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## **The Truth of Science for Justice and Peace**

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### ***The Truth of the Sciences***

'The truth will set you free': these words from the Gospel enjoy perennial validity and illuminate with divine light the endeavours of the scientist who refuses to subordinate his commitment and his research to anything but the truth. Truth is the goal of the whole universe: *finis totius Universi est veritas*, as one of the greatest thinkers of all time, Thomas Aquinas, wrote. The truth of all beings, their forms and their laws are hidden in the bosom of the Universe, which yearns for its truth to be discovered by the human intellect.<sup>1</sup>

In my opinion, theoretical truth – in its historic journey towards the recognition of its autonomy – can be encountered not only in theoretical philosophy or in theology, but also and increasingly in the sciences of nature, considered in their full range of topics. It is what Claude Allègre has pointed out in an excellent book in which he draws the balance of the discoveries of this century starting with the computer, and going on to biology (DNA's double helix), information technology, quantum mechanics, the chemical explosion (this is his wording), astrophysics, the order of chaos and, last but not least, the neurosciences. The common denominator is the idea of *discovery* and discovery is an organised form of the *observation of nature*.<sup>2</sup>

I would like to insist on the term *nature*. Indeed, it has enabled us to put mathematics back in its slot as a discipline of forms, numbers and relations as rational constructs pursued for themselves and not as constituting *the* science of reference. As Claude Allègre writes, "contrary to the sciences of nature, mathematics does not develop by virtue of an oscillation between observation and theoretical model". This is probably the reason for the perhaps excessive and certainly controversial title – *La défaite de Platon* – he has given to this extraordinary overview of science in the 20th century.<sup>3</sup> With the sciences of nature what is at stake is the knowledge of what is real and it is truth that qualifies the relation of theory to what is real in the sciences of nature.

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<sup>1</sup> *Contra Gentiles*, Bk. I, Ch. 1.

<sup>2</sup> Cf. AA.VV., *Paths of Discovery*, The Pontifical Academy of Sciences, Acta 18, Vatican City, 2006.

<sup>3</sup> Claude Allègre, *La Défaite de Platon ou la science du XXe siècle*, Fayard, Paris 1995, p. 429.

The second reason for concentrating on the sciences of nature to make the demand for truth arise in its theoretical purity is provided by Jean Ladrière throughout all of his epistemological works and, more in particular, in an essay entitled *Herméneutique et épistémologie* published by Paul Ricoeur in the book *Les métamorphoses de la raison herméneutique*.<sup>4</sup> He does not try to distinguish the project of the sciences of nature from that of the mathematical subjects, but from that of the human sciences that can rightly demand to derive an explanation from comprehension. These human sciences – he says – do not have as their theme the idea of nature as a system of phenomena regulated by laws, but the idea of action as a transforming initiative. Regarding action, “the recommended strategy consists in going from the objectivated forms towards their production, in short in redoing in the opposite direction the process of objectivation (...). Therefore, rebuilding such a project means recalling the meaning of what initially was only an enigmatic object, interpreted as a trace and constituting a problem starting from such an interpretation” (p. 109). Thus it would be a serious mistake – and this mistake might be the temptation of a sketchy and nebulous hermeneutical thought – to believe that the whole problem of the status of science can be rebuilt on the model of the de-subjectivation of the products of action. The need for such a result is extremely rigorous: it is believed that we can plausibly reconstruct the “very trajectory that leads from certain initiatives to certain situations. Now, what makes the reconstitution plausible is the fact that we can recognise ourselves in it, that is to say that when it is presented to us it appears to us as a course of events that we could have experienced, like a process in which we might have acted or, in any case, co-acted” (p. 110).

