dualism of mind/brain, and the abstraction of the intellect hardly seem tenable or significant in our present era. Reality at all levels and in every dimension, is a mystery. I do not suggest that the world of our sensual experience is not reality, but it is only the surface of reality. This surface can be penetrated only with great effort, either spiritual or scientific, over time. The more deeply we penetrate through the surface of this perceived reality, however, the greater the mystery becomes. This is reflected in quantum physics, and also in Orthodox Christian theological experience. Thus, both quantum mechanics and the world of Orthodox Christian

96. I believe Lord Bertrand Russell suggests such a situation in one of his works.
spiritual experience are complementary. Orthodox theology can be informed by modern science, and modern science can be illumined by Orthodox Christian spiritual experience. This can be accomplished only when we clearly maintain the understanding that science is a method of exploration, not a dogmatic system, not pursued in the manner of a religion or "spirituality." Orthodox theology is not a system for interpreting the physical history and properties of the cosmos, but a means of the assent and transformation of the human person, an avenue of the revelation of redemption, and a framework for life and experience.

What shapes our idea that we are in a second axial period, is the major shift in the paradigms of philosophical and religious thought in the present era, beginning with the last decade of the 19th century. The shift has been such that scientists, and physicists in particular, have gradually replaced the philosophers as the architects of the grid through which we view humanity in relation to the world and the universe, and to each other. This shift has clearly touched all areas of human thought and reasoning. Just as the lofty theories of philosophers slowly "trickled down" to the most common levels of society, reshaping human

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97. I believe Dr. Solomon thinks of a second axial period as beginning during them 1700s. I would date the beginnings of the era in the 1600s, and suggest that a pivot point took form in the 1800s. The two major impetuses in that era were Newton and Darwin. However, in my view, we see the great paradigm shift taking place early in the 20th century, with the acceptance of atomic theory and the birth of quantum physics, coupled with the emergence of evolutionary biology.
thought, so the abstractions of scientists have been trickling down to every human level reshaping, over the past four or five centuries, every aspect of thought, including theological and religious concerns. In the 20th century, and especially in the present century, technology, which is something of a parasite on science, has had an even greater impact on the shaping of the human mind. Still, at the root of the making of the post-modern mind one has to see both quantum physics and evolutionary biology as seminal. This is the great paradigm shift that constitutes what I see as the Second Great Axial Era.

From an Orthodox Christian point of view, if we are to continue to effectively witness the faith of Jesus Christ, we must respond to this Axial shift. At a time when the Scholastic system in religious thought has been exposed for its emptiness as a spiritual and theological cul de sac, a deep spiritual void and hunger has been created in man by the age of technology, with both its benefits and its dehumanisation. The equally blind alley of "spirituality without religion" offers no answers; it cannot separate itself from the spirit of the age and the bondage to ultimate hopelessness. Orthodox Christianity stands in a position to have a vital, existential encounter with the paradigm shift of the present Axial Era, and give form to the void and fulness in place of the emptiness that has been generated. It has the content and the spiritual power to carry man beyond mere spirituality and into a profound spiritual life, in the
IV. Orthodoxy and Modern Physics

grace of the Holy Spirit, which is not in conflict with this new grid of understanding, but which rather has a complementarity with it. I will assert that Orthodoxy alone can sail easily upon the sea of our unfolding understanding of the universe, the origins of humankind and the mysteries of the quantum world. In order to do this effectively, however, we must wean our Orthodox teachers and leaders away from the bondage of Western Scholasticism into which so many have fallen, and bring them back to the great existential revelation of the faith so clearly enunciated by the holy fathers, and in particular by the great hesychastic theologians who synthesised our understanding of our true relationship with God and the universe.

If we cannot, as teachers of the faith and theologians, address in a meaningful and open way, the new paradigms of the Axial Era in which we live, then we will be frozen in obsolete and meaningless *models of reality*, which we must forever set into militant opposition to the *models of reality* of physics and all the sciences. If we fall prey to such arrogance, we will be unable to respond at all to the spiritual needs and aspirations of mankind, we will be unable to sustain the Gospel and we will be able to speak only to the most superstitious and religiously credulous elements in our various societies. The younger generation will have been betrayed by us as we betray the Gospel and the faith with a blind, reactionary religiosity rather than an openness to new understanding and a grasp of the infinitude
of the Orthodox Christian revelation.

