RESEARCH SUMMARY

In this summary of my research I discuss many of the underlying assumptions concerning religion and Extraterrestrial Intelligence (ETI) found in the scenarios. I begin by identifying the major world religions and discussing both their current status and prospects for change over the next half-century. I then discuss the assumptions I make regarding contact with ETI, with special emphasis on the presumed format and content of ETI's message. I conclude by discussing what my research suggests concerning how major world religions might react to the presumed three types of ETI transmissions.

This project primarily considers Christianity, Islam and Hinduism. As Appendix C demonstrates, 32% of the world population is Christian, 20% Muslim, 13% Hindu and 6% Buddhist. Note in Appendix C that 13% of the world population is nonreligious (atheist, agnostic, etc.).

It does not appear likely that religious affiliation will change significantly in the near future. Johnson (1995) has created a quantitative forecast of world religious affiliation for the next 200 years. Johnson considers such demographic factors as religious affiliation by country and population growth by country to create three quantitative scenarios: a “Most Likely” scenario where present trends continue, a “Muslim Revival” scenario where “Islam makes unprecedented inroads into the Western world,” and a “Nonreligious growth” scenario where “Muslims in Asia are hard hit by secularization.” In all three scenarios the current global religious affiliation percentages do not change radically. Indeed, as Fisher (1999) writes, “Contrary to earlier expectations that religion would wither away in the face of science, logic, or materialism, we see that religion is very lively at the dawn of the twenty-first century" (p. 8). Yet, as this research summary will show, religion is changing in profound ways.

Cox (1995) argues that an examination of Pentecostalism helps explain the resurgence of religion in general (p. xvii). With 450 million followers worldwide Pentecostalism is the fastest growing Christian denomination (Fisher, 1999, pp. 63-64), growing faster than Islam and Christian fundamentalism. Approximately 25% of all Christians are Pentecostalists. Pentecostalism is growing rapidly in Africa, Korea and Latin America, where it is overtaking Catholicism in some countries (Cox, pp. 14-17).

Pentecostalism is difficult to define. Cox writes:

> … What we call "pentecostalism" [*sic*] is not a church or even a single religion at all, but a *mood*. It represents what might be called "a millennial sensibility," a feeling in the pit of the cultural gut that a very big change is under way. (p. 116)

Pentecostalist services typically feature loud music, personal testimonies, prayers for healing, (Cox, p. 6) and, often, glossolalia or "speaking in tongues," although Pentecostalists prefer to refer to it as "praying in the spirit" (Cox, p. 82).

Pentecostalism places emphasis on experiencing God, as opposed to adhering to a complex theology (Cox, p. 14). Pentecostalism, thus, can be viewed as a modern form of Christian mysticism (Cox, p. 209). Of Pentecostalism's phenomenal growth Cox writes:

> It has succeeded because it has spoken to the spiritual emptiness of our time by reaching beyond the levels of creed and ceremony into the core of human religiousness, into what might be called "primal spirituality," that largely unprocessed nucleus of the psyche in which the unending struggle for a sense of

> purpose and significance goes on. Classical theologians have called it the "imago dei," the image of God in every person. (p. 81)

Cox identifies three dimensions of primal spirituality that characterize the Pentecostal movement in general, and Pentecostal services in particular. "Primal speech" is glossolalia, or "speaking in tongues." "Primary piety touches on the resurgence in Pentecostalism of trance, vision, healing, dreams, dance, and other archetypal religious expressions" (p. 82). "Primal hope" refers to Pentecostalism's eschatology, i.e., "its insistence that a radically new world age is about to dawn" (p. 82). Cox believes that primal spirituality is buried deep within all of us: "Pentecostalism is not an aberration. It is a part of the larger and longer history of human religiousness" (Cox, p. 83). Indeed, mysticism – the sense of experiencing God directly – is found to a greater or lesser degree in Christianity, Judaism, Hinduism, Buddhism and Islam (Cox, pp. 308-309).

The relative emphasis religions place on mysticism vs. creed provides a key insight into religious change today. Spong (1998, p. 4), an Anglican bishop, argues that the decline of mainline churches (e.g., Presbyterians, Lutherans, Methodists, Episcopalians) can be attributed in part to their emphasis on traditional creeds that modern, sophisticated individuals cannot accept. Spong advocates a more mystical, or experiential approach to Christianity when he writes:

> The God I know is not concrete or specific. This God is rather shrouded in mystery, wonder, and awe. The deeper I journey into this divine presence, the less any literalized phrases, including the phrases of the Christian creed, seem relevant. The God I know can only be pointed to; this God can never be enclosed by propositional statements. (p. 4)

Cimino and Lattin (1998) argue (p. 19) that growing interest in experiential spirituality is a global trend. Cimino and Lattin see a

> Rising interest in Eastern faiths like Buddhism, Taoism, Hinduism, and Sufism [as] part of the broader move toward experiential spirituality. . . . In the new millennium, many practitioners of Eastern meditation techniques will continue to see themselves as Christians, Jews, or “none of the above.” (p. 21)

Indeed, Catholic charismatics represent one of the fastest growing movements in Catholicism (Cimino and Lattin, p. 102).

The prominent role of women in Pentecostalism is a harbinger of things to come in religion. Cox argues:

> There can be no doubt that, for whatever reason, women have become the principal carriers of the fastest growing religious movement in the world. Eventually this is bound to have enormous cultural, political, and economic implications. There is considerable evidence that once women join pentecostal [*sic*] churches they learn skills they can utilize elsewhere. (p. 137)

Furthermore, Cox notes, Pentecostal women in both Latin America and the United States often consider family planning to be a Christian responsibility (p. 137). Women often play important roles in Pentecostal services (p. 133). For example, Aimee Semple McPherson, a Pentecostal media star of the 1920s and 1930s, was the founder of the International Church of the Foursquare Gospel, with 1,700,000 current members worldwide (p. 127).

