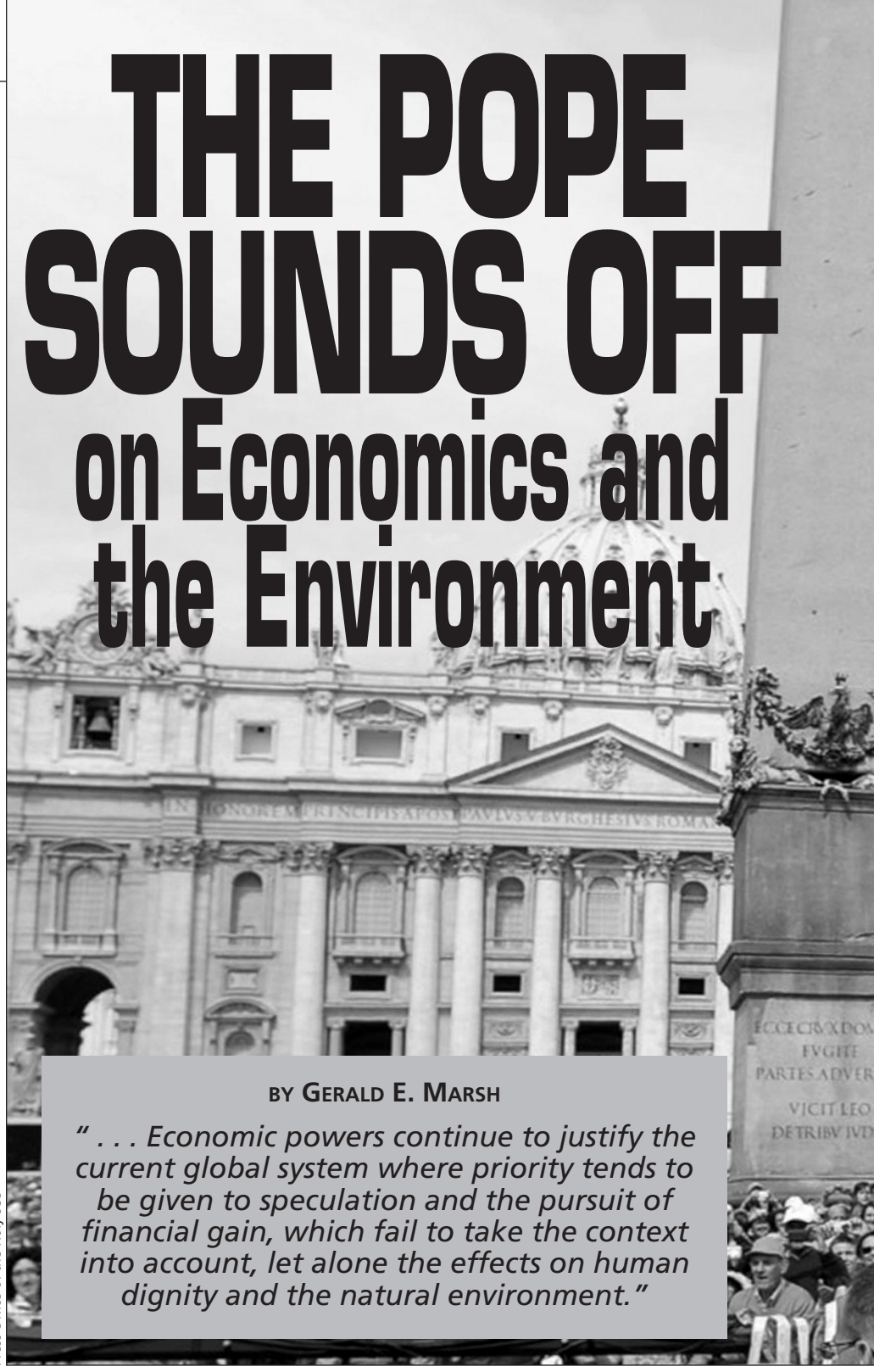
THE POPE SOUNDS OFF on Economics and the Environment



Press Office of the Holy See

BY GERALD E. MARSH

" . . . Economic powers continue to justify the current global system where priority tends to be given to speculation and the pursuit of financial gain, which fail to take the context into account, let alone the effects on human dignity and the natural environment."