Orthodox Christianity is not the arbiter of "facts," but the healer of humanity, the source of meaning, the path to authenticity of life and the doorway to eternity — to immortality.

This rough sketch of the Divine Wisdom church in Constantinople shows how the architecture is brought together and given unity by ascending toward the dome. The "Pantocrator" in the dome was plastered over after the Turkish conquest of the city, but the small sketch above presents an idea of what the Pantocrator looked like.
V

THE COSMOLOGY OF ORTHODOX CHURCH ARCHITECTURE

O Christ, the Wisdom and Power of God, that creates and sustains all things. (Irmos/Katavasia, Ode Three, Canon for the Feast of the Dormition)

Let us briefly look at the cosmological implications of the liturgical architecture in Orthodox Christianity and even more briefly at the space-time implications of our divine services. The dome on the interior of Orthodox churches represents the universe, and we usually place the icon of "Christ the Pantocrator" in the dome for just this reason. Christ is by no means depicted in this icon as the stern judge of the world. In the proper liturgical architecture of the (so-called) Byzantine temple, the central dome is the point of unity for the structure. Every feature in this cosmological structure aspires toward the dome, and it is the dome that draws the forms together and gives them unity and harmony, that gives the structure "wholeness."

98. I have read in one or two works about icons that the Pantocrator is placed in the central dome as a vision of the dread judgment. One writer whom I cannot now recall, asserted that, when we look at the Pantocrator, we are seeing the stern and all-powerful judge of the world whose "righteous wrath hangs over us." Such a pagan idea would be inconsistent with the entire meaning and nature of the liturgical architecture of the Orthodox Christian Church and, indeed, would be in diametric opposition to the meaning of the Liturgy itself.
This is the explanation of St Maximos the Confessor, and I would suggest that the icon of the Pantocrator in the central dome — the *ouranous*, the "heavens" — of the Orthodox temple is best explained by the Irmos of Ode Three, Canon for the Dormition, which declares that Christ is "the Wisdom and Power of God, which created and sustains all things" ("Ἡ δημιουργική καὶ συνεκτικὴ τῶν ἄπαντων θεοῦ σοφία καὶ δύναμις"). Christ is the point of unity of all things (*Col.1:15-20*), which He has *recapitulated* in Himself (*Eph.1:10*). He is the creator, sustainer and redeemer of the whole of creation. Inasmuch as the Church is a type of the redeemed

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100. Irmos/Katavasia, Ode Three, Canon for the Feast of the Dormition: "Ο Χριστός, τὸ Βουλαθητικόν καὶ συνεκτικόν τῶν ἄπαντων θεοῦ σοφία καὶ δύναμις." This is in contradistinction to the Western idea of creation based on Augustinian principles and Scholasticism, which holds that God the Father created and governs the universe through secondary causes, that is, created energies apart from Himself. He set the universe in motion, this idea has it, and it goes on guided and sustained, not by God directly, but by created, secondary causes. The universe, however, was subjected to frailty "by the will of Him Who so subjected it, yet with hope" (*Rm.8:20*). It is interesting to note in passing that the idea that God governs through "secondary causes" was common not only to neo-Platonists such as the Augustinians, but to the neo-Pythagoreans, who deduced the existence of created, intermediate forces, by means of which God works in the world of phenomena. These forces were not God Himself and not "beings," but were created reflections and expressions of God. This same idea appears in the thought of the most Hellenized of the Jews (see, e.g., *Ep. of Pseudo-Aristeas*, §132; 195), in which just such a distinction appears to be made.


102. Again, this is the thought of St Maximos the Confessor, loc.cit.
V. Cosmology of Church Architecture

cosmos,\textsuperscript{103} the fulness of the reign and rule of God, the icon of the Pantocrator (\textit{the All-Sustainer, the One Who governs all})\textsuperscript{104} is enthroned in its proper place. We are surrounded in church by icons of Christ, the bodiless angels and the saints as a revelation of the universality of the Holy Church for, in the Church, the universe is united — the heavenly and the earthly Church are one. We are, however, talking about the transfigured universe of the future, which is being revealed and foretold by our Orthodox Church architecture. The physical universe is, as we mentioned, not in perfect order and not completely harmonious, nevertheless, it has an essential unity which is clearly evident from the developments in quantum physics. Both these realities — the fact that the universe is not in a perfect, harmonious "concentric" order, and the fact that it nevertheless possesses an essential unity of activity and being — are understood and reflected in our Orthodox theology, as well.

