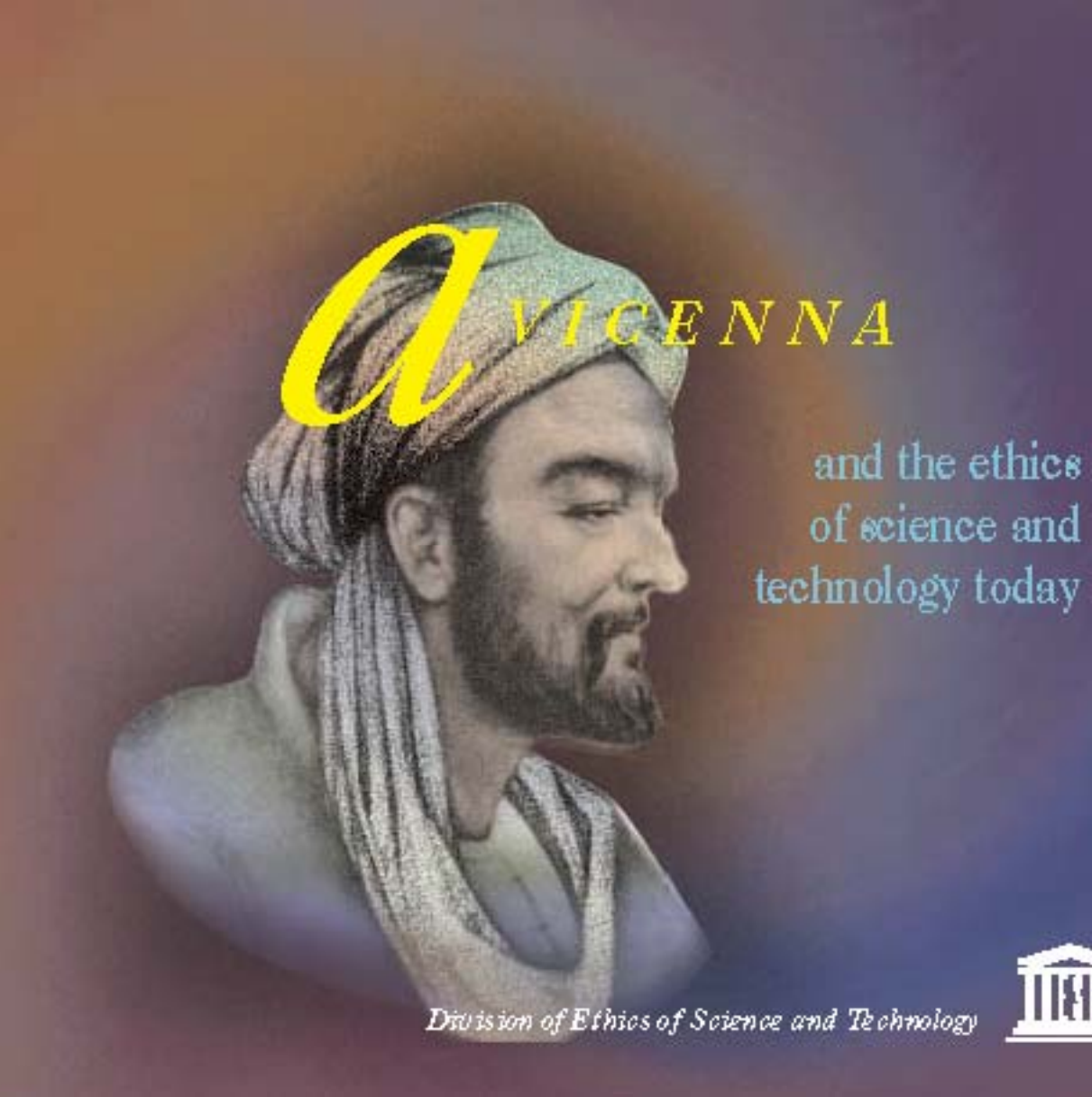
AVICENNA
and the ethics
of science and
technology today
Division of Ethics of Science and Technology

Avicenna

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and technology today

Illustrations
Front cover: Portrait of Avicenna
Back cover: Medal for the Avicenna Prize for Ethics in Science