Now, the fact that the initiative that produces the observed processes is entirely unknown to us, because it is extraneous, makes it possible for nature to be nature and not action. This is why we only have observation and explanation through laws. To quote Ladrière: “the source, here, is no longer action, it is law, that is to say nature itself whose law is considered capable of expressing an internal constitution and, if we can say so, an immanent intention. Now, the only way to effectively prove that an observed process can be subsumed under a law is to reconstitute it effectively starting from this very law. Such reconstitution – the famous *sôdzein ta phainomena* – is nothing else but a doubling of what nature has already produced on its own, the generation of a second process that should be a faithful image of the former; it is a simulation, unreal in

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<sup>4</sup> Jean Ladrière, *Herméneutique et épistémologie*, in P. Ricoeur, *Les métamorphoses de la raison herméneutique*, éd. du Cerf, Paris 1991.

itself, of what effectively took place” (p. 111). Therefore it is a copy of nature. In other words, the scientist, unlike the philosopher and mathematician, imitates nature, and the proof is that when imitation does not follow nature's profound laws, nature itself rejects it. Precisely because of the fact that we cannot understand the production of nature as an action similar to those that initiate from us – something that could be believed until Galilei and Newton – we must observe, experiment, explain and copy nature itself.

Unable to understand nature as an objectivation of an initiative similar to our own – of ourselves as agent beings – it is necessary for us to *explain* it “by appealing to the general notion of law, inasmuch as this notion provides a content to the idea of nature” (p. 113). Law, therefore, is present in the phenomenon that we would not be capable of producing with action or understanding through narration; it is present in it “as its own internal reason. And the explanation consists in exhibiting this reason, following the sense of implication, from the phenomenon towards its own condition” (*ibidem*).

In this radical initial situation epistemology finds a justification of its own autonomy; it happens to diversify the forms of explanation following the nature of the invoked principle of legality; it will thus speak of explanation by subsumption, by reduction, by genesis, by finalities. Thus we situate ourselves along the journey of the notion of truth appropriate to the sciences of nature, if we extrapolate the element common to these different forms of explanation, that element that constitutes precisely the clarifying moment of an explanation: “We ask for an explanation to dissolve the opacity of the fact that, in its singularity, it is only a pure apparition in the general field of experience” (p. 116).

At this stage of the reflection we find the role of models and the general process of modellisation. It occupies the place left empty by the comprehension of the action for which we take the initiative. Moreover, it bears the weight of the pretension of truth in the scientific sense of the term. The empty place is occupied by imagination which produces models: “It is precisely necessary to operate on another support compared to the one of the real bodies, on a support capable of sustaining the work of the imagination. It is the model, the abstract object, built according to perfectly well-know procedures, that is considered capable of constituting a sufficiently faithful representation, albeit a simplified one, of reality” (*ibidem*). Once again we find mathematics, discarded as a paradigm of truth, as a means to build *models*, that are not mathematical objects but figurative representations of the legality of what is real and which require testing or copying or reproducing the processes of nature in a

laboratory.<sup>5</sup>

### *From Truth to Justice*

I think we have said enough to draw at least a general outline of scientific truth; its fate is essentially linked to the *representation of the model*, an issue that has become central in epistemology. To this end, during the course of the development of sciences in the prodigious 20th century, nothing will come to deny the formal definition of the truth of science as the adaptation of the mind to the reality of the phenomenon of nature. Truth as *sôdzein ta phainomena*. And no idea of justice (or good) is necessarily implied by this idea of adaptation in oscillation, which Claude Allègre mentioned above, between theory and observation. There is no idea of justice inasmuch as we consider exclusively the *propositional* form of the observation protocols, of the construction of the model, of the verification and denial procedures applied to the alleged theoretical enunciations.

Things change – and the idea of justice stands out at the end of the journey we are about to undertake – if we consider *episteme* no longer just a network of propositions, which Frege said we should be able to write on a wall, but as a *project*. A hermeneutics of reason becomes possible, charged with the very project of *episteme*: “properly speaking, this is where – says Jean Ladrière – the task of a reflection begins that will be afraid of reading, in those same works in which the mathematical project is inscribed, what this very project really is, what carries it, what inspires it, what calls it. Here the properly hermeneutical task separates from the methodology of the explanation, modellisation makes room for reflection, the articulated clarity of the operation makes room for the uncertain decoding of a step that traces its path as it moves forward along it” (p. 123). The idea of project is already situated at the border between the theoretical and the practical. The threshold is crossed if this idea of epistemic project is connected to that of the founding moment, in which “a willingness starting from which something new begins” is underlined (p. 124).