A Universe in Need of Redemption

\textit{The whole creation is in a state of infirmity, not by its own fault, but by the will of Him who so}\textsuperscript{105}

\textsuperscript{103} This concept is also present in the thought of St Maximos the Confessor (loc.cit) who suggests that the universe is held together by the spiritual world which it presupposes. I do not read any sort of Platonistic dualism into St Maximos' concept, but accept that the universe is not governed by secondary created entities, rather by Christ Himself, by the will of God.

\textsuperscript{104} The usual translation of Pantocrator is "All-Ruler." If one follows the thought of St Maximos the Confessor in this matter, and considers the entire theology and liturgical presence involved, then such a translation would seem to be much too narrow and devoid of the greater implications of the fulness of the meaning.

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subjected it; yet with hope. We are aware that the whole of creation is groaning and toiling together until now, and that creation itself will be set free of its bondage to corruption, into the glorious freedom of God’s children. (Rm.8:18-24)

It occurs to me that entropy is the universe’s quest for freedom. (Physicist Subha Mangalam-palli)\(^{105}\)

Here we must make a distinction between the ideal and the fallen. We read in ill-thought-out "apologetics" that the perfect, harmonious movement and order in the universe is a "proof" of the existence of God, and of His Providence. This is distressing. It misses the point and it is unscriptural. Apostle Paul tells us that the universe is in a fallen state, together with man. St John Chrysostom\(^ {106}\) says that an incorruptible universe could not be the abode of corruption. Inasmuch as the creation was given for the nurture of man, God subjected it to corruption because man had become corruptible. Chrysostom’s thought appears to be that the fall of creation together with man is a mercy of God. The creation did not fall into sin in the same way as man, but "sin" means to fall short of the mark or goal, and both man and creation with him fall short of the mark, which is to

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\(^{105}\) In a conversation with the author of this paper.

\(^{106}\) On the Statues, 10:10.
live incorruptibly and everlastingly, in communion with God. Thus, at the macro level of the universe, we are not surprised to learn of the Heisenberg Principle of Uncertainty (although it is sometimes understood out of all proportion to its actual meaning), of the principles of Hamiltonian and Dissipative Chaos, or that there is much stochasticity in the universe. Black holes, the stochastic orbits in elliptical galaxies, etc. are all perfectly

107. Essentially it means that, for example, knowing one thing about a particle compromises our ability to know some other thing about it. It is fascinating to think about this in relation to the four paradoxes of Zeno of Elea (+464BC) in which he asserts an uncertainty principle in terms similar to this particular aspect of Heisenberg’s principle. The recent work of Per Delsing, et al, in Sweden should be taken into account, however. We will not discuss “virtual particles” and other more complex aspects of Heisenberg’s principle.

108. Note that the word “chaos” in the creation narrative should not be read as “confusion and disorder,” but as “darkness.” Chaos in the cosmology of modern physics also does not indicate a random confusion but a form of random order. In other words, chaos has the appearance of being an intentional effect. From my point of view, I would suggest that this is because the universe has become “subject to frailty by the will of Him Who so subjected it.”

109. Stochasticity is a form of order; let us say, it is order in another dimension, which moves away from harmony as opposed to the perfect harmonic form and order of the Hellenistic or Scholastic philosophers. It is, rather, a dissipation of harmony. I would like to suggest that stochasticity is a creative force, perhaps the force which drives “natural selection.” Perhaps the mind of the creative genius is stochastic. For the restoration of all things, it is evident that the Incarnation has seized the universe and impelled it forward toward its final destiny of transfiguration and glory. It is just as clear that this was not simply initiated by the Incarnation, but is the plan of the eternal will of God. For some interesting discussions of Chaos and Stochasticity, see “Chaotic Phenomena in Astrophysics” in Annals of the New York Academy of Sciences, N.Y., 1985.