Women are playing increasingly important roles in religion in general. Cimino and Lattin write, “Within mainline churches and synagogues, there is a strong feminist movement inspired by goddess literature actively promoting female imagery for God" (p. 34). Many religious feminists cite the first nine chapters of Proverbs to support the notion of Sophia, Greek for "wisdom," as a female representation of God[1] (Cimino and Lattin, p. 35). Cimino and Lattin write, "Women are already flooding into the ministry . . . . In mainline Protestant churches, the proportion of women clergy is rapidly approaching that of men. Women are also gaining a place in the pastorates in evangelical churches, especially in Pentecostal and charismatic congregations" (pp. 89-90). Despite the Vatican's prohibition of women from serving in the priesthood, "rising numbers of women enroll in Catholic seminaries. At the Franciscan School of Theology in Berkeley, for example, 40 percent of the students were women in the spring semester of 1997" (Cimino and Lattin, p. 90). Women are also playing increasing leadership roles in American Judaism and Buddhism (Cimino and Lattin, p. 90). Regarding Islam, Armstrong (1993, p. 158) writes, "Today Muslim feminists urge their menfolk to return to the original spirit of the Koran," which, Armstrong writes, emphasizes "the absolute moral and spiritual equality of the sexes."

Many so-called "megachurches" dotting the emerging religious landscape are Pentecostalist. The Yoido Full Gospel (Pentecostal) Church in Seoul, South Korea, with 800,000 members, is "the largest single Christian congregation on earth" (Cox, p. 219). In general, megachurches may have between several hundred to as many as 10,000 members. Megachurches of various denominations use sophisticated marketing techniques to increase membership. Such churches often offer a variety of amenities such as health clubs, primary and secondary education and day care centers. Like Pentecostalism's use of loud music, megachurches include contemporary music in their services. Many megachurches that are not formally affiliated with mainline denominations form their own network of satellite churches (Cimino and Lattin, pp. 55-58). Furthermore, members of megachurches will often form small Bible study groups that meet in members' homes. This is part of a larger trend among Americans who increasingly form such small theological groups (Cimino and Lattin, pp. 76-78). Cimino and Lattin write, "Megachurches embody the consumerism, eclecticism, and the conservatism shaping the religious future. They are the evangelical answer to Home Depot" (p. 56).

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[1] For example, see Proverbs 3:13-18.

Pentecostalism's emphasis on healing points to another trend related to religion: the increasing emphasis the Western medical community is placing on spirituality as a means to promote health (Cox, p. 108). Western corporations are increasingly promoting the spiritual and emotional needs of employees so as to reduce workplace stress (Cimino and Lattin, p. 36). Cimino and Lattin report, "Studies find prayer and congregation attendance have beneficial [health] effects. But meditation, and meditative varieties of prayer, seem to have the greatest effect" (p. 45).

Because Pentecostalism is growing so rapidly, it is worthwhile to note other salient characteristics of the Pentecostalist movement even though these characteristics do not necessarily represent overall trends in religion. Pentecostalism thrives among the urban poor: 87% of Pentecostalists live below the world poverty line (Cox, p. 119). Pentecostalists also tend not to be well-educated. This explains in part why glossolalia is so popular among Pentecostalists. As Cox writes, "Speaking in tongues allows less educated and less articulate people to express themselves without learning the proper phraseology the priests and pastors require" (p. 95).

Pentecostalism, like all religions and denominations, has internal conflicts. Yet as Cox writes, “One of the most astounding features of the movement is that it seems to thrive not only on opposition . . . but also on division. This is another reason for its growth. Wherever Pentecostalism goes it evokes both joy and anger, gratitude and rejection, polemic and schism” (p. 78). While Pentecostalism “is one of the least segregated forms of Christianity” (Cox, p. 150), a long standing division between many black and white Pentecostals began shortly after the movement was formed in Los Angeles in the early 20th century (Cox, p. 62). The movement is also divided along ideological and geopolitical lines. While the Pentecostal movement in North America is largely conservative, a Pentecostal form of liberation theology has developed in Latin America (Cox, pp. 294-295).

Cimino and Lattin list a number of other religious trends that are found in the scenarios. The Mormon Church is experiencing rapid growth in its membership (p. 86) and is becoming more ethnically diverse (p. 107). The boundary between psychology and religion is becoming less distinct, at least from the perspective of religion. For example, spiritual directors at many churches are beginning to charge fees for individual consultations. Although the decline in membership among mainline churches appears to be leveling off, liberal churches may continue to see membership losses. Growth studies show that churches that emphasize Christ as the only means to salvation have the highest growth potential (p. 59).

Regarding the relationship between church and state in the United States Cimino and Lattin maintain, “As evidence mounts that faith-based social services can be more effective than their secular counterparts, look for more cooperation between the state and religious organizations" (p. 169). Cimino and Lattin argue that, "The religious right that will gain a greater following in the future will be more accepting of religious and ethnic pluralism and fighting the local fight," by allying itself with Muslims and Orthodox Jews interested in promoting morality (p. 137). The religious left, in contrast, will remain small and less organized, especially if it continues to both simply react to the religious right and not adopt its own positive agenda (p. 140). However, some issues such as cloning and genetic engineering can bring these sorts of politically diverse religious groups together. "For example, a coalition formed to oppose the patenting of animals for biomedical purposes included organizations as diverse as the Southern Baptist Convention, the United Methodist Church, and the New Age environmental groups" (Cimino and Lattin, p. 155).

In short, the scenarios assume that while each of the current major world religions will share roughly the same relative proportion of the world population in 2050 that they do today, the major world religions are changing in profound ways. The scenarios also make many important assumptions about ETI, especially regarding the presumed format and content of the messages Earth might receive in the future.