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<sup>5</sup> With the application of the mathematical models to the scientific method, modern physics has perfected the conditions of images in which the phenomena of nature are intentionally reflected and, more in general, the contingency of matter. The application of mathematics to the physical method had perhaps been envisaged by St Thomas himself: “The principles of mathematics are applicable to natural things, but not vice versa, because physics presupposes mathematics; but the converse is not true, as is clear in the third book of *De Caelo et Mundo*. So there are three levels of sciences concerning natural and mathematical entities. Some are purely natural and treat of the properties of natural things as such, like physics, agriculture, and the like. Others are purely mathematical and treat of quantities absolutely, as geometry considers magnitude and arithmetic numbers. Still others are intermediate, and these apply mathematical principles to natural things; for instance, music, astronomy, and the like. These sciences, however, have a closer affinity to mathematics, because in their thinking that which is physical is, as it were, material, whereas that which is mathematical is, as it were, formal. For example, music considers sounds, not inasmuch as they are sounds, but inasmuch as they are proportionable according to numbers; and the same holds in other sciences. Thus they demonstrate their conclusions concerning natural things, but by means of mathematics” (*In Boeth. De Trinitate*, q. 5, 3 ad 6).

Well, this is precisely where truth and justice intersect and convert into one another. And truth is intended in a broader sense with respect to the propositional truth deriving from verification operations or to the representative models by which theories become accessible to the human being. This is truth as the common horizon to the comprehension of the operations that lead to the action and to the explanation of natural facts and, moreover, to the comprehension of the fact of being in the world, against the backdrop of which the comprehension of action and nature is outlined. Why justice? Because along all of this scale that goes from the project to the task, passing through the unpredictable, a community of research is implied.

This level is exactly where good and human justice are involved in the activity of scientific reason recognised as the vocation, task and mission of the scientist.

This is well known at the level of the science of nature, in which the scientific community is the collective subject of research, with its teams, its rivalry, its power struggles, but also its vocational unity before the other powers, its exercise of professional responsibility before technical applications, in short the search for its place in the totality of *episteme*, among theology, philosophy, ethics and politics.

This is precisely the level in which justice is involved in this enterprise of reason recognised as a task. And it is implied at the same time as the intersubjective structure of practical reason is implied, which is common to the scientific community, to technology and to politics. Justice, in all of these cases, consists essentially in the equal access to speech, in the duty of sharing the best arguments, in the obligation of listening to the other side in all conflictual situations and in the recognition of the human rights of the person and the consequent *ius gentium*. In short, the conflictual-consensual statute of *research* – at all levels – indicates the space of justice.

Bernard of Clairvaux, one of the strongest personalities in history, who came down from the loftiest peaks of mysticism to share divine and human truth with the ecclesial and civil society of his time, as a true master of love and knowledge, described the different types of men and women of culture always found in history. According to St Bernard there are five motives that lead human beings to study: 'There are people who only wish to know for the sake of knowing: this is base curiosity. Others wish to know in order that they themselves may be known: this is shameful vanity, and such people cannot escape the mockery of the satirical poet who said

about their likes: “For you, knowing is nothing unless someone else knows that you know”. Then there are those who acquire knowledge in order to re-sell it, and for example to make money or gain honours from it: their motive is distasteful. But some wish to know in order to edify: this is charity. Others in order to be edified: this is wisdom. Only those who belong to these last two categories do not misuse knowledge, since they only seek to understand in order to do good’.<sup>6</sup>

The words of St Bernard the mystic indicate a profound grasp of what motivates those who engage in culture, and they are more than ever relevant in order to remind both the teachers of thought as well as their disciples of the true purpose of knowledge. St Bernard explained that the motor of practical reason is justice and good. St Bernard of Clairvaux raised knowledge to the level of love, to the level of charity and understanding: *Sunt qui scire volunt ut aedificent et charitas est.*

The thematisation of justice in the field of the search for the truth has been brought to a level of radicality that makes the idea of justice worthy of being elevated, in many ways, from the condition of simple virtue among other virtues to that of a transcendental, equal to the truth. In a nutshell, in my opinion there are five directions along which justice has been considered a sign of theoretical practice of sciences belonging to the field of practical reason.