110. We must clarify “stochasticity” with a concrete example. Galaxies usually exist in cluster as spiral galaxies. Elliptical galaxies appear to be formed in these clusters when the greater gravitational pull of larger galaxies nearby causes a spiral galaxy to stretch into an elliptical configuration as it moves through the cluster, and this results in a change in the order of the orbits in the galaxy’s constituent stars. Let us say that in a galactic system, the spiral galaxies move through the system like dancers in a ballet, but when an elliptical is formed, that ballet collapses into a Martha Graham routine: both are choreographed, but rather differently. The spiral galaxy might be said to be more Vivaldi, while the elliptical galaxy is more Hindemuth—it has order, but only heaven and Schoenburg know what it is. See “Stochasticity in Galactic Models” by G. Contopoulos and “Galactic Models with Moderate Stochasticity,” by Martin Schwarzschild, both in the Annals of the New York Academy of Sciences, Vol.497, 29 May, 1987.
scriptural. The imaginary concentric circle "perfect order" in the universe is based in a preoccupation with Plato and Aristotle (and other Hellenistic philosophers). Moreover, if, as Mangalampalli suggests, entropy is "the universe's quest for freedom," then it a self-willed quest, because entropy is the tendency toward less and less order. To me, entropy is the testimony of a universe in need of redemption.

The harmony and unity of the Church, expressed in its architecture, art and liturgical cycle, is outside the merely creaturely. It is a revelation of the rule and reign (the "kingdom") of God — the universe that is redeemed in Jesus Christ. The liturgical cycle of the Church is a revelation about that redeemed and transfigured cosmos of the future, when the rule and reign of God is truly manifested in all things — but let us remember that while the liturgical cycle, liturgical architecture and art of the Orthodox Church are set in an intentional diametric contrast to the corruptible universe, it somehow reflects the quantum level symmetries which underlie all physical reality, and so does not ignore the sustaining power of Jesus.

111. I am cognizant of the time-frame paradox that this poses, but I am inclined to believe that the natural and indispensable marriage of quantum and relativity theory gives us an insight into the resolution of this paradox. Remember that if God is the Creator of all, then the principles of quantum physics and of relativity are the works of God's will.

112. This is not to be taken as a denigration of the Hellenic philosophers who were, after all, the precursors of modern science; rather this is a criticism of theologians who fear modern science because it does not agree with pre-technological scientific speculation. The Greek mathematicians were "Hellenistic philosophers" and they, among others, laid the foundations for the development of the technology which could bring science into its own.
Christ, the "wisdom and power of God that creates and sustains all things." Nor does it suggest any kind of Augustinian or Platonistic concept of an abstract, disembodied ideal "reality" apart from the physical universe. Let us say that the corruptible universe, as our physics reveals it to us, is at the starting point of a vector, the destination of which is the universe as the liturgical cycle, liturgical art and liturgical architecture of the Orthodox Church reveals it to us. The universe will be transfigured in the fulness of time. Then, the liturgical cycle, iconography and liturgical architecture will vanish, because they will have been fulfilled. The prophecy always passes away in the presence of its fulfilment.\textsuperscript{113} Let us assert here that declaring that Christ is the sustainer and redeemer of this universe, abolishes the concept of dualism, together with the idea that "reality" consists in some disembodied "ideal."

The words of Apostle Paul, cited above, bring up another question which is often asked. Why and how did the whole universe fall together with man? Let me suggest that there is a reflection of the answer to this in the principles of quantum physics. It happens that anything which occurs in one field of the universe necessarily has an

\textsuperscript{113} I suggest that it is precisely through the Church, by Jesus Christ, that man and all creation are being redeemed.
effect in every other field.\textsuperscript{114} This is reasonable if one believes that God created the entire universe\textsuperscript{115} and that Christ is "\textit{God's creative and sustaining wisdom and power in all things.}"\textsuperscript{116} The same mind and will formed the whole, including man. Man should have fulfilled a vocation as a unifying element in nature, for he is not only its crown, but the microcosm of creation, possessing within himself both its spiritual and physical dimensions. This unifying vocation could only have been fulfilled through unselfish love and the absence of egotism. This would have constituted a proper use of his energies. The fall really constitutes a proclivity to habitually misuse our energies, not the loss of them. Christ healed this misuse through His perfect humanity, in whom the perfect human nature is expressed, making unity with God and the cosmos again possible for human beings — a unity which Christ realised for us in His unity of perfect humanity with complete divinity. Human nature, restored in Him, has given man the

\textsuperscript{114} Based on non-locality theory. Incidentally, I am aware of Whitehead’s "fallacy of misplaced concreteness" and its implications, as well as of the continuing debates about non-locality. As I recall, the tests of Bell’s Theorem dealt exclusively with the question of non-locality in paired particles emanating from the same quantum system. Nevertheless, I am convinced by the arguments of physicists who would insist that the parts do not govern the whole, but the whole governs the actions of the parts. Atomic and subatomic particles do not behave in a deterministic fashion, but they behave as they do not as independent entities, rather because they are integral parts of the whole.