Each scenario assumes that an extraterrestrial probe in interstellar space intercepts a message that has been sent from Earth toward another star. The probe, created by an ETI, responds to the message with its own transmission. The scenarios consider three possible responses by the probe: a simple existential message, a message indicating that ETI believes in God, and a message indicating that ETI does not believe in God.

Note that the scenarios assume that the reply is made through electronic contact with an artificially intelligent probe created by an ETI, not through direct physical contact with extraterrestrial beings themselves. While visitations by extraterrestrial beings to Earth play a prominent role in much science fiction, most members of the Search for Extraterrestrial Intelligence (SETI) community believe that direct physical contact with extraterrestrial beings is not likely. The limit of the speed of light combined with the enormous distances between stars make it much more likely that first contact with an ETI will be made through some form of electromagnetic communication such as radio or laser (Bracewell, 1975, p. 33; Dall'Acqua, 1988, p. 17). For purposes of the scenarios, the probe is assumed to be a robotic probe that communicates with Earth through radio transmissions.

It is important to understand the assumptions underlying the format of the messages sent between Earth and the probe, as the format of the messages limits the level of qualitative information (including information about religion) that can be contained in the transmissions. Ever since the pioneering work in interstellar communication theory in the early 1960s, most SETI scientists and mathematicians have agreed that any future electromagnetic communication with an ETI will likely occur using mathematics and science as the "language" of communication (Vakoch, 1998-a, p. 698). Both the 1999 Encounter 2001 transmissions and the 1974 National Astronomy and Ionosphere Center transmission from Arecibo, Puerto Rico used mathematical and scientific concepts to communicate information about Earth and humanity. Both transmissions used "pictograms" to convey the mathematical and scientific symbols that constituted the messages. The pictograms are constructed using a certain number of bits of information. As in computer science, the bits can be thought of in terms of "1's" and "0's." Transmitted across interstellar space, the pictograms are designed to be easily reconstructed by any ETI that might intercept the transmitted bits of “1’s” and “0’s.” When reconstructed, the pictograms form rectangular pictures in which mathematical and scientific symbols appear, as well as crude sketches.[2]

While the use of mathematical and scientific facts and formulas as an interstellar language necessarily limits the degree of qualitative information that can be included in interstellar transmissions, it is possible to convey at least some cultural information (including rudimentary information about basic religious beliefs) using mathematical and scientific symbols. In discussing the qualitative limitations of interstellar messages that rely on mathematics and science as the “language” of communication, Vakoch (1998-b) writes that “extraterrestrials might be able to convey aspects of their culture as abstract as their sense of beauty, all the while using the language of numbers and physical constants” (p. 24). The Encounter 2001 transmissions use a specially designed mathematical “alphabet” to represent mathematical and scientific concepts.[3] Each transmission begins by defining symbols that represent the digits 0 through 9. Then, using these digit symbols, symbols for the simple mathematical operators of addition, subtraction, multiplication, division and exponentiation are defined. This is followed by symbols for such mathematical constants as pi and the natural number e, symbols for unknown variables (such as “x”, “y” and “z”), and symbols for simple logical operators such as the negation symbol $\neg$ and the logical “and” symbol $\wedge$. Using these sorts of basic mathematical operators and constants, the message goes on to define other symbols and mathematical and scientific relationships, such as power, temperature, time and the concept of repeating decimals. Indeed, a total of twenty-three pictograms constitute the first of four scientific messages included in the Encounter 2001 transmissions.[4]

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[2] For both a more detailed description of how pictograms are constructed, and a comparison of the Encounter 2001 and Arecibo transmissions, see Appendix D, pp. 23-26, and a recent MSNBC article at http://www.msnbc.com/news/335961.asp The MSNBC article includes a pictogram from the Encounter 2001 transmission showing a sketch of a man and a woman.

Using these symbols – the Encounter 2001 mathematical "alphabet" – it is possible to create a symbol representing the concept of God. The notion of God's omnipotence could be represented by combining symbols representing "power" with "infinity." One could represent God's eternal existence by combining the "time" symbol with an "infinity" symbol. And one could represent God's omnipresence by using a three-dimensional vector equation where the coefficient of each vector component is an "infinity" symbol. Although the Encounter 2001 mathematical alphabet does not include a symbol for knowledge, it is conceivable that one could define such a symbol and combine it with an "infinity" symbol to represent God's omniscience. Having defined this "God symbol," one could, furthermore, illustrate the evolution of thought concerning God by using a timeline. (The atheistic scenarios refer to such an imagined theological timeline in the reply message sent by the ETI probe.) This imagined timeline begins with multiple "God symbols," representing ETI's supposed initial belief in polytheism. Then, only one "God symbol" appears, representing ETI's subsequent monotheistic belief. Finally, the "God symbol" is combined with the logical "not" operator $\neg$ to represent ETI's eventual atheism. Note that this imagined timeline in the atheistic scenarios assumes theological concurrence among the ETI population at any given time: everyone in the ETI society initially believes in the existence of many gods, then everyone believes that there is only one god, and finally everyone in the ETI society becomes an atheist. It

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[3] For examples of the characters in the Encounter 2001 mathematical alphabet, see Appendix D, p. 9.

[4] This student created one of the four scientific messages. Called the "Braastad Message", the message used the mathematical alphabet in the first scientific message to create three pictograms that together describe the Encounter 2001 spacecraft's planned trajectory, physical dimensions and payload.

is conceivable that, using such a mathematical alphabet one could provide a statistical breakdown of the ETI society showing the percentages of the ETI society that are polytheistic, monotheistic, and atheistic.