First of all, there are Husserl's pressing invitations, in the last part of his life, to *responsibility*, which he believes belongs to the final level of transcendental phenomenology. Of course this endeavour is supportive of a claim defined as “final foundation”; however, it is worthy of note that this very demand involves what Husserl calls the *responsibility of oneself* for the self-founding action. Now, Husserl did not ignore the intersubjective dimension of this theoretical-practical action of self-responsible foundation. All the work connected with *The Crisis of European Sciences* tends towards a raising of the awareness of the temporal and historical dimensions, that ends up assigning this responsibility to a culture, the European one, and to a community, that he calls “arcontic” of the thinkers that bear the weight of the transcendental task. The fact that justice is the virtue implicitly designed as the final ethical mark of this responsibility shared by a historically-situated community is not far fetched.

With K.O. Apel and J. Habermas' discourse ethics – *Diskursethik* – this mobilisation of the virtue of justice no longer

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<sup>6</sup> St. Bernardus, *Sermo XXXVI in Cantica*, PL, CLXXXIII, 968.

remains implicit; it is clearly required by the very practice of discourse; justice is the moral rule underlying any discourse, upheld by the idea directing the search for a *consensus* and moved by an exchange of arguments without limitations or constrictions. The well-known formula of the jurists – *audi alteram partem* – leaves the restricted environment of the court to cover the entire space of public discussion.

The third significant reference, i.e. the hermeneutics of reason, foreseen by Paul Ricoeur and Ladrière, who was my privileged guide in the first part of this paper, cannot fail to encounter the transcendental of justice. In his book, which I have extensively quoted, justice is expressly nominated towards the end, when the foundation of the epistemic task is compared to that of technique and to that of politics. With regard to the task of reason, he writes that “...this having to be is in itself structurally connected with an unrepresentable [contrary to the abovementioned modellisation], in which the sense of the task to carry out – which cannot be assimilated to any effective foundation of a finite nature – is dissimulated, although we tried to think of it as the horizon of truth, of justice and, at times, even of beauty” (p. 124).

Moreover, the foremost contemporary philosopher who has tried to elaborate a global ethics of technological civilisation is Hans Jonas. He is persuaded that faced with the “Prometheus Unchained” of today's civilisation, which is threatening the very survival of the planet, it is indispensable to develop a new ethics of responsibility that takes into account the long-term effects of our actions, that is to say the extra human world and the future generations.<sup>7</sup>

Last but not least, the fifth reference is of a theological nature and derives from the Magisterium of the Popes of all times, but especially in these last one hundred years of the Pontifical Academy of Sciences and Social Sciences: practical reason, also in its relationship with the theoretical activity of science, needs to be purified by the grace of Christ, since it is continuously inclined to egoism because of sin, both individual and social, and gives rise to hotbeds of injustice in the world.<sup>8</sup>

### ***From Justice to Truth***

Considering that the theoretical truth of science recalls justice, I shall continue with the dialectic current which, starting from the

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<sup>7</sup> Cf. H. Jonas, *The Imperative of Responsibility: In Search of an Ethics for the Technological Age*, The University of Chicago Press, Chicago, 1984.

<sup>8</sup> *Papal Addresses*, Introduction, biographies of the Popes and ed. Marcelo Sánchez Sorondo, Pontifical Academy of Sciences, *Scripta Varia 100*, Vatican City 2003.

self-sufficiency of the idea of goodness developed in the notion of justice, continues by a further reference to the idea of truth.

Life, if it is to be human life, is originally evaluated and the evaluations are originally qualified in terms of *good* or *evil*, just or unjust. There is no way of seeking a supplementary truth liable to legitimate the injunction of good and justice. This is where St Thomas comes to our aid, by maintaining that, since the first unprovable principle of theoretical reason is that affirmation and negation are incompatible and thus that the supreme law of thought is the principle of non contradiction, therefore the first principle of action is founded on the distinction between good and evil and, thus, on the principle of *bonum est faciendum et malum vitandum*.<sup>9</sup>

In order to find the truth in the notion of good and justice it is necessary to look to the anthropological presuppositions or fundamental anthropology, which determine entry of the human being into ethics. These fundamental presuppositions are those by virtue of which man is considered existentially *capable* of receiving the injunction of good and justice. The originality of the existential sphere in which this capacity moves is a completely original situation that we may call the emergence of freedom and, with it, of all human rights. Christian thought – well before the moderns and with the same, or more awareness than them, regarding the independence of the human subject – had called freedom the *motor omnium* of a person's capacities and the principle of that person's independence (therefore *capax* as *causa sui*) both before nature and society, and before God. Speaking of capacity and freedom, assertions are made that refer to what man is in his way of being, therefore if it is true that he is made to be accessible to a moral, legal or political problem, be it merit – or demerit – worthy, or broadly speaking, to a problem of value and rights.