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Introduction:
the life of a hero (980 – 1037)

Abu Ali al-Husain ibn Abdallad ibn Sina, also known by his Latin name as Avicenna, was one of the most eminent scientists and philosophers in the 10th and 11th centuries. He was of Persian origin, and was born near Bukhara in 370 in the year of the Hegira. In Persia he lived a turbulent life of wandering, imprisonment and escapes. This was the golden age of philosophy and spiritual life in the Islamic world, and also a time of political agitation and instability. The power of the Caliphate in Baghdad was in decline, and the Turks were conquering the Persian and Arab worlds. This being a golden age for the spirit in a declining civilization, parallels between Plato, Aristotle and Avicenna have been drawn. As Hegel wrote in the preface of his *Principles of the Philosophy of Right* (1821):

The Owl of Minerva first takes flight
with twilight closing in.

Avicenna was an exceptionally gifted and precocious child. At twelve, he was better than any of his teachers, and continued his training on his own. Endowed with a prodigious memory, he knew the Koran by heart at the age of ten and Aristotle's *Metaphysics* before he was eighteen, as well as *Theology*, which at the time was attributed to Aristotle (it was in fact a compilation of texts by Plotinus). In his wandering life Avicenna could not travel with a library (had he possessed one), and so his quotations and references are from memory.

For instance, he learned medicine without formal education or training and, according to his autobiography, considered it to be "not a difficult science". It seems that Aristotle's *Metaphysics*, which Avicenna says he read forty times without understanding it, was the only subject he ever found really difficult. The books of Al-Farabi, then known as "the Second Master" (Aristotle being the first), allowed Avicenna to finally find a way out of this situation, frustrating for someone of his genius.

By age seventeen, Avicenna had mastered more or less the totality of existing knowledge of his time in philosophy, medicine, mathematics, law and religion, and he spent the remainder of his life deepening this knowledge. Before he had reached the age of twenty, he was already a

famous physician. There was a turning point in his life when — after having cured the Prince of Bukhara — he was given access to the Prince's well-endowed library. An exceptionally gifted young man until then, Avicenna was now also able to become a truly universal scientist.

When his father died, Avicenna, who was then about 23, had to support himself. He earned a living by practising medicine and politics, excelling in both of these arts. In medicine he would teach the most renowned of his peers, and heal patients considered incurable. He wrote the famous *Canon of Medicine (Al-Qanun fi l-tibb)*, which was used in the West for teaching medicine until the 17th century and is still used in the East today. Avicenna was also sufficiently skilled in politics to make a forty-year career of it, serving many rulers during the course of his long wandering life. During those forty years, it was at night that Avicenna studied, read and wrote, the day being devoted to his political duties.
A strong personality, Avicenna was quick to criticize others, and would not remain silent if displeased. He was also quite aware of his own talents. For instance, he wrote these verses in his autobiography:

Since I have become great, no country
has been able to contain me
Since my price has risen, I have lacked buyers.

He also indulged in worldly pleasures, especially wine and women. It should be noted that he paid much attention to sexual hygiene in his medical treatises. To quote his autobiography once again:

> ***God has been generous to me. I therefore put all my gifts to good use.***

Regrettably, significant parts of Avicenna's works have been lost. What remains are the *Canon of Medicine*; the *Book of Healing (Kitab al-Shifa)*, which is a philosophical masterpiece of vast range and a milestone for the rediscovery of Athenian philosophers in the medieval West; comments on *sura* of the Koran; poems; some commentaries on Aristotle *(al-Mubhathat)*; some works on geology, fossils, metals and music (in Persian, the second part of the *Danesh-Nameh*); and finally his autobiography (*Al-Sira bi Qalam Sahib al Sira*), which was completed by his faithful disciple Al-Juzajani.

All these works demonstrate not only that Avicenna had mastered a vast and encyclopedic culture, but also that he had intellectually influenced many of the areas of knowledge in which he was interested. His masterpiece, the *Treatise of Illuminative Philosophy*, was destroyed during his lifetime. Answering some twenty-eight thousand questions, it constituted Avicenna's personal philosophy, which he himself called *Oriental philosophy.*

Concluding this brief summary of his life, the question might be asked why today Avicenna has become a synonym for moral authority and

ethics, lending his name to foundations, hospitals, philosophical and medical associations, bookshops and, last but not least, to the Prize for Ethics in Science that is co-awarded by UNESCO and the Islamic Republic of Iran. This is the question that we will explore in the next few pages.