Finally, it should be noted that there is considerable disagreement within the SETI community as to the whether or not we can fairly assume that humanity's mathematics and science can be used as an effective means of communicating with an ETI. SETI scientists and mathematicians argue that the laws of science and mathematics are universal, and therefore suitable for interstellar communication. Critics, mostly philosophers interested in SETI, maintain that SETI scientists and mathematicians are ignoring the possibility that extraterrestrials may operate under a totally different scientific and even mathematical paradigm than humanity's (Vakoch, 1998-a, pp. 698-702). As Vakoch (1998-c) writes:

> Our models of the world – including scientific, religious, ideological, and artistic models – are influenced by the particular characteristics of our biological evolution, our cultural patterns, and the vicissitudes of history. To claim that we can anticipate with confidence which of these frameworks will be most commensurable across [interstellar] civilizations is unwarranted. (p. 707)

Vakoch offers two alternatives to the strictly mathematical/scientific approach to interstellar communication. One alternative entails the use of sending messages reflecting multiple perspectives (Vakoch, 1998-c, pp. 705-708). For example, by transmitting images of works of art, or even text, along with scientific and mathematical messages, we may give extraterrestrials a better chance to understand our transmissions. Vakoch also suggests the use of icons "in which there is a non-arbitrary, physical similarity between the sign and what it stands for . . .” (Vakoch, 1998-a, p. 702). For example, suppose one is interested in describing a chemical to extraterrestrials. The pictogram approach might entail drawing a Bohr model of an atom. It is possible that extraterrestrials would not understand the Bohr model approach to chemistry. Instead, Vakoch suggests varying the wavelength of the radio transmission to correspond with the emission lines of the chemical. “Thus,” Vakoch (1998-a) writes, “instead of transmitting a signal with an arbitrary structure, the structure of the signal would physically resemble the concept being conveyed” (p. 703).

The notion that contact with an ETI would pose grave consequences for Earth’s religions is a widely held belief within the SETI community (Alexander, 1994-a), and indeed was the main research impetus for this student to undertake this project. Davies (1995) offers perhaps a representative view of the SETI community when he writes:

> … It is hard to see how the world’s great religions could continue in anything like their present form should an alien message be received. . . . From the point of view of religion, it might be the case that the aliens had discarded theology and religious practice long ago as primitive superstition and would rapidly convince us to do the same. Alternatively, if they retained a spiritual aspect to their existence, we would have to concede that it was likely to have developed to a degree far ahead of our own. If they practised anything remotely like a religion, we should surely soon wish to abandon our own and be converted to theirs. (pp. 54-55)

Yet, as the remainder of this research summary will show, it appears unlikely that a message from space proclaiming extraterrestrial atheism or piety would cause the wholesale destruction of Earth's religions.

Several surveys show that, with the exception of evangelical/fundamentalist Christians, most clergy and lay people do not see possible future contact with extraterrestrials as posing a potential threat to their faiths. Bainbridge (1983) studied the attitudes of college students enrolled at the University of Washington in 1981 toward interstellar communication. Bainbridge (pp. 302-303) found that compared to Catholics, Jews, mainline Protestants and persons who are not religious, born-again Christians are more likely to oppose efforts to communicate with extraterrestrials.

Harrison (1997) discusses the findings of a survey conducted by Michael Ashkenazi of Israel's Ben Gurion University. Ashkenazi conducted interviews with twenty-one theologians, the majority of whom believe that extraterrestrials exist. Harrison writes, "Ashkenazi concludes that many of the world's great religions, including Buddhism, Hinduism, and the Chinese religious complex, either explicitly acknowledge the possibility of advanced life-forms elsewhere or at least do not make a sharp distinction between the human and nonhuman" (p. 297). Among Christians, a variety of responses to the discovery of an ETI are expected, "with the most fundamentalist and dogmatic sects reacting the most adversely" (p. 297).

Vakoch and Lee (1997) conducted a cross-cultural study of how Chinese and American college students might react to the reception of an extraterrestrial message. Vakoch and Lee found that more religious students are less likely to believe in the existence of an ETI than less religious students, and that "more anthropocentric students from both countries were also less open to the existence of extraterrestrial life than were their less human-centered counterparts" (p. 4). Religion and anthropocentrism also are related to whether one views extraterrestrials as benevolent or malevolent. Vakoch and Lee write, "*less* religious Americans were more likely to think that [an] ETI would be benevolent," and that among Chinese students, the less anthropocentric a student is, the more likely it is that the student will believe extraterrestrials are benevolent (p. 5).

Perhaps the most useful survey from the perspective of writing the scenarios is the 1994 Alexander UFO Religious Crisis Survey, sponsored by the Bigelow Foundation. The survey studied the attitudes among Catholic, Protestant and Jewish clergy in the continental United States toward possible future contact with an ETI. (Alexander, 1994-b) The survey's basic conclusion:

> is that religious leaders [do] not believe that their faith and the faith of their congregation would be challenged by contact with an advanced extraterrestrial civilization – one with or without a religion. According to many of the respondents, it would confirm God's glory as creator of the universe. (Alexander, 1994-a)

The particularly useful aspect of this survey for purposes of writing the scenarios is the large number of written comments made by survey respondents as reported in the survey's results. Several of these comments provided this student with arguments used in the scenarios. For example, in his feedback to the Alexander survey a Catholic priest in Pennsylvania questioned the commonly-held belief in the SETI community that technologically advanced extraterrestrials are therefore spiritually, morally and culturally advanced as well. A Protestant pastor in Ohio echoed these sentiments:

> I note that, somehow, an underlying assumption in [the survey] questions is that "advanced technology = morally/philosophically superior." Look around you . . . . Would you say our technology has made us better, or simply more likely to abuse ourselves, others and our environment with what we have discovered. No, an "advanced" society does not threaten me as a religious person. (Alexander, 1994-a)

Some fundamentalist clergy also appear to have responded to the Alexander survey. One survey respondent wrote:

> It is my belief that UFO sightings are spiritual apparitions emanating from demonic activity in these last days before the second coming of our Lord Jesus Christ. Any "Advanced extraterrestrial civilization" would be therefore angelic in nature. These angels represent both the good and the bad . . . . (Alexander, 1994-a)

There are a number of reasons why many fundamentalist Christians question the existence of an ETI. Bainbridge (1983) notes that there is a:

> . . . large body of literature suggesting that sectarian, conservative Protestants (but not necessarily Catholics) exhibit a general *xenophobia*, a hatred and fear of outsiders. For example, one famous study found that rejection of Jews was especially common in fundamentalist Protestant groups, among the same population that opposes [SETI]. . . . Members of fundamentalist Protestant groups tend to suffer a variety of social and economic deprivations, and they vehemently assert their religious righteousness as a balm for their bruised self-esteem. Aliens, whether Jews [or] ETs, may thus be disvalued as a way of

> elevating the subjective status of the fundamentalist who claims that only his kind of people are truly exalted. (p. 303)

Rhodes (1998, pp. 37-39) sees the existence of an ETI as a threat to the uniqueness of humanity. As Rhodes argues, "The centrality of the Earth is . . . evident in the creation account, for God created the Earth *before* He created the rest of the planets and stars . . ." (p. 39). Indeed, Barbour (1997) writes that "the defensive reaction to Copernican astronomy [by the contemporary church] was not unlike the reaction to the threat to human dignity in evolution or to recent speculation about intelligent life on other planets. In each case human uniqueness was cast in doubt" (p. 32).

Christian fundamentalists may also see SETI as a competing religion. Rhodes (1998) writes that SETI supporters such as Carl Sagan and Frank White have viewed the possibility of establishing contact with an ETI as a way to provide meaning for humanity's existence. Rhodes argues instead that "True meaning, of course, can only be found in a relationship with the living God . . ." (p. 36). Indeed, Rhodes writes that at least some Christians believe "that one goal of Satan as we draw deeper into the end times may be to supernaturally stage or mimic an actual landing of an 'alien' spacecraft, or perhaps supernaturally broadcast a message to earth from 'aliens' in deep space" (p. 35).

Christian fundamentalists appear to be correct in suspecting that SETI has become something of a religion. Davies (1995) writes of the quasi-religious nature of SETI:

> Today a separation is usually made between belief in extraterrestrial life forms and belief in supernatural or religious entities – i.e., between aliens and angels. Yet it was not always thus. For most of human history the "heavens" were

> literally that: the domain of the gods. Beings who inhabited the realm beyond the Earth were normally regarded as supernatural. In spite of the fact that ET is now firmly in the domain of science, or at least science fiction, the religious dimension of SETI still lies just beneath the surface. Many people draw comfort from the belief that advanced beings in the sky are watching over us and may some day intervene in our affairs to save us from human folly. (p. 131)

Dick (1998) agrees:

> It may … be that, as a search for superior beings, the quest for extraterrestrial intelligence is itself a kind of religion. Even [philosopher Roland] Puccetti argued that if extraterrestrials doomed religions, the religious attitude – the striving for "otherness," for something beyond the individual that offers understanding and love – might survive . . . . It may be that religion in a universal sense is defined as the never-ending search of each civilization for others more superior than itself. (p. 253)

Furthermore, the notion of SETI as a quasi-religion can be seen in a larger social context where technology in general has become a *de facto* religion. Hall (1997) argues that the intelligentsia long ago gave up religious faith only to experience a void that was eventually replaced by a belief in progress. Yet, as Hall writes:

> The Religion of Progress, in its demise, has [also] left a conspicuous vacuum, and there are strong withdrawal symptoms. The quasi-religious manner in which many, even among the intelligentsia, approach the computer and other marvels of communication indicates how difficult it is to let go of that religion and to face the void that letting go leaves. (p. 64)

It seems Sartre's "God-shaped hole in the human consciousness, where God had always been" (Armstrong, 1993, p. 378) must be filled by some sort of belief system.

It seems best not to rely exclusively on results from surveys that have respondents consider how they might react in future hypothetical situations. As Vakoch and Lee (1997) perceptively note "it is not clear to what extent self-reports about likely responses to news that [an extraterrestrial] message has been received will correspond to real responses at some future date" (p. 7). Therefore, to better understand how major religions might react to a message from an ETI it is useful to consider the religions themselves, including their current and past cosmological beliefs and debates.

Although religions such as Buddhism and Jainism accept the possible existence of extraterrestrials (Guthke, 1983/1990, pp. 3, 17), Christianity is unique among the major world religions in the degree to which followers of this religion have engaged in speculation about the existence of sentient beings in outer space. Dick (1998) writes:

> . . . Lacking a more explicit discussion of the [extraterrestrial existence] problem by practitioners, the attitudes of many religions have had to be deduced by others from the general doctrines of those religions. The major exception has been Christianity, where the doctrine of Incarnation has been a central focus of discussion and where the consensus has been that a discovery of intelligence beyond the Earth would not prove fatal to the religion or its theology. In general, for Christians as well as for other religions, indigenous theologians see little problem, while those external to religion proclaim the fatal impact of extraterrestrials on Earth-bound theologies. (p. 247)

Islam provides a good example of this relatively low level of astrotheological speculation by non-Christian theologians. Armstrong (1993) writes “the Koran is highly suspicious of theological speculation, dismissing it as *zanna*, self-indulgent guesswork about things that nobody can possibly know or prove” (p. 143). Indeed, in a telephone interview, Dr. Mazhar Kazi of the Islamic Society of Greater Houston said that speculation concerning the existence of extraterrestrials and the resulting impact on Islam is outside the purview of Islam. As in other religions, Muslims believe angels live in the heavens, but there is no significant Islamic thought concerning the existence of sentient beings such as ourselves living in other parts of space (M. Kazi, personal communication, November, 1999).