\textsuperscript{115} This is logical enough, and I am inclined to believe that it would hold true in cosmic string theory. We will have occasion to elucidate this fact later because eventually we will have to examine the principle of the wavelike nature of all particles. I will later suggest that the effect of events in any field in the universe upon the whole reflects something of the effect of each of the saints upon the human nature and in particular upon the faithful.

\textsuperscript{116} See FN. 36 above.
possibility to make the proper use of his energies. As we have mentioned, energy, both in man and in the universe, is essentially about relationships, and both man and the universe function by means of created energy. Thus, if the universe fell together with man, Apostle Paul clearly tells us, in the words cited above, that the universe is being redeemed together with "the children of God." Of course, the first answer is that the universe fell (or, was brought into corruptibility) through no fault of its own (since it is not human and cannot take decisions and exercise will), but "by the will of Him Who so subjected it." Nevertheless, there is bound to be a physical principle at work, which binds the actions of man together with the destiny of the whole of creation — for God created the whole, not a series of sometimes associating or occasionally interacting parts. The universe is intimately interconnected and interdependent. The "parts" that comprise the elements of our universe are not isolated or independent in their actions. The parts do not govern the whole, rather the whole governs the actions of the parts. Atomic and subatomic particles, which are ultimately the "stuff" of the universe, behave as they do, not as independent entities, but because they are integral parts of the whole. That is to say, there is One who governs all — the Pantocrator, Ἡ δημιουργική καὶ συνεκτικὴ τῶν ἀπάντων θεοῦ σοφία καὶ δύναμις.

This is a commonplace of quantum physics, and it is also theologically sound. It would seem that this interrel-
ation between man and the rest of creation is expressed in the creation narrative in Genesis. Certainly we have seen that man's destruction of the earth is directly connected to his spiritual condition and it is difficult to believe that in our interconnected universe, man does not have an effect on the whole. Man's spiritual condition affects the decisions he takes and the way he directs his life and uses his energies, and man is both spirit and body combined. No spiritual act or decision selected by man can fail to affect him physically and, in turn, this cannot but have an effect on the world around him. For this reason, work on one's own salvation is the most important endeavour for each person, and it is so without one being self-centred or self-absorbed. Every act in our lives is like the proverbial pebble dropped into the centre of a pond. It sends ripples out which do not stop until they have reached the boundaries of the pond. So every act of each of us does indeed affect the whole. There is only one human nature and all mankind shares in that common nature. The light of grace has entered the human race because of the Incarnation and the Divine Hypostasis having entered human nature. If, in our struggle for our salvation, we ourselves become less dark inside and more filled with this light of grace then, merely as a consequence of this, there is already less darkness in the whole of humanity and more light in the whole of human nature, because it is so in us. This is part of the mystery of the saints whom we venerate and portray in icons. It is not only
that they have ascended from glory to glory, but that they have already had a profound, positive effect on the whole of human nature. Each individual must, however, choose to receive and participate in these victories of man over Satan, in this pulling away from the fallen human nature and ascending toward the divine, given us as a free gift by Jesus Christ.  

I would like to suggest also that, since its creation, there have been two major breaks in the symmetry of the universe, and that there is one final break yet to come. The Incarnation of God and the Resurrection, it seems to me, are radical breaks in symmetry, and the Second Coming will be the most radical break in the symmetry of the universe ever to occur.

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117. It is true that this salvation is given as a free gift of God, but as with any gift, if we do not make the effort to unwrap it, we cannot make use of it. If we do not struggle to make use of it, it remains, for us, without effect.
VI
THE IMPLICATIONS OF THE LITURGICAL CYCLE

The Liturgy is the highest form of the human story, and its most concrete expression. (David J. Goa)\textsuperscript{118}

The incarnation of God has seized the universe and impelled it forward toward its final destiny of transfiguration and glory. (Deacon Lev Puhalo)\textsuperscript{119}

That in the ekonomia of the fulness of time, he might recapitulate all things in Christ, both that which is in the heavens and that which is on earth. (Eph. 1:10)

The study of the structure of Orthodox divine services is not a mere technical course. It is a spiritual examination of the inner flow, the pulse and heartbeat of the Church — the Body of Christ on earth. It should bring us to an understanding of the very essence of the Gospel, for the rhythm and content of the cycles of divine services is that of the Gospel itself; it is the rhythm of the Heavenly Kingdom, the expression of the harmony and unity which