POPE FRANCIS' encyclical Laudato Si' generally has been characterized as being an environmental call to arms, but it is far more than simply a defense of the environment. It maintains that the "basic problem" underlying environmental degradation is "the way that humanity has taken up technology and its development according to an undifferentiated and one-dimensional paradigm," or what he calls "the technocratic paradigm." It is a strong and heartfelt critique of the existing socioeconomic system.

Quoting his 2013 apostolic exhortation Evangelii Gaudium, Pope Francis states that "economic powers continue to justify the current global system where priority tends to be given to speculation and the pursuit of financial gain, which fail to take the context into account, let alone the effects on human dignity and the natural environment. Here we see how environmental deterioration and human and ethical degradation are closely linked. Many people will deny doing anything wrong because distractions constantly dull our consciousness of just how limited and finite our world really is. As a result, whatever is fragile, like the environment, is defenseless before the interests of a deified market, which becomes the only rule."

There perhaps are some surprises in this encyclical with regard to biological evolution and genetic engineering: the encyclical contrasts the speed with which human activity has progressed with "the naturally slow pace of biological evolution." In the context of the new biological technologies, Pope Francis tells us: "Here I would recall the balanced position of Saint John Paul II, who stressed the benefits of scientific and technological progress as evidence of 'the nobility of the human vocation to participate responsibly in God's creative action,' while also noting that 'we cannot interfere in one area of the ecosystem without paying due attention to the consequences of such interference in other areas.' "

Pope Francis makes it clear that the Church values the benefits which result "from the study and applications of molecular biology, supplemented by other disciplines such as genetics, and its technological application in agriculture and industry." However, he also points out that this should not lead to "indiscriminate genetic manipulation," which ignores the negative effects of such interventions. "Human creativity cannot be suppressed. If an artist cannot be stopped from using his or her creativity, neither should those who possess particular gifts for the advancement of science and technology be prevented from using their God-given talents for the service of others. We need constantly to rethink the goals, effects, overall context, and ethical limits of this human activity, which is a form of power involving considerable risks."

This power is not new and, to give a historical perspective, Pope Francis clearly states that genetic manipulation has been used for thousands of years: "Genetic mutations, in fact, have often been, and continue to be, caused by nature itself—nor are mutations caused by human intervention a modern phenomenon. The domestication of animals, the crossbreeding of species, and other older and universally accepted practices can be mentioned as examples."

Given that these new biological technologies include the ability to do genome editing, these indeed are very enlightened views. However, the caution expressed by Pope Francis already is a matter of concern in the scientific community.

Researcher David Baltimore, for instance, states in *Science*: "Genome engineering technology offers unparalleled potential for modifying human and nonhuman genomes. In humans, it holds the promise of curing genetic disease, while in other organisms it provides methods to reshape the biosphere for the benefit of the environment and human societies. However, with such enormous opportunities come unknown risks to human health and well-being."

In response, Robert Pollack, professor of biological sciences at Columbia University, in a subsequent issue of *Science*, says that the authors of the review "call for the convening of a 'globally representative group of devel-

opers and users of genome engineering technology and experts in genetics, law, and bioethics, as well as members of the scientific community, the public, and relevant government agencies and interest groups, to further consider these important issues, and where appropriate, recommend policies.'

"That simply will not do. This opening to germline modification is, simply put, the opening of a return to the agenda of eugenics: the positive selection of 'good' versions of the human genome and the weeding out of 'bad' versions, not just for the health of an individual, but for the future of the species. I do not think their call is sufficient. Even in its inadequacy, I doubt it will be heeded by the six private corporations that are listed in the paper as supporting their research, nor by the universities listed as holding their patents on continuing CRISPR/Cas9 research."

Perhaps a little humility would be of value here with regard to who should be involved in the discussion. Pope Francis addresses the limitations of the scientific world view when he says, "It cannot be maintained that empirical science provides a complete explanation of life, the interplay of all creatures, and the whole of reality. This would be to breach the limits imposed by its own methodology. If we reason only within the confines of the latter, little room would be left for aesthetic sensibility, poetry, or even reason's ability to grasp the ultimate meaning and purpose of things. . . . It would be quite simplistic to think that ethical principles present themselves purely in the abstract, detached from any context—nor does the fact that they may be couched in religious language detract from their value in public debate. The ethical principles capable of being apprehended by reason can always reappear in different guise and find expression in a variety of languages, including religious language."