Speculation concerning the existence of extraterrestrials, and the religious implications of their possible existence, has a long history in western culture. Between the time of ancient Greece and 1917 over one hundred and forty books were written concerning what was historically called the “plurality of worlds” (Crowe, 1986, p. xiii). The atomists of ancient Greece believed in the existence of multiple *kosmoi* – basically, universes (Dick, 1982, p. 2). Aristotle disagreed, arguing instead that Earth is the only inhabited planet (Dick, 1982, pp. 12-19). Thomas Aquinas, who synthesized Aristotelian science with Christianity, also argued that there are no other inhabited worlds in the universe (Dick, 1982, pp. 25-27). In 1600 the Roman Inquisition burned a former Dominican monk, Giordano Bruno, at the stake in part for his heretical belief that, contrary to the church-sanctioned cosmology of Aquinas and Aristotle, there are planets orbiting other stars in the universe (Dick, 1982, p. 69). Philip Melanchthon, a prominent sixteenth-century German theologian and close friend of Martin Luther, raised many of the theological questions that would surface repeatedly in subsequent debates concerning the plurality of worlds. Dick (1982) summarizes Melanchthon's objections to the plurality of worlds concept. Melanchthon saw in this idea

> . . . grave implications for certain Church doctrines such as Redemption, Incarnation, and the implied one-to-one relationship between man and his Creator. If there were indeed intelligent beings on the moon or planets, would they be "men" and would they be tainted with Adam's sin? If so, had they been redeemed by Jesus Christ, or were they still in need of Redemption? If not, might they not need to be redeemed in the future, and by whom? Was Jesus Christ to be seen as a planet-hopping Savior in the new cosmology? Moreover, extraterrestrial inhabitants were nowhere to be found in the pages of Scripture. (p. 89)

The plurality of worlds debate continued through the end of the nineteenth century, influencing many authors, poets, and politicians. Crowe (1986) writes, "About three-fourths of the most prolific astronomers and nearly half of the most prominent intellectuals of the eighteenth and nineteenth centuries contributed to the debate" (p. 547). Among these were Benjamin Franklin, John Adams, Charles Darwin, William James and Immanuel Kant (Crowe, 1986, pp. 107-116, 223-238). Literary figures such as Tennyson, Byron, Shelley, and Wordsworth believed in the existence of extraterrestrials (Crowe, 1986, pp. 169-170, 232). Both Walt Whitman and Mark Twain (Crowe, 1986, p. 446) were pluralists, as was Friedrich Engels (Crowe, 1986, pp. 425-426).

Preceding by over a century Orson Welles' famous 1938 broadcast of *The War of the Worlds*, the "Great Moon Hoax of 1835" illustrates how pervasive the belief in the existence of extraterrestrials was among the general population of the western world in the nineteenth century. An American journalist, Richard A. Locke, wrote a series of reports in the New York *Sun* concerning the alleged discovery by astronomer Sir John Herschel of “vegetation, animals, and (winged) humans on the moon” (Guthke, 1990, p. 326). “So fascinated were New Yorkers by [the first article, which was published August 25, 1835] that they purchased over nineteen thousand copies of the August 26 *Sun*, giving it the largest circulation of any paper on this planet” Crowe (1986) writes (p. 210). Of course, the reports were eventually shown to be fictional. However, while Locke had meant the reports to serve as a satirical attack on the works of a prominent contemporary proponent of pluralism, his reports were instead labeled a hoax. “The ultimate irony,” Crowe (1986) writes, “is that Locke’s satire failed. He had underestimated the gullibility of a generation raised on the pluralist writings” of the day (p. 215).

Given the widespread belief in pluralism in the eighteenth and nineteenth centuries, it is perhaps not surprising that two Christian denominations founded in the United States during this period included belief in extraterrestrials as part of their doctrine. The founders of the Seventh Day Adventist Church were pluralists. Most prominent among them was Ellen G. Harmon (1827-1915), “a prolific writer of articles and books in which she developed the doctrines of the Adventists” (Crowe, 1986, p. 240). Among her beliefs was that the planet Saturn is inhabited by a sinless race of people, and, “that the Orion nebula is the opening through which Christ will return for his second coming” (Crowe, 1986, p. 239). Joseph Smith, the founder of the Church of Jesus Christ of Latter-day Saints, was also a pluralist. Although pluralist themes do not appear in the *Book of Mormon*, they do appear in two later Mormon works that serve as important sources of Mormon theology. *The Doctrine and Covenants* (first published in 1835) and *The Pearl of Great Price* (first published in 1851) “contain many statements in support of a plurality of worlds” (Crowe, 1986, p. 242). Other famous Mormons, such as Parley P. Pratt and Brigham Young, were pluralists as well. “Pluralist themes even appear in traditional [Mormon] hymns . . . still sung by Latter-day Saints” (Crowe, 1986, p. 244).

The history of the plurality of worlds debate can provide clues as to how future theologians and lay people might react to the discovery of an ETI. Despite the acceptance of pluralism by many nineteenth-century Christians such as the Mormons and Seventh Day Adventists, it is important to note that many contemporary Christians still resisted the idea. Furthermore, it is significant to note that the theological debate over pluralism never could be drawn along purely denominational lines. As Crowe (1986) writes

> Among the most remarkable features of the religious phase of the pluralist controversy is the degree to which it may be characterized as a night fight in which participants could not distinguish friend from foe until close combat commenced. Allies in a dozen conflicts, authors agreeing on a hundred issues, disagreed on extraterrestrial life. (p. 558)

Shortly after the beginning of the twentieth century pluralism lost the respectability it had had for centuries. Belief in the possible existence of extraterrestrial life did not regain significant respect until the 1950s (Guthke, 1990, p. 5). Certainly the modern religious community does not treat the issue as seriously as it historically did. Thus, in thinking about how future theologians and lay people might react to the discovery of an ETI, it may be helpful to supplement the results of modern surveys with the substantial history of the plurality of worlds debate. Indeed, many of the sorts of questions raised by Melanchthon appear in the scenarios.