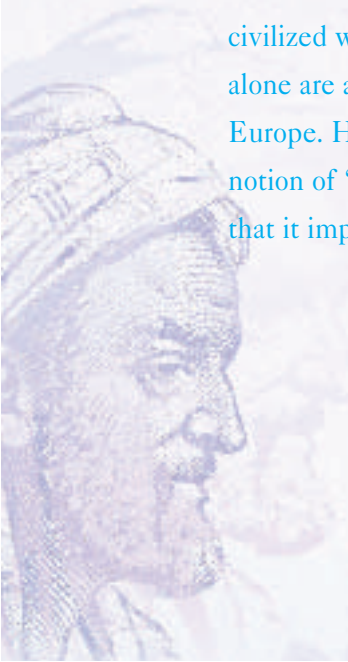
I. Linking East and West

The rationalist tradition of Islam

AVICENNA is particularly significant because he can be regarded as a scholar linking the West and the Islamic world. There is an undeniable tendency in Western culture to consider science a purely Western phenomenon. One often forgets that not only writing, the concept of zero and mathematical demonstration were born in earliest historical times in the region that is now called the Middle East, but that the exact sciences, the experimental method — of which we are so proud now — also

originated there. So the very reference to the name Avicenna is a reminder that Western science and wisdom have their roots in the Islamic world. The histories of the West and of Islam have not, as some believe, developed separately with only occasional connections. These histories are intimately intertwined. Refering to the name Avicenna is also a reminder of the extent to which Persia in particular was the centre of a cultivated, noble and ancient civilisation.

Avicenna takes us back to a time when the West was a place of obscurantism and barbarism, a civilization that had been regressing since the fall of the Western Roman Empire, while Persia was the centre of the civilized world. One could say that Persia's achievements in medicine alone are an indication that it was then more "developed" than feudal Europe. Hence, Avicenna can be seen as contradicting the 20th century notion of "development", and the simplistic and linear vision of history that it implies.



Avicenna's philosophical heritage

FROM a philosophical point of view, Avicenna and the 12th century philosopher Averroes were known in the West even before Plato's and Aristotle's texts were rediscovered and studied. It is through Avicenna's and Averroes' works translated from the Arabic that this rediscovery took place at the beginning of the 12th century, thus paving the way for the European Renaissance and its return to Antiquity. But even before the Renaissance, Avicenna and Averroes provided intellectual inspiration for Thomas Aquinas. During the last years of his life, Thomas Aquinas opposed Avicenna's and Averroes' readings of Aristotle. In his *Summa Theologica*, he quotes Avicenna almost 400 times. Without going into theological subtleties, Avicenna's wide influence in philosophy can be attributed to his invention of the distinction between *being*, *essence* and *existence*. In this regard Avicenna's heritage is immense, as it opened the way to the scholastic tradition of establishing proof of God's existence, of contingency, necessity, and possibility. Even the German idealists owe some fundamental parts of their doctrine to Avicenna. Hegel's *Logic* is divided into *Logic of Being* and *Logic of Essence* (which addresses the question of existence). And a dialogue with Avicenna's philosophy can also be discerned in the work of Descartes and Spinoza.

In both the West and the Islamic world, Avicenna's influence has remained fundamental. In that sense, Avicenna not only evokes the cultural heritage of the West to the Islamic world; it also underlines the fact that these two civilizations, which in many ways still oppose each other today, actually have a common root. One should also mention the important role of Avicenna in the Jewish tradition, especially his fundamental influence on the 12th century philosopher and physician Maimonides, thus testifying to the spiritual proximity of Jewish and Islamic thought.

What does Avicenna's life teach us?