This is where the true function of attestation intervenes. It operates with the first natural principles of reason but it moves them within the transcendent truth that is God the Creator and the soul as a spiritual free subject. Thus even the soul lies hidden in the bosom of each of us, but it makes its presence felt with the action of which the I *capax* or the self is the beginning and end.<sup>10</sup>

I am reminded of the famous text of *Kritik d. praktischen Vernunft*: 'two things fill my spirit with an ever new and increasing admiration and veneration, the more my reflection increases: the

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<sup>9</sup> Cf. *S. Th.*, I-II, 94, 2.

<sup>10</sup> "Each one experiences within himself that he has a soul and that acts of the soul are within him", i.e. "Unusquisque in se ipso experitur se animam habere et actus animae sibi inesse" (St Thomas, *De Veritate*, q. 10, 8 ad 8).

starry sky above me and the moral law inside me'.<sup>11</sup> He has no uncertainty or doubt: 'I see them both before me and I connect them immediately with consciousness of my existence'.<sup>12</sup> We can say that it is a form of belief, a *Glauben*, in the non doxic sense of the term, if we reserve the term *doxa* for a degree lower than *episteme* and in the order of the phenomena of nature and also in that of human phenomena liable to being treated they themselves as observable. The belief proper of attestation is of another order; it is of the order of conviction and confidence; its opposite is suspicion, not doubt, or doubt as suspicion (P. Ricoeur); it cannot be denied, but refused; it cannot be re-established and strengthened if not through resorting again to attestation, and is rescued by the approval of the other, indeed thanks to some kind of gracious divine support. In this context to which fundamental anthropology refers, one can observe that one is dealing with a truth that is closely connected with the fundamental conviction that the human being has of himself and which is not temporary as is the case with the acquisitions of the arts and sciences and philosophy itself with which, however, it has a close relationship, and thus one speaks of 'philosophical anthropology' to refer to its specific genre of knowledge through reflection that takes place by stages.<sup>13</sup>

As you can see, the correlation between good or justice and truth is very special. The capacity precedes attestation and in this sense it is of an ontological level; it is the one that is precisely postulated by the attestation as its referent. We could speak of existential possibilities that arise from a practical injunction.

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<sup>11</sup> Kant, Immanuel, *Kritik der praktischen Vernunft*, (ed. Felix Meiner, Hamburg 1990, p. 289); *The Critique of Practical Reason*. English translation available from Internet (with my adjustments): <http://www.gutenberg.org/dirs/etext04/ikcpr10.txt>

<sup>12</sup> *Loc. cit.*

<sup>13</sup> The fact that sensitive knowledge precedes intellectual knowledge in the human being, the sensitive origin of human intellectual knowledge and the affirmation that the soul (the profound self of each of us) can come to know itself as spiritual only through the intellectual species that are abstract from the sensitive one, have prevented most of the time not only the understanding but also the actual reading of the texts of St Thomas who focuses on the real issue in question and shows that "the principle of human knowledge comes from sense. However, it is not necessary for everything that man knows to be submitted to sense or that it is immediately known only by means of a sensitive effect". Indeed, he affirms what we may call the decisive epistemological position of the Socratic principle of "know yourself": "The very intellect knows itself by means of its own act, which is not submitted to sense. In the same way, it also knows the interior act of will, since will is somewhat moved by the intellectual act and since intellectual act is caused in another way by will, like the effect is known by means of the cause and the cause by means of the effect" i.e. "principium humanae cognitionis est a sensu; non tamen oportet quod quidquid ab homine cognoscitur, sit sensui subiectum, vel per effectum sensibilem immediate cognoscatur; nam et ipse intellectus intelligit seipsum per actum suum, qui non est sensui subiectus: similiter etiam et interiorem actum voluntatis intelligit, in quantum per actum intellectus quodammodo movetur voluntas, et alio modo actus intellectus causatur a voluntate, ut dictum est, sicut effectus cognoscitur per causam, et causa per effectum" (*De Malo*, q. 6 ad 18).

