

## A THEOLOGICAL REFLECTION ON NUCLEAR DEVELOPMENTS:

### The Limits of Science, Technology, and Power

by Jacques Ellul

The splitting of the atom, whether it is used for the production of energy for industry or for military ends, raises questions of a theological nature, while the "how" of its use raises questions of a moral and ethical nature: I have often challenged the belief that the basic problem with technique is whether it is used for good or ill, but here I do not want to take up that general theme. It is enough to recall it to mind. It seems to me that four issues can be raised: (1) the fundamental one of the limits of science; (2) the spirit of power; (3) human self-sufficiency; and (4) the rigidity of the structures. Despite these seemingly sociological issues, theology cannot be indifferent to them.

#### THE LIMITS OF SCIENCE

It is with some trepidation that anyone broaches the insoluble question of the limits of science. Put schematically, "If such and such a research is called 'scientific,' is it thereby legitimate and proper?" Do we have the right to do anything and everything? It is quite clear that the modern age, to the extent that it has no criterion for life other than scientific "truth" and is dazzled by research results, will spontaneously answer, "Yes." But the Christian has to phrase it a bit differently. "Do we, *before God*, have the right to do absolutely nothing, simply because it is scientific?" That is the true problem.

Christians are afraid to take a stand, first because they share the prejudices favorable to science held by all and sundry in this era and, second, because they remember the errors committed by the "obscurantist" church in the Middle Ages—e.g., the ban on dissecting cadavers, the Galileo affair, etc. (Let's not forget that the medi-

eval church was not at all as obscurantist as we're led to believe and that Galileo was able to pursue his research thanks only to a pension from the Pope!)

We must get beyond this difficulty. Are there limits? Are there any spheres before which we must remain silent or research must stop? Is it good that science recognize no limit?

Of course, no direct answer is given in the Bible, notwithstanding the hint given in Ecclesiastes 1:18 ("he who stores up knowledge stores up grief"), and the author of that book had Greek science in mind. But his warning is not enough. Can we un-create? Can we go back to the source, to the origin, to the crucial point when life or matter appears? Is that not a forbidden place, an unacceptable action? Don't we see (clearly enough, I think) that here we reach, not God, but the point of an action of God where we tend to substitute ourselves for God?

The comparison is with Genesis 3, when Eve takes the fruit of the knowledge of good and evil—that is, the possibility for us to decide from then on, by ourselves, what is good and evil. Until then, God alone could declare good and evil. At that moment, we had taken over a realm reserved for God.

The question I pose is exactly the same: In laying claim to alter the structure of matter, to transfer matter into energy, to split the atom, so also in claiming parthenogenesis or the artificial "creation of life" and the whole complex of genetic engineering, are we not precisely at the limit beyond which we make ourselves equal to God, where we do what God does—and can we enter into this competition?

I know that here I am broaching a question that is inadmissible for scientists and formidable and apparently insoluble for theologians, who prefer not to hear it discussed. Nevertheless, if we do not dare to pose it, perhaps we'll have to expect, as a result of our trespass, consequences as dire as those following the first transgression. Obviously, I cannot supply a scientific response. Rather than giving a direct answer, I believe that all we can do is reach a certain probability in the answer through an analysis of some of the consequences.

The question of the limits of science seems to me particularly radical, particularly in the area of atomic research. If it were simply a matter of knowing the constitution of matter, I don't think there would be any problem. We all know the traditional answer of

Christian scholars: "The more we come to know about the reality of creation, the more we are led to adore the Creator." Unfortunately, in atomic research we are not dealing with knowledge, so much as manipulation, transformation, and disintegration. Here, there isn't any respect either for the Creator or for the creation—and that is why the question becomes radical.

### THE SPIRIT OF POWER

All atomic research is research for power. It is no longer simply "nuclear energy." Some, as in France, must compensate for oil deficiencies; other nations must guarantee continuous growth in energy consumption; still others must escalate nuclear weapons in order to guarantee national security. In all cases power is indeed at stake. We have the fixed idea that matter contains an unlimited amount of power and is completely at our disposal.

We have always been imbued with the spirit of power, which is one of the marks of evil in the Bible. It's called "pride" or "lust." Past theologians often erred in relegating these tendencies to individual psychological defects, whereas the Bible talks about much more fundamental powers. These are powers that overcome us and make us act; they are existential and collective impulses that have to be situated in relationship to the affirmation of Jesus as Lord or the reality of the kingdom of God. Pride and lust are not particularized sins, but rather the source and expression of our radical opposition to God.