AVICENNA is not only heir to Antiquity, which incarnates the ancient Greeks' nostalgia for the "beautiful unity" of man; in several respects he is closer to our time. This can be seen in the life he lived. Since he was obliged to work for a living, he would have been regarded as a slave according to the classical Greek vision and, as such, could not have become a legitimate defender of the general interest. However, it is precisely because Avicenna was a "worker" that he is closer to us. We admire his ability to overcome adversity and, though not "financially independent", to achieve more than many scientists of nobility who were financially autonomous. Great scientists and philosophers, such as Plato, Newton or Buffon, who were wealthy and of nobility, did not have to worry about making a living. But Avicenna showed that science was not a luxury which only rich people could afford, as Aristotle had maintained in his philosophy. In today's ethics of science and technology, this is relevant not only for individuals, but also for States: science should not be the privilege of rich countries alone, and poorer countries should not be deprived of science and its accomplishments.

Avicenna's life also raises the issue of the status of scientists and scholars. They were dependent on the goodwill and support of powerful

people, dependent on sponsors. If we look at scientific ethics today, it is obvious to us that the independence of science and the scientist must be assured, and our modern research institutions try to do so. But Avicenna had neither public research institutes nor universities as our modern scientists do. He had no courtly patronage, such as that of François I or of the Medici, who considered it their duty to give scholars and artists of the Renaissance the means to carry out their work in the best possible conditions. He funded his own research, and was thus obliged to study and write at night. The circumstances of his life also forced him to wander, change masters, go to prison and face enemies. In short, there was no institution to safeguard his independence; he was obliged to obtain and maintain it on his own.

Another ethical lesson from Avicenna's life relates to his political career. Historically, he is remembered as a scientist, but his "job" was politics. Since the early days of philosophy, the relationship of the philosopher to political power, and in particular his participation in political life, has been an issue. Plato invented the "philosopher king", but he himself was disgusted by politics and would not take part in it. Aristotle also stayed away from power, even though Alexander was his disciple. Avicenna, on the other hand, achieved the impossible in that throughout his life he was not only a man of politics and a brilliant orator, but also a scientific genius. We do not know much about his political accomplishments

but, knowing his temperament, we can imagine that he did not separate his theoretical research from his work in politics, and that this may have been one of the reasons for his relative lack of prudence, forcing him to change masters several times. Consequently, Avicenna's life demonstrates that the distinction we tend to make between scientist and politician and which Max Weber elaborated, is futile.

Avicenna's political work reflected, on the one hand, his knowledge of human nature though medicine and, on the other, political conceptions that he developed from his perfect knowledge of the science of law and of the Koran. Avicenna therefore embodies the idea that science is not only the business of scientists. Science involves both the personal commitment of individuals (the Greek *poiesis*, the domain of production, of activities that do not have value per se, but are destined for something else), and the public affairs of communities (which belong to Greek *praxis*, activities that constitute an end in themselves).

This is matter for thought and sufficient to initiate a reflection on ethics of science and technology. Let us now consider the question of the impartiality of science and its supposed indifference to politics.

II. Avicenna and the Renaissance

Avicenna is heir to Antiquity…

WE owe the science and technology of which we are so proud to Islamic civilization. While Europe was not yet aware of the teachings of the ancient Greeks and Romans, the Persian world treasured and nurtured this heritage. It was the Roman Emperor Justinian who closed down Plato's Academy. Yet Islamic tradition — of which Avicenna in a way was the central figure — preserved the works of Plato, Aristotle and Greek science as a whole for more than 800 years (incidentally, Greek science arose from Egyptian science). The "East" thus welcomed the medical and philosophical achievements of the Greeks, their mathematics, their logic, and their astronomy, and inherited the Roman notion of law. Although the tradition of written law founded upon the rights of the subject was undoubtedly absent from feudal Europe, it was at the heart of Islamic culture. Avicenna represents that tradition, especially through his commentaries on the Koran, his readings of Al-Farabi, and his political

action as *Vizir*.

Only a few decades after Avicenna's death did the opposition between East and West become more apparent and violent: the "holy crusades" began in 1096. It was then that the "Franj" (as the crusaders were called by the Arabs and Persians) showed their complete alienation from this culture and tradition, and their ignorance of the Graeco-Roman roots they shared with the Islamic world. Yet it was through this confrontation that the West was able to rediscover these roots: the crusaders brought back the texts of Avicenna and Averroes, as well as Arabic translations of Aristotle and Plato, among others, thus giving rise to the famous school of Toledo translators in the 12th century. And it is through this long journey, the critical study of texts, the return to science and Aristotle's logic that the Renaissance was ushered in, and with it western modernity (modernity being the period following the Middle Ages — which according to some may not yet be finished). In Europe, Avicenna was discovered and read even before Aristotle.