Turning now to the environmental aspects of the encyclical, contrary to what often is claimed, Pope Francis does not maintain that global warming is the primary cause of current and future degradation of the environment. What he actually says on this subject is that "a very solid scientific consensus indicates that we are presently witnessing a disturbing warming of the climate system . . . even if a scientifically determinable cause cannot be assigned to each particular phenomenon. Humanity is called to recognize the need for changes of lifestyle, production, and consumption in order to combat this warming or at least the human causes, which produce or aggravate it. It is true that there are other factors . . . yet a number of scientific studies indicate that most global warming in recent decades is due to the great concentration of greenhouse gases . . . released mainly as a result of human activity." The phrase "at least the human causes, which produce or aggravate it" leaves a great deal of latitude in the sensitivity of climate to increases in carbon dioxide concentrations resulting from human activities.

The scientific studies that the Pope refers to is research that depends on various climate models upon which all projections of future climate are based. He perhaps is unaware that the projections of temperature rise given by these models differ amongst themselves by far more than the less than 1°C rise observed over the last few decades. What this shows is that model projections do not constitute an adequate foundation for public policy decisions. To deal with this disparity, the various model projections are averaged, a procedure that climate researchers themselves have found to be mathematically illegitimate. It also should be noted that natural global temperature variations over the last few thousand years far exceed the current small observed temperature rise.

While the dire predictions from those who worry about global warming may be exaggerated, it nevertheless is true that the continued burning of fossil fuels ultimately could have a significant effect on climate. Over the Phanerozoic eon—the last 570,000,000 years—carbon dioxide concentrations below 500 ppmv (parts per million by volume) are associated with the two longest-lasting glaciations of the earth. One occurred during the Permo-Carboniferous, some 300,000,000 years ago,

and the other during the Cenozoic era, in which we now are living. Cool climates are found to be associated with carbon dioxide concentrations below 1,000 ppmv, while no cool periods have been associated with concentrations above 1,000 ppmv. Current concentration is about 400 ppmv, so continued burning of fossil fuels might have an upside. We are approaching the end of an interglacial period, and higher carbon dioxide concentration might be good rather than bad, because it may moderate the slide into a new ice age over the next few thousand years.

Laudato Si' also discusses the fundamental conflict between economic growth and environmental sustainability. Pope Francis makes it clear that anything that would reverse current trends and set the stage for solving the worldwide problems we are facing in the 21st century would constitute nothing less than a multifaceted socioeconomic revolution on a global scale.

In his view, "many problems of today's world stem from the tendency, at times unconscious, to make the method and aims of science and technology an epistemological paradigm which shapes the lives of individuals and the workings of society. The effects of imposing this model on reality as a whole, human and social, are seen in the deterioration of the environment, but this is just one sign of a reductionism which affects every aspect of human and social life." This technocratic paradigm "also tends to dominate economic and political life," and he warns that "politics must not be subject to the economy, nor should the economy be subject to the dictates of an efficiency-driven paradigm of technocracy."

He also has no sympathy with the claim that "current economics and technology will solve all environmental problems [as well as] the problems of global hunger and poverty . . . simply by market growth." Those who believe market growth is the solution to these problems show "no interest in more balanced levels of production, a better distribution of wealth, concern for the environment, and the rights of future generations. Their behavior shows that for them maximizing profits is enough. Yet by itself the market cannot guarantee integral human development and social inclusion."

The unpleasant fact is that the current socioeconomic model will not be able to deliver a decent standard of living in the face of advanced automation, distribution, and off-shoring. This means the current trend of increasing the concentration of wealth in a small fraction of the population will continue, and is likely to lead to significant social unrest and conflict during the remainder of this century. Pope Francis is not alone in believing that we need a new economic model.