\textsuperscript{118}. In an informal symposium.
\textsuperscript{119}. From a Nativity sermon of then Deacon Lev Puhalo (Archbishop Lazar), delivered in Victoria, B.C. in 1974.
Our lives flow in rhythms and cycles. Indeed, all of nature is set to rhythms and cycles, from the life cycle of individuals to the circle of the seasons, the rotations and revolutions of solar systems. The whole universe is alive with rhythm and motion, from the largest star to the lightest lepton or massless photon. There are no inanimate objects in our universe. Every stone, every block of wood, every shard of pottery is alive with motion and interaction. From the very beginning, the vitality of what we call "lifeless elements" has been profoundly creative.

From the moment when God commanded, and the universe exploded into being, expanding outward in a chaotic sea of unimaginable energy, all was "without form, and void" (Gn.1:2). The grandeur of the Creator was revealed, however, even in the basic subatomic particles which, though formless, invisible and in disarray, served as the material for the establishing of all nature and man himself. We do not know the original state of the void universe nor do we know how many millions of years the

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120. According to Fr John Romanides ("Church Synods and Civilisation," Theologia, Vol.63, Issue 3, July-September, 1992) the Greek expression rendered into English as "kingdom of God," is misunderstood. The correct rendering would be "rule and reign of God," and it must be understood spiritually. The reason many rulers of the Jews rejected Christ is because they misunderstood the "kingdom" to be a worldly dominion and physical kingdom. The rule and reign of God is a manifestation of Divine Love and not a manifestation of worldly power with geographical boundaries, or even with a "spiritual geography" as is sometimes imagined. This is why the "kingdom of God" can be within you if you allow the will of God to reign in your heart.

121. This idea is even more profound in cosmic string theory.
elements existed in chaotic conditions, for the Holy Scripture commences its history at the time when the Life-giving Holy Spirit was already moving across the face of the deep, ordering the universe. The history of the visible world, however, actually begins with the formation from energy of the simple particles, indeed, with the wondrous moment when the will of God set in motion His majestic plan with the massive explosion of immeasurable energy which began the great process of creation.

Both Holy Scripture (Prov. 8:26) and modern physics inform us that the elements which surround us and fill our universe were only formless particles with a singleness of nature in the beginning,\textsuperscript{122} and these subatomic particles were gifted by the Creator with a strength of action incomprehensible to us, a strength of action profoundly evident and orderly in every micro level entity of the universe today. As a result, over millions of years, they formed, from their unions, joinings and partings, a countless variety of forms and bodies so that every known element has been created simply by the addition of neutrons and protons to the nucleus of a hydrogen atom, which is the most elementary of the atoms. Moreover, the chemistry of every element is determined by the number of electrons in the atom. Within everything that exists, deep within beyond human eyes, no matter how inanimate the object appears, there is a reflection of the universe. Within the atoms of

\textsuperscript{122} Or as someone once remarked, every thing is just fatter and fatter hydrogen.
VI. The Liturgical Cycle

every material object, subatomic particles race in orbits which, though stochastic, are kept bound together by the forces of nature. There are cycles, rhythms and, as it were, pulse in the symmetrical movement and actions of the subatomic particles which fill a bar of iron, a stone along a garden path and even the bench in the garden. It occurs to me also that radiation is a form of neurotransmitter in the "inanimate" world.

Man himself is not separate from this pattern of the universe. Heartbeat, pulse, brainwaves; the individual is a living system of rhythms and cycles which cannot be unrelated to the whole. Indeed, as we have seen, man is a microcosm of the whole universe, being both physical and spiritual and relating and acting through his energies.

The Orthodox Church is a living organism, and also has its own rhythms of life which, in themselves reflect the creation and serve to sanctify it. Since the Church is the Body of Christ, its rhythms and cycles are geared to the life of Christ and designed to bring spiritual harmony to all creation, for the whole universe is being redeemed together with man, as Apostle Paul says (Rm.8:18-24).

The "worldly system" around us also has its special rhythms of life and these, in turn, affect the rhythms and cycles of our own individual bodies and lives. The hierarchical and divinely inspired rhythms and cycles of the Church are quite different than those of the materialistic, passionate, often agitated and disjointed flow of "worldly"
systems and popular music.