…But he also heralds modern times

IN many ways, Avicenna resembles the great geniuses and humanists of the European Renaissance and even makes them appear less original. Indeed, the return to Antiquity, the universal curiosity of scholars and artists, the search for efficiency, the rejection of magical explanations, scientific rigour, the experimental method and the critical mind are usually considered as characteristics of the Renaissance. But Avicenna had been practising the methods of Greek science more than five centuries before the Renaissance, and, as stated above, it was thanks to him (and several other scholars of the Arab-Persian world) that the West rediscovered this part of its history and these roots. He personified a curiosity of universal scope, one might say the whole of human knowledge concentrated in one person. His scientific methods were based on rigour, experimentation, observation and critical thought. We could also mention that the organization of the University, with courses, examinations, diplomas and the physicians' oath, was inherited from the Islamic world of the 10th and 11th centuries.

Precisely because he anticipates humanism, Avicenna carries a message of ethics and faith in humankind. He exemplifies the moral progress that should always accompany science. The multidisciplinary approach, in particular, leads us to consider the importance of ethics in

science and technology. Indeed, a fundamental aspect of the need for ethics in science and technology today lies in the incomplete vision that our scientists and engineers have of the world. Specialists in their own fields, they lack understanding of essential issues in other scientific fields. They thus seem unable to have a global vision of the world and, moreover, a true (if any) appreciation of the impact their work has in the world. But what is ethics in science and technology, if not the awareness of their role in the world? No doubt this problem is linked with the abundance of knowledge today. It seems unimaginable that a scientist today could master all the knowledge of his time, as Avicenna did. Even our greatest mathematicians only know a small part of today's mathematical science, not to mention physicians, physicists, etc. However, what we should really think about is not the extent of Avicenna's knowledge, but its quality. In his view, the body of knowledge of his time constituted a whole, a unity, and not a collection of separate parts.

Let us add that assimilating the Renaissance and ethics would be inaccurate. For the foundation of European modernity cannot be described simply as this great new curiosity and revival of science. Western modernity, as we have inherited it, was not a simple leap back across the Middle Ages into Greek and Roman Antiquity. It was also initiated by events such as the Reformation, the discovery and conquest of the American continent, the religious wars, the emergence of new sciences

such as optics and analytical geometry, and a new relationship to nature (as we will now see). It seems quite doubtful that Avicenna foreshadowed these aspects of modernity as well.

III. Avicenna and the harmony between humankind and nature

THE question now becomes whether it is precisely these aspects of modernity that are giving rise to the concern over ethics in science and technology. Indeed, if we consider ethics in terms of science's wide impact, then we also have to think about how ethics affects our relationship to the world. In Avicenna's science, humankind is (still) looking for a harmonious relationship with nature, and seeking to know it and conform to it. In European modernity, human beings dominate nature, and capture it through natural laws and equations (in what Kant called in the late

18th century the *legislating power of Reason* – philosophy usually understands the facts only long after they occur). This is not only an epistemological consideration. Modern humankind, as we will now see, assumes that it owns nature, and the planet as a whole.

Modernity as an attitude of destruction toward the world

Like Prometheus, modern human beings consider themselves to be the centre of the world, regarding the universe as an object at their disposal for the realization of their ambitions. The Reformation underlines the spirituality of this revolutionary view: it gives infinite value to the individual, seeing him or her as the only one who can ensure his or her own salvation. Humankind uses the world, consumes it, and destroys it to its profit, in a way that has no historical precedent. Consider Brazil: its name comes from a tree that covered the country's coastal regions. Due to the red colour of this tree, the colonizers called it Braisil (from the word for glowing embers). One century after the colonizers' arrival, the tree (which was highly valued by the Spanish and Portuguese courts) had totally disappeared from the 100 km wide stretch that used to be its natural habitat. From the outset, this type of exploitation of natural resources was characteristic of Western modernity. This was later exemplified by the

Industrial Revolution, by the internal combustion engine and the absolute supremacy given to fossil energy over natural energy (which today is termed "recyclable"). One can find the same features of modernity in capitalism, which Max Weber showed to be tightly linked to the Reformation: the very principle of capitalism is the ceaseless accumulation of capital and hence, in a sense, the denial of limits, whatever they may be.

