GIULIO TARRO

GOOD SCIENCE

Medicine in the name of Humanism which
has saved millions of lives around the world

edited by Rita Pennarola

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Chapter One

Science and Humanism

Science must delve deeper into the mysteries of the universe but above all to alleviate the miseries of the people on earth

Albert Sabin

The relationship between science and religion, the great theme of "miracles," the need to open up the ivory towers of research, too often reduced to an idol and a slave to business: these are just some of the complex issues addressed by Giulio Tarro in this first chapter, intended to lead us towards his vision, which illuminates the subsequent sections of the book.

Professor Tarro, you wrote that "Man is something different from his parts." Would you like to explain the implications of this principle?

I mean, especially today, medicine must be able to reconcile science and the use of technology without ever forgetting the human being in its entirety. Biomedical research requires in-depth exploration of knowledge methods, the processing of knowledge, and the ethical values that should guide decisions. I clearly see the need to find a balance between extreme experimentalism subjected to the pressure of technology, even if it is functional to medical progress, and the need to protect both the patient and humanity as a whole, moving beyond the existentialist ethos that too often dominates.

What exactly do you mean by "existentialist ethos"?

I define "existentialist ethos" as that principle, widespread even in many scientific communities, according to which there is no meaning in life other than that which human beings themselves give it. This is why ordinary people have often come to view science as threatening and degrading, responsible for alienating them from the universe in which they live. But there is another, very different, and possible reading of science.

Which?

Far from presenting human beings as accidental products of blind physical forces, science can suggest that the existence of conscious organisms is a fundamental aspect of the universe and that the universe itself, through countless processes spanning billions of years, reached its final stage of development in human beings, in their brains, in their psyches. This interpretation of creation, embraced by scientists like Fred Hoyle or mystics like the Indian Sri Aurobindo, was long considered at best a poetic intuition, not a scientific theory. Until the arrival of quantum physics heralded a stunning synthesis between mysticism and rationalism, between psyche and matter, and, ultimately, between miracles and medicine.

How did this happen? Is quantum physics a Copernican achievement, in your opinion?

Let's start in 1935 when Niels Bohr, one of the leading exponents of quantum physics, responding to objections raised by Albert Einstein, Boris Podoisky, and Nathan Rosen, among others, formulated a statement that opened up unexplored avenues for science: "Even if two entangled photons were found in two different galaxies, they would still remain a single entity, and any action performed on one of them would also affect the other." For decades, this statement remained unproven, until 1982 when a physicist from the University of Paris, Alain Aspect, emerged on the scene and proved that quantum physicists were right. The experiments conducted in Paris by Aspect involved separating a pair of entangled photons, originating from the disintegration of a calcium atom, and launching them toward distant detectors. These detectors, in turn, measured the photons' behavior after a "filter" was randomly inserted along the trajectory of one of them, altering its direction. The results of the tests demonstrated that when one of the two photons deviated following interaction with the filter, the other also instantly deflected, even though they were spatially separated - 13 meters to be precise, an enormous distance for subnuclear particles. This extraordinary result not only confirmed "non-localism," and thus the existence of actions at a distance, but also demonstrated that these actions occurred simul-

taneously, almost as if there were an instantaneous transmission of information between the entangled particles. This astonishing ability of infinitely distant particles to correlate, generated at the same time, along with other discoveries in quantum physics, such as the observer's ability to influence a scientific experiment simply by observing the experiment itself, have upended centuries of science. Today, they open up revolutionary perspectives, including philosophical ones, that could mend the dichotomy between science and religion on which Western civilization has been based for centuries.

We've reached an important point: the age-old dichotomy between science and religion. So you say quantum physics has made it possible to overcome it?

Of course, but not only that. The dichotomy between science and religion, one with the secular sentiment of trust and the other with that of faith, entails a path of logical knowledge within the intimacy of the human soul, with a rigorous curiosity for immanence and existence. On this point, I think it's important to recall the trip to Lourdes of Nobel Prize winner Alexis Carrel, the discoverer of tissue cultures. In 1903, Carrel was "struck" by lightning in the French town, like Paul of Tarsia on the road to Damascus. But we can also speak of those who, more modestly, traveled to Pietrelcina to visit Padre Pio's birthplace, or his cell in San Giovanni Rotondo, undergoing intense experiences in an atmosphere of devotion and prayer, to the point of acquiring a new vision of knowledge, regardless of whether they considered the stigmata to be vascular phenomena or not.

Professor, are we talking about miracles?