In the past, however, the spirit of power existed vis-a-vis God and was only potentially concrete, for it did not have the means to express itself fully. It didn't have "the power." Now, this situation has changed. We have acquired the means to serve our spirit of power, particularly with the technology of energy. The development of atomic energy is closely linked to the spirit of domination, conquest, and human lust. People get all fired up about applying nuclear power not for the sake of its usefulness nor its profits (though, of course, that plays a role too), but because they are driven by the unrestrained search for power. This is what is dangerous. We are no longer capable of saying at any given moment, "Enough! We're stopping!" At any given moment, we have neither the criterion nor the motivation *not* to pursue to the nth degree everything that can satisfy our spirit of power.

In other words, the field of nuclear power, more than any other technical area, has seemingly unlimited development. Thus, when it comes to nuclear armaments, for instance, it is pointless to hope for a "non-proliferation" treaty or a serious enactment of arms limitation agreement. What I am saying is confirmed, in fact, by the very rapid proliferation of atomic weapons. We do not have to dwell on recent events in Iraq and Pakistan. Obviously, Iraq, thanks to France's delivery of enriched uranium, will soon have nuclear weapons, just as Israel has established a nuclear force thanks to France's delivery of a reactor. And Pakistan is even closer to this possibility with aid from Libya, which itself seems to be at least well on the way if not already in possession.

Non-proliferation is a pious ideology, a virtuous declaration that masks a reality that is quite the opposite (exactly as happens with the declaration of human rights). The root of this phenomenon is the unbridling of the spirit of power that can do nothing but will the means to its own satisfaction, no matter the cost. All other reasons are superficial. This is truly a question posed to Christians who, above all, must fight against all manifestations of this spirit of power. Here we stand on intrinsically theological grounds concerning nuclear energy, which has no other objective than the pursuit of power.

### HUMAN SELF-SUFFICIENCY

When separated from God, we claim complete mastery over the world; we want to be independent and autonomous, reckoning that we can cope with everything. On entering the nuclear realm though, we face immense responsibilities.

First, we have entered a world of total uncertainty. If I object to *all* nuclear development, I do so because, when all is said and done, we don't know what we are doing. When you read expert and scientific reports—each as serious, as learned, as competent as the next one—you are struck by the mass of contradictions among them. What is the maximum radiation dose a person can be exposed to without danger? The answers vary from the straightforward to double talk. What are the results over a number of years? Impossible to say, as not enough time has elapsed. The point is, this lack of certainty dominates every aspect.

From the standpoint of economics, what is the cost price per

kilowatt hour for nuclear electricity? Once more, the answers vary from the straightforward to double talk, and there are even greater fluctuations in the estimates before and after the construction of a power plant. (In any case, the actual construction consumes a considerable amount of energy; for example, the French nuclear program involves an enormous increase in petroleum imports for 10 years.) What are the chances of an accident? Statistics show that they are quite small. Fair enough. At the same time, solid mathematical studies show that calculations of probability mean nothing when the risk verges on the absolute.

How to get rid of the wastes? There are no reliable and long-term solutions. Reprocessing? Most recent studies have demonstrated that reprocessing plants end up producing more plutonium than they process. How are we going "to deconstruct" the atomic piles in the core of the reactor once the plant has finished its cycle of production? Even experts favoring the atomic enterprise recognize that nobody knows. The only general answer is that they "hope" that technological progress will solve the problem 20 years from now.

I could go on listing the detailed questions that give rise to either total uncertainty or contradictions among the experts. This list is enough, though, to assert clearly that as long as we do not know the risks, as long as we do not know the meaning of what is being done, we must not do it. This prudent guideline, I maintain, is linked directly to faith in Jesus Christ. Faith cannot lead us to an irresponsible attitude under the guise of "confidence in God." We cannot take cover under the conviction that God, good and all-powerful, will set things straight. That is bad theology. We are called to act as responsible beings and the central question remains "What have you done to your sister and brother?" In this nuclear business, all we can answer is, "I don't know anything about it." This is precisely the answer that God cannot tolerate. It is the answer of the lukewarm, the flighty, the irresponsible person. This answer is fundamentally the inverse of the Word of God. If we do not know what we're doing, we must not do it.