It is clear that this manifestation of modernity highlights issues that are of ethical concern, in particular regarding the environment and ecology. An important aspect of the debate over ethics in science and technology relates to the tension that exists between finite natural resources on one hand, and infinite human demand on the other. When referring to Avicenna, one is referring to a time when this modernity did not yet exist. The figure of Avicenna incarnates the ethical demand for harmony between humankind and nature, a harmony that has been lost in modern times, and that we are trying to find again today.

When it is said that the question of ethics as concerns our relationship with the world was not an issue before the Renaissance, it is not only for spiritual reasons but also for historical ones. Indeed, if we consider the relationship between humankind and nature and the environment, it is obvious that the power of human beings is a determining factor. As the reach of human action approaches more and more the limits of a finite world, the tension between the two becomes that much greater.

This is precisely what was revealed during the Renaissance: prior to the great discoveries of Columbus, Magellan and others, no one had a true idea of how big the world was. In the Renaissance, humankind was confronted for the first time with the limits of its planet. It is clear that the tension that arose then could only become more acute with the diminution of fossil resources, the lack of fresh water, deforestation, and the greenhouse effect. If, in Avicenna's world, people were trying to live in harmony with nature, it is partly because they had no other choice. They considered the dimensions of the world to exceed those of humankind. Comparison between our times and Avicenna's thus makes us aware that we, unlike Avicenna, must accept responsibility for our environment.

Holistic vision of human beings in Avicenna's medicine

IN Greek science, a special role is given to medicine. Avicenna is an excellent disciple of the *Hippocratic tradition*, and is well aware of the famous Hippocratic Oath, in which we can see the first historical manifestation of scientific ethics. But there is also a much deeper connection to scientific ethics. First we should note that Avicenna's medicine was fundamentally different from what is considered to be medicine in the West today. Without neglecting rigorous experimental observation, Avicenna's medicine

treats the individual as a whole, an approach that today we would call "holistic". Avicenna does not see the individual as being constituted of separate parts, or as a complicated mechanism. The anatomy and physiology that Avicenna developed were violently disputed in the Renaissance, with Leonardo rejecting Avicenna's anatomical science and Paracelsus burning copies of the *Canon*. Since Avicenna considered each human being to be a whole, he did not make a strict distinction between mind and body as is often done today. For example, it is said that Avicenna took a great interest in the psychic life of his patients. In some cases, he would even consider mental treatment to be sufficient. He would thus cure a young man of a mysterious disease first by guessing that he had a secret love, and then by simply prescribing that he join and marry his beloved (the same story is told about the Greek physician Galen, but in any case it illustrates the holistic spirit of Avicenna's medical practice). What we consider today to be a psychosomatic illness was to him a disease just like any other. In his clinical work, Avicenna saw love as a pathological state, like melancholia or epilepsy, and described and analysed it with insight, and quite correctly by today's medical standards.

Another way to show the relevance of Avicenna is to point out that the partial approach to human beings that prevails today is continuously being criticized in present-day medicine. When, during the Renaissance, medicine was revolutionized by new approaches to anatomy and physiology,

the new theory of blood circulation, and the discovery of the importance of the nervous system, the body began then to be seen as being made up of separate parts. From a more general point of view, science (physics for instance) rejected the Aristotelian and finalistic view of nature in favour of an ever more mechanistic view of causality. Descartes exemplifies this approach. He makes a clear distinction between matter and thought, and an absolute separation between mind and body, with the body obeying its own mechanisms. In Descartes' view, for example, animals are akin to robots. The mind obeys completely different laws, it is independent from the body, and the interaction between the two takes place through the pineal gland. Here we are very far from the non-distinction between mind and body in Avicenna's medicine. In the modern conception of medicine, it tends to be a science or technique rather than an art. Hence disease is treated by addressing the mechanism of the disease rather than by giving it meaning, as was the practice in ancient medicine. To use a well known expression, modern medicine — by focusing on the mechanisms of disease — is naturally inclined to treat the disease rather than the individual.