## *Peace is the Work of Truth and Justice*

At this very grave moment in history, we must go from the truth to the good-justice, and from the good-justice to the truth. We must implement that circular movement that goes from the truth of science to the human good of justice and from justice to anthropological and scientific truth. Together with St Bernard we have to ask for the charity of knowledge and the knowledge of charity which “builds peace”. Peace is a gift of God offered to men and women of goodwill. St Bernard’s words are now addressed to all men and women of goodwill no matter their faith, and first and foremost to Christian men and women.

The science which brings together those engaged in research, specialists and workers, which mobilises political and economic powers, which transforms society at all levels and in all its institutions, has a task today which is proving more urgent and indispensable than ever, namely the task of cooperating in preserving and building up peace.

From the depths of centuries past there rises the voice of an unarmed prophet, Isaiah: ‘They shall beat their swords into ploughshares and their spears into pruning hooks’.<sup>14</sup>

In recent times, at a moment when war was imminent, there rose with biblical force the prophetic voice of an unarmed Pope, Pius XI, who quoted the Psalm: *Dissipa gentes quae bella volunt*.<sup>15</sup>

Unarmed prophets have been the object of derision in every age, especially on the part of shrewd politicians, the supporters of power. But today shouldn’t our civilisation recognise that humanity needs them? Shouldn’t they alone be heard by the whole of the world’s scientific community, so that the laboratories and factories of death may give place to laboratories of life? The scientist can exercise his or her freedom to choose the field of his or her own research. When, in a particular historical situation, it is all but inevitable that a certain form of scientific research will be used for purposes of aggression, he or she must make a choice that will enable him or her to work for the good of people, for the building up of peace. An example of this is one of the most distinguished members of the Pontifical Academy of Sciences, Franco Rasetti, a friend of Enrico Fermi, who firmly opposed the use of nuclear energy in war on the eve of the final stages of the Second World War and

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<sup>14</sup> *Is* 2:4.

<sup>15</sup> *Ps* 67:31.

stated that, “Physics cannot sell its soul to the devil”.<sup>16</sup> By refusing certain fields of research which, under concrete historical circumstances, are inevitably going to be devoted to deadly purposes, the scientists of the whole world should come together in a common readiness to disarm science and to form a providential force for peace.

Faced with this great patient in danger of death which is humanity as a whole, scientists, in collaboration with all the other members of the world of culture and with the social institutions, must carry out a work of salvation analogous to that of the doctor who has sworn to use all his powers to heal the sick.

Peace is born not only from the elimination of theatres of war. Even if all the latter were eliminated others would inevitably appear, if injustice and oppression continue to govern the world. Peace is born of justice: *Opus iustitiae pax*.<sup>17</sup>

Now science, which seeks the truth and is free from all ideologies, can and must promote justice in the world; while not remaining a slave of the economically privileged peoples, it can and must spread everywhere, in order to ensure, through appropriate technological means, that all peoples and all individuals are given their due. The modern world awaits the liberation of science that is a result of the liberation of the mind and heart. The globalised world makes it possible more than ever to join forces in defending truth and freedom to build world peace through justice.

With an acute sense of history, the Second Vatican Council warned us of this: ‘The common good of people is in its basic sense determined by the eternal law. Still the concrete demands of this common good are constantly changing as time goes on. Hence peace is never attained once and for all, but must be built up ceaselessly’.<sup>18</sup>

*Pax perpetuo aedificanda*: peace has to be ceaselessly built up. Peace is a continuous effort which is entrusted to research, to technological applications aimed at promoting justice, through the authority of the sciences, with that freedom of thought and will that enables other choices to be made to contrast violence and the exploitation of research and discoveries against justice and human rights. Pope Benedict XVI adds that “Peace is a gift that God entrusts to the responsibility of human beings, so that they may

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<sup>16</sup> Cf. Nicola Cabibbo, *Commemoration of Franco Rasetti*, in “The Cultural Values of Sciences”, The Pontifical Academy of Sciences, *Scripta Varia* 105, Vatican City 2003, p. XXXIV.

<sup>17</sup> *Is* 32:17.

<sup>18</sup> *Gaudium et Spes*, n. 78

cultivate it through dialogue and respect for everyone's rights, reconciliation and forgiveness".<sup>19</sup>

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<sup>19</sup> Pope Benedict XVI, *Angelus*, 28 March 2010.