A second aspect of self-sufficiency, equally unacceptable, is the irreversible nature of the trends brought about by nuclear development, irreversible trends that bring irreparable results. If there is an atomic catastrophe, it will be irreparable from every point of view—not just for the dead (in which case it wouldn't be different

from other catastrophes), but also for the genetic results and the natural environment. It could be possible to sterilize vast stretches, thousands of square miles which would no longer have any use at all. No material, medical, or even financial restitution would be possible. Soon no insurance company will cover atomic risk. We have here an ethical rule of thumb which, it seems to me, also stems from Revelation; namely, "When the risk generated becomes well nigh inevitable and totally irreparable, the action must not be undertaken." No argument can prevail against this maxim. This situation presents us with a modern, sociopolitical application of the commandment, "Thou shalt love thy neighbor as thyself." In other words our pursuit of the spirit of power was a matter of contempt and transgression against the first great commandment, a lack of respect for the limits God placed on our actions. Here it is a matter of a clear violation of the second great commandment given by Jesus Christ.

### THE RIGIDITY OF THE SYSTEM

The growth of this atomic system brings about ever more impressive economic, political, and structural flexibility. The whole industrial process changes with the introduction of electricity from nuclear power plants. The operation of such a plant cannot be slowed down either by season or by night (contrary to all other energy-producing systems) because of the heat constraints that repeated variations would inflict on the metal casings enclosing the uranium rods. Nor can this electricity be put "on hold," so there must be continuous use at a level fixed by the plant.

In order to use up the nighttime "overload," the equipment and processes used in many establishments supplied by this electricity must be modified. At the same time, industry is forced to adopt new production procedures to use electricity instead of other energy sources (e.g., electric furnaces for melting metals and maintaining them in a molten state or drying at high frequency, a drying that has to be further accelerated for wood or reinforced concrete). In addition, non-stop use of this energy entails revisions in the norms of production, the expansion of units to manufacture the new equipment, etc. In short, "the all-electric factory" goes hand in hand with "the factory with permanent maximum operation."

This trend has two important consequences. First, the rigidity

makes adaptation difficult. The more precise and strained the system is, the less able it is to adapt. Techno-organizational integration leads to a certain paralysis in responses (whether technical or economic) or at least to a slowness in adaptation. This effect is made worse by the second one—the acceleration of events in the wake of technical innovation and the spread of disturbances (whether voluntary or involuntary). You could say that after a certain degree of integration (and the nuclear development is now the most powerful factor in integration), the “adaptation-event” relationship becomes an internal contradiction. Events mushroom while the technical-nuclear system is paralyzed.

We are faced, then, with one of those rigid situations that seem to me to be fundamentally anti-Christian. On the one hand, let's always remember that God is the liberator. No need to go further on that score. On the other hand, Jesus has shown us that all relationships should be established along the lines of flexibility, openness, in the concreteness of the here and now. The lesson is not only for interpersonal relationships: It is valid for any structure. Jesus reproached the Pharisees because they made God's law into an iron yoke for people, a total constraint; they made the commandment into an objective duty; they made detailed prescriptions so that there was no longer any room for initiative. They made the free Word of God into an inflexible, systematic code. Jesus came to bring flexibility, adaptability, openness, freedom back into it. In this way, the law of God (which, as James says, is “the Law of Freedom”) is truly honored.

The law of God had become a social system. By analogy, it seems to me that any system that leads to inflexibility goes against the will of God. It is not just freedom in general either. Dictatorship, wherever it is found and whatever form it takes, is unacceptable to the Christian, because it is a rigid system leaving no “play” among the structures, no place for initiative. Institutional, economic, and social rigidity, in my opinion, are unacceptable Christian practice. And that is why nuclear development, in my opinion, is unacceptable. I have given above a single example of the inflexibility it breeds in the economic sphere, but I could show how, in many other sectors (e.g., the police administration, the recruitment of personnel, control), nuclear development always brings about the same result and increases the social rigidity in every sector.

## WHAT ARE OUR LIMITS?

### Questions for Thought and Discussion

1. How is the pursuit of nuclear armaments in conflict with the Christian affirmation of the sovereignty of God? What might penance mean for Christians aware of the evils present in nuclear technology?
2. Ellul argues that by trying to harness the power of the atom, we are trying to make ourselves the equals of God. Is there something inherently destructive in gaining such power? Is it safe to entrust such tremendous and potentially destructive power to the hands of human beings?