More precisely, we are talking about the fact that the ethical debate regarding biomedical research cannot fail to directly affect the great themes of life and death, those of the psychophysical identity of man and humanity. I'm reminded of the famous experiment from the 1990s, when they wanted to evaluate the healthful effects of prayer: not that of the patient, but prayers addressed to him by strangers. The study was conducted at the prestigious *San Francisco General Hospital*, where approximately 400 heart patients were divided into two groups, one of which received the prayers of a Neocatechumenal association. To eliminate the placebo effect, since even if one doesn't pray personally, being the center of attention and commitment certainly has a positive influence, the patients were unaware of the experiment. Well, according to the final results, those "not prayed for" were three times more likely to suffer complications than the others and five times more likely to take antibiotics. However, similar experiments conducted on AIDS patients subsequently failed to yield significant results. This

prompted the editor of *The Lancet*, perhaps the most prestigious international medical journal, to declare that the evidence for a relationship between religion, spirituality, and health is "weak and inconsistent."

Did that experiment on AIDS patients mark yet another gap between science and faith?

To answer your question, I begin with the warning of a great man like Albert Einstein: "Religion without science would be imperfect." But the opposite is also true. A science that aimed to achieve absolute knowledge, deluding itself into thinking it could replace religion, would be the most arid thing imaginable. This is why I believe that science and faith must proceed along paths that are certainly separate, but not divergent, toward the ultimate goal of both, which can only be to serve humanity. Mind you, these considerations become even more poignant when science in general reaches medicine. Indeed, the relationship between medicine and faith is thousands of years old, considering that ancient civilizations had a sacred bond with illness and medicine, not to mention the fact that the work of the priest was very often identified with that of the doctor.

But in the Western world, in your opinion, how is the relationship between Science and Faith structured today?

I would begin with a conception of the relationship between theology and science, which has changed profoundly in recent centuries: modern reason has sought to replace theology, the *Queen of Science* in the medieval encyclopedia of knowledge, as the sole protagonist and absolute pinnacle of knowledge. This is why, in the era ushered in by the Enlightenment, the relationship between theology and science was conceived almost exclusively as a conflict. A conflict that began when science seemed to threaten the comfortable place occupied by Mankind within a cosmos created according to a divine plan. In essence, the revolution begun by Copernicus and concluded by Darwin had the effect of marginalizing, even demeaning, human beings: no longer placed at the center of the supreme plan, but relegated to a secondary role, apparently meaningless in an indifferent cosmic drama, like improvised extras who ended up by chance in the middle of a great movie set.

How do we get out of this? Is there a third way?

Many have already concluded that religion and science not only "can" but "must" work together, especially in the fundamental fields of peace, human and civil rights, and human development. Consider the commitment of various churches around the world in areas such as volunteer work, welfare, and pacifism. The fact is that humanity, just like Ulysses, in his eternal quest for knowledge, in unraveling the hidden mysteries of the universe, has ultimately attributed to culture the role of a fundamental element for true democracy and true freedom. Albert Sabin himself spoke of scientific progress through discoveries not as ends in themselves, but aimed at the social value of research. In freeing suffering humanity from the shackles of disease, priority must be given to the social value of research and not, obviously, to the study of the sex of angels: "To delve deeper into the mysteries of the universe, but above all to alleviate the misery of people on earth": this was his declared mission. And this can be considered the third way. If we don't take this path, if we don't achieve a far-sighted vision of research, the risks increase.

And what are the greatest dangers for those who do research without this vision?

To answer this question, we must first clarify a premise. Life is an intuitive concept, but before defining it, we must understand living organisms in all their essential characteristics, because these are what allow us to get closer to the truth. We begin with the curiosity to know, then we arrive at the point of manipulating life as never before, with immense responsibilities for a future pregnant with radiant scenarios, but also with catastrophes. Here are the greatest risks. What can be done to limit them? Often, when discussing the dangers of science, we recall an ancient legend passed down to us by Hesiod: Zeus, enraged at Prometheus for daring to steal his secret of fire, decided to punish humanity through Pandora, to whom he gave a jar containing all the evils of the world, commanding her never to open it. But curiosity for knowledge was stronger than prudence, and Pandora broke the jar. Thus, irreparably, evil spread across the Earth. And so I ask: is this really the humiliating lesson humanity should learn? To stifle its innate desire for knowledge in the name of fear? This is probably an impractical path. Better, perhaps, to minimize the distance between those who conduct research and those who will suffer its consequences; to open research laboratories and the ivory towers of knowledge to the public so we can all decide together what to do, and at what cost. From this perspective, bioethics must abandon

the confines of "insiders" and committees. It must become a source of knowledge and debate for all of us. Otherwise, especially in the biotech field, a whole series of risks arises, as is already happening.

How is this happening?

Let's just consider that in recent decades, the medical profession has undergone a radical transformation, affecting many different aspects. One of the most significant developments is certainly the relationship between doctor and patient, and, more generally, between the medical profession and the society of potential users. The idea that doctors are service providers, like architects or plumbers, who offer their expertise to the market is increasingly gaining ground. According to this trend, doctors must adapt their service offerings based on requests, without claiming to judge or direct the patient's request in any way. Thus, especially in the biotechnology field, a single theory has gained traction: we must accommodate every patient's wish. This has led to a kind of "medicine of wishes."