In imagining how religions might – or might not – change as a result of an extraterrestrial message, it is also useful to consider some of the general characteristics of religion and of religious change. Religion is an integral part of humanity: It is not something that can be easily expunged from the human psyche. Armstrong (1993) writes "my study of the history of religion has revealed that human beings are spiritual animals. Indeed, there is a case for arguing that *Homo sapiens* is also *Homo religiosus*" (p. xix). Armstrong also writes that while Paul Tillich, a prominent twentieth-century Protestant theologian,

> . . . was convinced that the personal God of traditional Western theism must go, . . . he also believed that religion was necessary for humankind. A deep-rooted anxiety is part of the human condition . . . . We constantly fear loss and the terror of extinction, as we watch our bodies gradually but inexorably decay. (Armstrong, 1993, p. 382)

Religions are also quite resilient and capable of adapting to new circumstances. "Throughout history," Armstrong writes, "people have discarded a conception of God when it no longer works for them" and replaced it with another (p. 356). In discussing religious change, Barbour (1997) distinguishes between the core beliefs and the peripheral beliefs of religion. For example, core beliefs in Christianity include belief in God as a source of creative love, and that God was revealed to humanity through Christ. The notion that God is omnipotent, however, is a peripheral belief according to Barbour (pp. 132-134). Seemingly answering one of Melanchthon's questions, Murphy (1996) provides an excellent example of how Christianity might preserve its core belief in the incarnation of Jesus should we receive a religious message from extraterrestrials indicating an extraterrestrial belief in a similar divine incarnation. “The hypothesis of other savior-revealer figures in other parts of the universe does not refute strong claims for the significance of Jesus,” Murphy writes, “but it would call for a re-examination of the language in which those claims are stated” (p. 1029).

Not only are the core beliefs of religions unlikely to be challenged by an extraterrestrial message, but also the quintessential core belief of most religions – that God exists – seems immune to whatever future extraterrestrial – or terrestrial – arguments may be proffered. The very notion of God’s existence transcends reason. Armstrong (1993) likens religion to art or music (p. 379, 306): it is not something that can be either verified or denied through the use of reason alone (p. 379). Armstrong seems to agree with Augustine that, “God . . . [is] not an objective reality [subject to logical analysis] but a spiritual presence in the complex depths of the self. Augustine shared this insight not only with Plato and Plotinus but also with Buddhists, Hindus and Shamans in the nontheistic religions” (Armstrong, p. 121). Armstrong lays the blame for the notion that reason alone can prove the existence of God at the feet of post-Reformation theologians who focused on Thomas Aquinas’ famous arguments for the existence of God while ignoring Aquinas’ belief that his

> . . . philosophical arguments bore no relation to the mystical God he had experienced in prayer. But by the beginning of the seventeenth century, leading

> theologians and churchmen continued to argue the existence of God on entirely rational grounds. Many have continued to do so to the present day.[5] (p. 291)

Furthermore, this reliance on reason alone, “would ultimately enable the new ‘atheists’ of the late eighteenth and early nineteenth centuries to get rid of God altogether” (Armstrong, p. 291).

Yet despite the forecasts made by many philosophers and intellectuals of the 1950s and 1960s, religion is alive and well. Indeed, as demonstrated above, the Christian Pentecostal movement is growing not *because* of reason, but *in spite of* reason. As Armstrong writes “it is far more important for a particular idea of God to *work* than for it to be logically or scientifically sound. As soon as it ceases to be effective it will be changed – sometimes for something radically different” (p. xxi). Despite the continued advancement of science and technology – nurtured through the use of reason – at the dawn of the new millennium the primal spirituality of *Homo religiosus* appears to have a bright future.

Finally, it is useful to consider the encounter between white European explorers from the Old World with the native Indians of the New World as an analogue to a possible future encounter between Earth and an extraterrestrial civilization. Josephy (1961) writes of the encounter between the Spanish conquistadors and the Indians of Latin America:

> On the one hand the communal outlook [of the Indians] produced attitudes toward cooperation and group identity that were reflected in some measure in every

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[5] An excellent example is provided by Dr. Hugh Ross, an astronomer and popular evangelical preacher who employs a modern version of Aquinas’ “argument from design.” Ross uses astronomical facts to argue not only for the existence of God, but also for the belief that Earth is the only location in the universe where sentient beings can exist (Ross, 1995, pp. 131-145).

> gesture of Indian existence, from practical jokery to religion. On the other hand the ingrained custom of personal acquisition at the expense of one's neighbors, of striving in constant competition against each other, colored every aspect of European thought. . . . These two world views, each never dreaming of the other's existence, had really created two totally different worlds. (p. 108)

Despite the fact that the Europeans had a vastly superior technological civilization, the Indians were loath to give up their religion. In fact, the Spanish priests complained "that the Indians could not be taught and converted unless they were forced into congregations" (Josephy, p. 80). Note that the encounter between the Europeans and Indians was a direct physical encounter.

Imagine, however, a closer hypothetical analogue to the nonphysical Earth/ETI encounters envisioned in the scenarios. Imagine a fifteenth-century Native American Indian walking along the shore of the Atlantic Ocean. Like a future radio astronomer who is extremely lucky enough to discover an extraterrestrial radio message that has traveled through the immense distances of interstellar space, the Indian perchance finds a message in a bottle that has washed upon the shore, having made its journey across the Atlantic Ocean. The Indian opens the bottle and examines the message, just as the supposed future radio astronomer attempts to decipher the message from an ETI. Assuming the Indian can read – admittedly a big assumption – and eventually succeeds in translating the message – written with the strange symbols of a European alphabet – the Indian begins to learn something of the alien life forms that live on the other side of the ocean.