If we are to be one with Christ, participants in Him and in the redemption which He has offered us — truly united with His Body, the Orthodox Church — then our lives must be in tune with His. The orderly procession and rhythm of the cycle of Orthodox divine services is designed to bring us into such a condition. It is designed to re-orient our lives, to root out and replace the worldly, passionate rhythms which penetrate us and lead our minds, souls, and bodies captive to their concepts and cycles of life. The rhythms and cycles of Orthodox Church life are designed to transform us so that our lives move like the ticking of a clock which is geared to the life of Christ, synchronized with the life of the heavenly kingdom.

It is clear that the "world" has its own system, which is quite different from the teachings of Christ. The things of this world; the passions, ideals, desires, and goals of this world, all work together to enslave mankind, and man has truly become enslaved. Satan accomplishes this both individually and collectively by creating a spiritual void in the life of mankind, and then convincing him that this void can be filled by material possessions, shallow, often emotionally destructive entertainments, foods and discordant, pulsating rhythms which negatively affect the rhythms of body, mind, and soul, instilling carnal agitations, confusion and a selfish and irrational expectation of instant gratification. This is the worship of the "prince of this
world" (Jn.12: 31; 14:30; 16:11) and its liturgical cycle is served daily on television, its litanies are chanted on radio, on records, from stages and podiums. The iconography of this worship of "the prince of this world" is portrayed on billboards and in a constant flow of commercials and advertisements. This is the cycle of life which breeds avarice, malice, crime, violence, war and stunning inhumanities.

The liturgical cycle of the Orthodox Church is diametrically opposite to this. It is filled with a spirit of love, peace, inner joy, and universal harmony. It flows with a spirit of transfiguration, resurrection, new life, and blessed eternity. It is a path of liberation from the bondage of passions and death. Yet even within our Orthodox parishes today, this wondrous, divinely inspired cycle is not merely misunderstood, but often completely unknown. As a consequence, by ignoring the Orthodox cycle of divine services, or even worse, treating it with contempt, many are simply yielding in the face of battle, surrendering our people to false and destructive concepts of life and to fraudulent spiritualities. Whole heretical concepts are being introduced (often because of ignorance) and replacing Orthodox Christian worship.

We hope to make you aware of the richness, beauty, and total necessity of the liturgical cycle, and of the reasonableness, usefulness, and spiritual vitality of the structure of the Orthodox divine services, their rhythms and cycles, and perhaps to discourage the immoderate and ill
conceived tampering with our liturgics which Ecumenism has bred in our exuberant if cynical modernists.

The life of the Church, and of each of its members, is set in logical cycles, each one an expansion of the preceding one. These cycles seek to pull us away from the fallen world and toward Christ, to bring the rhythms of our life into harmony with the Gospel and the life of Christ.

**Space-time and the Divine Services**

One of the problems facing our Scholastics and fundamentalists in dealing with the scientific details of creation is the time frame paradox — or what many of them perceive to be a paradox. It may be summarised in the argument that no species could have become extinct before the fall, because there was no death until then.

Dr Alexandre Kalomiros, in his treatise *The Six Dawns*, suggests that the answer lies in the foreknowledge of God. I would like to suggest, however, that Genesis does not say anything about whether non-humans died before the fall, it speaks only of those humans living in Paradise. I can see no logical reason for surmising that other living things did not die before the fall, because that would indicate that all living things were intended to be *immortal by grace*, and that man, therefore, was not unique, not the only "image and likeness of God."

VI. The Liturgical Cycle

The crucial misunderstanding of the Creation Narrative lies in seeking to limit God to our own perception of Euclidian space and linear time. We have philosophically limited God and, in our own minds, placed upon Him the constraints of our finite, three dimensional perception.

Nevertheless, even our divine services tell us that this is not correct. The verses of the feastdays often and intentionally begin with the word "today" ("Today Thou hast manifested The glory of Thy divinity on Mt Tabor, O Lord...." or "Today have the words of David been fulfilled, for in the sight of the whole world we venerate the footstool of Thy most pure feet...."). This expression "today" is intended to open us to a spiritual dimension in which not only is the historical event present to us now, but we are ourselves present to the spiritual event. All linear conceptions of time and space collapse in the divine services, and never more profoundly than when we receive the Body and Blood of Christ Who was offered for us "once continuously" (Hb.10:10) two thousand years ago. In the divine services, we enter a dimension in which time and space are one, the moment becomes immeasurable and the finite is enveloped by the infinite. The past, the present and the future are all present in this moment and we lose every concept of linearity as we become present to eternity, present to paradise, present to life, present to the Trinity.