In the advanced economies, it might be possible, at least temporarily, to rescue the current economic model if appropriate measures are taken. Much of what Thomas Piketty says when speaking about Europe in *Capital in the Twenty-First Century* would be relevant for the U.S.: "When we look at all the available data today, what is most striking is that national wealth in Europe has never been so high. To be sure, net public wealth is virtually zero, given the size of the public debt, but net private wealth is so high that the sum of the two is as great as it has been in a century. Hence the idea that we are about to bequeath a shameful burden of debt to our children and grandchildren and that we ought to wear sackcloth and ashes and beg for forgiveness simply makes no sense. The nations of Europe have never been so rich. What is true and shameful, on the other hand, is that this vast national wealth is very unequally distributed. Private wealth rests on public poverty, and one particularly unfortunate consequence of this is that we currently spend far more in interest on the debt than we invest in higher education. This has been true, moreover, for a very long time: because growth has been fairly slow since 1970, we are in a period of history in which debt weighs very heavily on our public finances. This is the main reason why the debt must be reduced as quickly as possible, ideally by means of a progressive one-time tax on private capital or, failing that, by inflation. In any event, the decision should be made by a sovereign parliament after democratic debate."

Such action would reduce the inequality that Piketty argues is inevitable in the capitalist model when the rate of return on capital exceeds the growth rate of the economy. Globally, a tax on capital would be almost impossible to implement under current world conditions —nor would it be likely that the influence of special interests could be countered easily.

Population problems

The challenges before us in the 21st century primarily result from uncontrolled population growth (from 1990-2010, world population increased by some 30%) coupled with our inability to change our basic nature or the world's socioeconomic structures fast enough to accommodate the increasing population.

The Pope cannot accept the idea of reducing the birth rate and argues: "To blame population growth instead of extreme and selective consumerism on the part of some, is one way of refusing to face the issues. It is an attempt to legitimize the present model of distribution, where a minority believes that it has the right to consume in a way which can never be universalized, since the planet could not even contain the waste products of such consumption." However, to have a better distribution of goods without growth simply would socialize poverty.

The conditions under which people in any society actually live depends on the technology of the time—using "technology" in its broadest sense—and the economic structure that determines how wealth is shared. All wealth is, in the end, based on agriculture; the more efficient the agriculture, the more people are freed to do other things.

A given type of agriculture only can feed so many people per acre. The small-plot farming still practiced throughout much of the world is very limited in the population it can support: the small holdings make it economically difficult to employ anything other than human and animal labor, and good roads and food-storage facilities generally are absent or very limited. The introduction by the developed world of basic sanitation and medical practice into the developing world, without compensating changes in cultural norms, has led to a rapid and unsustainable increase in population. Even in much of Africa or countries like India or China, where poor sanitation and quality of drinking water often lead to the spread of parasites and disease, the population has increased beyond what current agricultural practice can support.

Today, we face a looming, serious crisis. Unless a massive, coordinated, worldwide reform is undertaken, the conditions under which humanity lives is going to deteriorate dramatically over the next 40 years or so. The global population is projected to reach some 9,000,000,000 by 2050. There currently is no hope of providing a decent standard of living in 2050 for even the majority of people unless the non-Western world resolves its problem of poor governance, changes its agricultural practices, and invests massively in food science and production, energy sources, and international regulatory structures. Our current economic and political structures, both in the West and globally, are not up to the task.

Some believe that advances in agriculture and technology alone will solve the problem, but the real question is whether such advances and their worldwide implementation can outpace population growth so that living standards actually increase for the poor. If not, population growth in the underdeveloped world indeed will moderate, but by the usual means: war, famine, and disease, from which the rest of the world will not necessarily be immune.

The world is fully capable of supporting 10,000,000,000 people at a good standard of living but, if that comes to pass, it would be the first time in human history that cultural, religious, and sectarian divisions were overridden to do what is necessary.

Although we lack the needed economic and political structures, as well as the will to introduce them, the technology is there. For success, cultures will have to change quickly, and reason will have to inform policy decisions—although, given the reality of the human condition, it is hard to see how reason will prevail any time soon. ★

***Gerald E. Marsh**, a retired physicist with the Argonne National Laboratory, Lemont, Ill., and fellow of the American Physical Society, College Park, Md., was a consultant to the Department of Defense on strategic nuclear technology in the Ronald Reagan, George H.W. Bush, and Bill Clinton administrations, and served with the U.S. START delegation in Geneva, Switzerland.*