The Indian learns that the aliens have a society that has a vastly superior technology, and is otherwise totally different from the Indian way of life. The aliens are white men who ride four-legged creatures called "horses." The white men don't use bows and arrows. Instead they carry what the Indian might refer to as "fire sticks" that produce fire and smoke, and magically kill game (and other white men!) at great distances. The white men have even bigger instruments, called cannons, that can kill much game (or many white men!) with just one shot. The aliens also have the totally bizarre custom of owning property – a custom that the Indian finds positively revolting. In addition to all of these – and other – strange customs and practices, the white men believe in a religion called "Christianity."

Given the actual Indian resistance to the religion of the white man's "superior" culture in the historical physical encounter between the Old and New Worlds, does it really seem plausible that the hypothetical fifteenth-century Indian who discovers the message in a bottle would, upon translating the message, thereupon abandon his religious beliefs, fall to his knees, and begin praying to the Virgin Mary?

CONCLUSIONS AND SUGGESTIONS FOR FURTHER RESEARCH

Despite forecasts made in the 1950s and 1960s that religion would decline with the advance of science, religion appears to have a bright future at the dawn of the new millennium. Quantitative forecasts show that the major world religions should maintain their relative proportions of the world population for the foreseeable future. A significant factor in the revitalization of religion – especially of Christianity – is the shift in emphasis from theology and doctrine to primal spirituality and religious experience. The rapidly growing Pentecostal movement and the successful Catholic charismatic movement provide excellent examples of this trend. In contrast, the decline of mainline churches can be explained in part by their continued relative emphasis on creeds and religious dogma. Other significant trends in religion include the growing role of female clergy, the growth of megachurches, and the increasing political activity by conservative churches in American politics.

Although extraterrestrial communication theory allows for the transmission of rudimentary religious information (such as belief in God) across interstellar space, there are limits to the level of theological detail that can theoretically be included in interstellar transmissions with any hope of effective communication with an ETI. While it is possible to use mathematical and scientific symbols to represent the concept of God, many in the SETI community – especially philosophers interested in SETI – question the assumption that humanity's mathematical and scientific paradigms are valid for extraterrestrial civilizations.

Contrary to the views of most in the SETI community, the receipt of an extraterrestrial message should not spell the doom of Earthly religions. One may expect some religions may change some of their peripheral beliefs, or at least alter their liturgies and other religious language. But both recent surveys of clergy and laity, and study of the major religions themselves indicate that the core beliefs of the major world religions would not be threatened by future communication with an ETI. This conclusion is bolstered by consideration of the general characteristics of religion, such as the resiliency and adaptability of religious faith, and the intrinsic role of religion in humanity. Indeed, the SETI movement itself can be viewed as a quasi-religion.

The twelve scenarios in this project forecast how Islam, Christianity and Hinduism may react to the discovery of various ETI transmissions. Even under radically different social backgrounds – from an aging world population, to a growing disparity between the world's rich and poor, to continued environmental degradation resulting from such factors as deforestation, the fall of aquifers and the use of genetically modified crops – the scenarios forecast that the receipt of an extraterrestrial message would have little effect on the major world religions.

Hinduism provides an excellent example of this forecast of what amounts to theological indifference to the receipt of an ETI transmission. One of the oldest religions, Hinduism can be viewed as a theological umbrella under which a wide variety of theological beliefs reside. It is difficult to compare the monotheistic religions of Judaism, Christianity and Islam with Hinduism, which has over three hundred and thirty million gods and goddesses. On the other hand, many Hindus do not believe in the existence of even a single god (Kanitkar and Cole, 1995, p. 44). Given Hinduism's historical and philosophical spirit of toleration of various religious beliefs, and its sheer historical longevity, it is difficult to imagine any scenario in which Hinduism might find its theological existence in peril. Indeed, in all three Hindu scenarios the hypothetical guru sees the ETI message – the simple existential message in Scenario 10, the message indicating the ETI's belief in God in Scenario 11, and Scenario 12's atheistic message – as confirming essential Hindu beliefs.

The one notable exception to this global theological concurrence about extraterrestrials can be found in Christianity, which has a long history of debate concerning the existence – and theological significance – of extraterrestrials. While most Christian theologians do not view the possible existence of extraterrestrials as a threat to core Christian beliefs, many Christian fundamentalists provide a modern manifestation of the plurality of worlds debate that persisted for centuries in the western church.

It is not difficult to conceive of other opportunities for academic research related to the impact of ETI messages on world religions. As one might expect given Christianity's unique role among the world religions in speculation concerning the existence of an ETI, most of the surveys I found focused primarily on how Christians might react to the discovery of an encounter with an ETI. It would be very interesting to see how Muslim, Hindu, and Buddhist clergy and laity respond to surveys concerning extraterrestrial intelligence. However, there is still much room for survey research within Christianity. For example, it would be interesting to determine if Christian attitudes toward the possible existence of an ETI differ among the many Christian denominations – and among divisions within denominations. Given the pluralist philosophies of the founders of both the Seventh Day Adventist Church and the Mormon Church, it would be especially interesting to compare attitudes toward the possible existence of an ETI of these two Christian denominations with other denominations.

Other fertile fields for academic research include exploring the parallels between the theological issues raised by the possible existence of an ETI with the theological issues raised by the future development of artificial intelligence. A study of science fiction works such as *Star Trek* and *2001: A Space Odyssey* would likely prove insightful.

Religious futurists with special expertise in Eastern religions could engage in more in-depth analysis of how Hindus and Buddhists might react to the discovery of an ETI. And anthropologists familiar with the historical interaction between technologically advanced Europeans and the native peoples of Africa, the Pacific Islands, Australia and the New World might provide greater insight into how a technologically advanced extraterrestrial civilization might – or might not – influence Earth's religions.

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