Treating the person as a whole, however, should not be confined to Avicenna's holistic approach in medicine. This attitude was manifest throughout his entire life: through his involvement in politics (unity of theory and practice, of science and politics); through his quality as a universal scholar (unity of different parts of knowledge); and through his

relationship with nature (unity of humankind and its environment). The example of Avicenna's life and work thus incites us to reflect on the ethics of science and technology, and in particular on bioethics. Whereas contemporary medicine considers ethics to be a separate, if complementary, matter, it is clear that with Avicenna's holistic approach, ethics is an integral part of medicine. Avicenna discards the separation between ethics and medicine, and more generally between ethics and science, which is precisely the aim of ethics of science: that is, the integration of ethics with scientific practice.

Conclusion:
Avicenna today

FOR today's thinking on ethics Avicenna is important in many ways: he appears both as a bridge between West and East, and a bridge between antiquity and modernity. Heralding many aspects of modern science, he sees no divide between the different fields of knowledge, between scientist and homo politicus, between science and ethics, and between science and the environment. These divisions were invented by Modern European thinking, and this is probably the root of today's problems over ethics. Yet no one can ignore that during modern times this conception has also been linked to progress in science, technology and standards of living in certain countries. It would of course be absurd (on the pretext of this historical evolution) to turn Avicenna into an emblem of nostalgia or represent the wish to go back in time. It would also be wrong to believe that Avicenna had already solved in his time the problems we are now facing in ethics of science and technology. However, his is a spirit that we would like to recapture and rebuild today. Thinking about Avicenna in the present-day context of ethics in science and technology is somewhat like thinking

about one's parents in psychoanalysis. In trying to understand the consequences of being separated from them, one does not seek to go back to childhood but rather to overcome the difficulties that have resulted from these initial traumas.

Through his extraordinary life and work, Avicenna thus invites us to reflect upon scientific ethics, which both UNESCO and the Islamic Republic of Iran encourage, notably by awarding the Avicenna Prize for Ethics in Science.

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The Avicenna Prize for Ethics in Science

The Avicenna Prize for Ethics in Science is co-awarded every two years since 2003 by the Islamic Republic of Iran and the United Nations Educational, Scientific and Cultural Organization (UNESCO), on the initiative of the former. It rewards the activities of individuals and groups that have contributed to high-quality research in the field of ethics of science and technology.

The purpose of the Prize is to highlight the importance of ethics in science, to develop reflection on the issue and to bring it to the attention of scientists and the general public. The Prize is destined in particular for young scientists, helping them to gain recognition for their work and allowing them more international exposure.

The Prize consists of:

- a medal of Avicenna along with a certificate;
- a sum of money; and
- a one week academic visit to the Islamic Republic of Iran, which includes delivering speeches and presentations to relevant academic gatherings. This visit may be extended to cover other destinations at the invitation of Member States.

The prizewinner is selected by the Director-General of UNESCO, based on the recommendation made to him by an international jury. The jury consists of three members of different nationalities, one of which is to come from South-Western and Central Asia. They are appointed by the Director-General from among the members of the World Commission on the Ethics of Scientific Knowledge and Technology (COMEST).

Ethics of science and technology is a priority for UNESCO. One of the Organization's strategic objectives is to "promote principles and ethical norms to guide scientific and technological development and social transformation", in accordance with the medium-term strategy for 2002-2007.

Division of Ethics of Science and Technology of UNESCO

The Division of Ethics of Science and Technology reflects the priority UNESCO gives to ethics of science and technology, with emphasis on bioethics. One objective of the medium-term strategy of the Organization is to "promote principles and ethical norms to guide scientific and technological development and social transformation".

Activities of the Division include providing support for Member States of UNESCO that are planning to develop activities in the field of ethics of science and technology, such as teaching programmes, national ethics committees, conferences and UNESCO Chairs.

The Division also ensures the executive secretariat for three international ethics bodies, namely the World Commission on the Ethics of Scientific Knowledge and Technology (COMEST), the International Bioethics Committee (IBC) and the Intergovernmental Bioethics Committee (IGBC).

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Medal for the Avicenna Prize for Ethics in Science

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