In such a moment, in such a dimension, we can learn to free the Creation Narrative from the bondage of our own
finiteness and mortality and return it to the hands of God in which not only time and space are one, but every boundary of past, present and future vanish, and every dimension of time, space and existence are encompassed in each other.

When we fail to understand this aspect of our liturgical cycle and absorb Western concepts and modes of contemplation, we deprive ourselves of this treasure. Moreover, we trouble our souls with fundamentalist, sectarian notions about the Creation, and lose the very meaning of the event and, I fear, miss the meaning of being itself.
SOME YEARS AGO I HAD A LENGTHY CONVERSATION WITH A
LOVELY GROUP OF MENNONITES WHO HAD WITHDRAWN FROM
MANY OF OUR PUBLIC INSTITUTIONS BECAUSE THEY NO LONGER
WISHED TO BE SHAPED BY THEM. THEY BUILT THEIR OWN SCHOOL
AND EDUCATED THEIR CHILDREN SOLELY WITHIN THE FRAMEWORK OF
THEIR UNDERSTANDING OF SCRIPTURE.

AN IMPORTANT FACTOR IN THEIR WITHDRAWAL FROM THE
SCHOOL SYSTEM WAS THE TEACHING OF EVOLUTIONARY THEORY. IN
THIS TEACHING THEY SAW A DOCTRINE OF HUMAN ORIGINS. LIKE ALL
DOCTRINES OF THE ORIGIN OF HUMAN BEINGS IT IS ALSO, IN SOME
SENSE, A DOCTRINE OF HUMAN DESTINY AS WELL. FOR MY HUMBLE
FRIENDS, THE IDEA THAT HUMAN BEINGS HAD DESCENDED FROM
MONKEYS OR FISH WAS DISAGREEABLE BECAUSE THEY DID NOT
WISH TO HAVE THEIR CHILDREN THINK THAT ANY LOWER FORM OF LIFE
WAS AN ADEQUATE IMAGE OF WHAT IT MEANT TO BE HUMAN. TO
THEM, FOLLOWING THE GENESIS CREATION STORY, THE HUMAN
BEING WAS CREATED BY GOD, HAD ITS ORIGIN AND ITS DESTINY IN
THE DIVINE. THE IMAGE OF THE HUMAN NATURE WAS GOD.

THIS INTELLIGENT AND GOOD PEOPLE HAD DEVOTED CONSIDERABLE
ATTENTION TO EVOLUTIONARY THEORY AND ITS IMPLICATIONS
FOR THEIR CHILDREN. THROUGH THE COURSE OF OUR CONVERSATION
I CAME TO REALISE THAT THEIR WHOLE ORIENTATION TOWARD SCIENCE
HAD BEEN FRAMED BY THE EVOLUTIONARY DEBATE LEADING UP TO
the Scopes trial. I suggested that this trial was really quite a long time ago and that whatever they made of it, there were far more pressing issues on the horizon of modern science that needed to be thought about by good people. I introduced the current state of research into human genetics and drew out some of the implications. My main concern was with the movement among geneticists to map the human genome and, in this way, open up for our consideration both the possibility of ameliorating many genetic diseases and of posing ethical choices based on quality of life criteria. We will be able, as the propaganda on this new industry proclaims, to genetically enhance the next generation of children, giving them (this obviously means a few well-off families) a leg up on all others in the competitive market place.

In light of Archbishop Lazar's lectures, what interests me is simply to point out that, when your attention is focused solely on one issue in science, such as on evolutionary theory as with my Mennonite friends, you may miss the enormously significant set of challenges that are coming to greet us from the new frontiers of science. The issues of genetic intervention in the human genome, and the possibility of re-engineering the genetic structure of life in its earliest forms, require that our attention be given to thinking through what we may best pursue and what we pursue at our own peril.

We think through this enormous set of issues far better
when we are grounded in a healthy regard for creation, free of fear for what science may teach us about the human status. I don't know how Orthodoxy will come to address this set of issues. But the marvellous understanding we find in Orthodox thinking about our human nature, our creatureliness, and the wonder of creation gives me confidence.
The heavens declare the glory of God; and the firmament showeth his handiwork.

Day unto day uttereth speech, and night unto night showeth knowledge. There is no speech nor language in which their voice is not heard. Their sound has gone forth through all the earth, and their words to the ends of the cosmos. In them hath he set a tabernacle.... (Ps.20:1-4)
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