What are the concrete dangers of this "medicine of desires"?

A four-step process could be outlined. First, technology opens up new possibilities previously unthinkable or impracticable - just think of the vast fields of application of genetic engineering. Second, these new possibilities ignite unprecedented desires. Third, desires tend to be considered rights, until - and we are at the fourth step - the battle for their legal recognition erupts. It is noteworthy that in this framework, the governing function is exercised not by law, nor even by politics, but by technology, which entails the very death of the concept of law and, therefore, of ethics. In short, to quote Hobbes, "Auctoritas, non verìtas facit legem," meaning that today it is force that dictates the law, no longer reference to the truth of things.

So, you say that force has reached the point of replacing the search for truth?

In truth, there are some "North Stars" that can help research and even technology avoid such dangers. I'll start at the highest levels, with Albert Einstein, who stated that "The search for truth is more valuable than its possession." He then added immediately that "Imagination is more valuable than knowledge." These two seemingly contradictory aphorisms outline a discourse on the intrinsic value of research that

goes beyond its "practical" applications and that, unlike ideologies, connotes an innate impulse, the very essence of humanity: curiosity. There are certainly other rewards that can befall the researcher: wealth, power, fame... but nothing, absolutely nothing, can replace the adventure of discovery, the pleasure of seeing what were once vague deductions transform into incontrovertible experiments. Let's be clear: it goes without saying that research, especially scientific research and even more so medical research, in a society as complex as ours, certainly cannot be reduced to a mere pleasure for the researcher. Also because the consequences of a scientific discovery can be devastating. But the fact remains that science, unfortunately or fortunately, is not pure. Science is already driven by a technical intention: it looks at the world to change it. "Scientia est potentia," said Bacon.

In your opinion, who is, or rather, who should be, a scientist today?

In my work as a scientist - if I may use the term, which only in Italy and very few other countries is shrouded in an aura of sacredness - I have often wondered what the characteristics and qualities that define this figure should be. There are countless answers to this question, but to find the most pertinent one, we must once again return to Albert Einstein. The genius of physics said that the desirable characteristic in a true scientist should be "the ability to be amazed, to marvel at nature." And that this characteristic "unites him with the artist, who also engages in non-calculating play." Play, fun, the endless satisfaction of curiosity: this describes a scientist, and I believe these are the true motivations that should drive a scientist worthy of the name. I would add that, as Claude Lévi-Strauss asserted, "the scientist is not the man who provides the real answers, he is the one who asks the real questions."

A magnificent definition, this, far removed from those you have called the architects of a "science turned idol." How can we protect ourselves from this further danger?

Of course, it goes without saying that Lévi-Strauss's definition risks excluding the vast majority of those who today are considered "scientists," yet who are perpetually entrenched behind their experiments and rigid laboratory protocols, committed, I dare say, to cultivating a science that has become, in fact, "an idol." A science that, however, as has always been the case, the further it advances, the more it discovers infinite prairies of the unknown, of that which, at least currently, cannot be known. Eric Fromm says that one of the principal limitations of scientific research is the exclusion of facts it cannot explain in light of its current knowledge. And so it is. The attitude of dismissing with a skeptical shrug phenomena that

cannot be explained using current knowledge has become a habit, essentially born with the Enlightenment, but which persists even today and is much more widespread in the field of scientific research than commonly thought. The reason for this is essentially explained by the attitude of the vast majority of researchers, always seeking the funding needed to carry out their work. For fear of being marginalized, they prefer not to meddle with rare phenomena that cannot be easily reproduced in the laboratory. But this gigantic front of researchers is contrasted by the increasingly rare figure of "heretical scientists" who dare, for example, criticize animal vivisection or the dogma of vaccinations.

So let's talk about these rare, precious heretical scientists.

Let's begin by asking what happens when science is medicine and the scientist is a doctor. Many think that medicine can be compared to other scientific disciplines in its experimental research component because it is subject to the scientific method. But, at the same time, there is a perception that biological variability and the impact of the patient's inevitable dynamics force us to abandon a scientific approach when it is translated into clinical practice. Or, conversely, that the possibility of extrapolating novel elements and knowledge factors must imply a detached and reductive attitude, as if there were a doctor who studies, distinct from a doctor who treats. Thus, medical practice, diagnostics and therapies, and research end up separating into incommunicable worlds, with non-overlapping skills and fields. But this is precisely one of the main risks facing medicine today. And I like to think that medicine, to which I have dedicated my entire life, is not just a science, but something more. This is why I have embraced Voltaire's words from the very beginning: "Those who devote themselves to healing others, using both skill and humanity, are, beyond all doubt, the Great Ones of the Earth. They even possess something of the divine, since saving and restoring life is almost as noble as creating."