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SUMMARY: A CONCEPTUAL APPROACH TO THE ACT OF FORENSIC AND LEGAL MEDICINE; BACKGROUND AND DEFINITIONS OF LEGAL AND FORENSIC MEDICINE; THE NEW CHALLENGES OF LEGAL MEDICINE AND FORENSIC SCIENCE; RECOGNISE THE ROAD TRAVELLED; IDENTIFYING THE NEW REALITY THROUGH TECHNOLOGY; THE NEW HUMAN POTENTIAL AND ITS RELATIONSHIPS; HUMANISATION OF THE MEDICO-LEGAL PROCESS; CONCLUSION; BIBLIOGRAPHY.

ABSTRACT. - The act of legal and forensic medicine in the 21st century needs to identify this new technological, technical and scientific era. To recognise that this can only be done through multidisciplinary, inter-professional cooperation, especially between practitioners and academics, and the institutions involved. Restoring, renewing and innovating professional work are actions that must be carried out in our times, which will be full of disruptive innovations, both scientifically and socially. Analysing, updating and sharing the values that are violated when practising the professions linked with the act of legal and forensic medicine will allow society to be more educated, fairer and safer.

A Conceptual Approach to the Act of Forensic and Legal Medicine.

The word 'concept' designates a reality that is constructed through action. From the verb *concipere*, to conceive, it is related to *capere*, to grasp or capture, and to *conceptus*, the action of containing.

The concept indicates the *capturing* of an idea or thought, built out of our learning and experience, and then internalised. Concepts are an abstraction that explains and summarises our experience, reasoning and imagination: through concepts we make sense of the information received and perceived. Even by linking concepts in a harmonious and coherent way we build paradigms. It is a way of understanding that evolves with us. This is what is happening in the conceptual field of science and technology, and therefore in legal medicine and forensic science.

When we look closely at the etymology, a "treatise on certainties", we find many of the elements that build and bring up to date the concepts regarding the act of legal and forensic medicine required today. Let's see.

The word 'act' comes from the Latin *actus*; it is a noun with a verbal effect, in other words, linked with action, and therefore has to do with performing, acting, taking action and reacting, i.e., "with doing". If an act is action, it is logical to understand that for Aristotle it lay in the explanation of movement and in the principle of being. This is why our acts are human when the rational powers, such as intelligence and will, are involved.

An act is recognised and qualifies as medical when it has to do with medicine, the science and art of the multiple ways of preserving and caring for health. One of them, a very important one, is diagnosis, *diag-nosis*, that is, what is done through 'gnosis', knowledge. Its etymology crystallises the word 'medical': 'medicus', 'medeor-eri'; to cure and care, and 'meditor' and 'medonai', which leads us to meditate and think. The root 'med' is also related to measuring and measure, in the sense of moderation and modesty, virtues that coexist with scientific curiosity, the desire to find the truth and the humility, which, in turn, are fundamental characteristics of critical thinking, essential for the scientific work of any era.

We could conclude, up to this point, that within our conceptual framework the act of medicine is an act because it is an action or reaction in itself, developed out of knowledge, will and prudence, within the framework of medicine, which is enriched today with a term more appropriate for this work: "biomedical sciences".

The word 'legal' comes from the Latin *legis*, law. With the term *legalis* we designate the quality of being accepted by the law. The term *lex* also fits into the framework as it links us with a rule, a mandate, a decision that is imperative and therefore required by what is legal.

Medicine becomes legal medicine when its acts are linked with laws and the law, in accordance with what is right, the law, the rules and regulations that societies have given themselves throughout history.

The term 'forensic' originates from *forensis*, the public square, the forum. A forum refers to an enclosure with no buildings, the place where judicial proceedings took place, hence the expressions 'public and judicial life', 'courts of justice'. The forum was the public square at the confluence of two emblematic streets of a Roman city, the *Cardo Maximus* (running north-south) and *Decumanos Maximus* (running east-west), an emblematic place where the augurs read the omens and performed divination. It is not trivial that the cardinal points emerged within this conceptual framework. In the forum, the forensic doctor explained the medical causes related with the judicial process, as the "peritus", he who knows.

It is acknowledged that medicine may have been one of the first forensic disciplines, for as early as the Egyptian civilisation there is evidence of the use of tests to diagnose pregnancy by observing the effects of urine on certain plants. Today we can affirm that the new concept of forensic and legal medicine leads us to consider that any science becomes forensic from the moment it serves for the procedures, development and clarification of legal proceedings.

Background and Definitions of Legal and Forensic Medicine.

Having looked at the conceptual origins of legal and forensic medicine, we can look more closely at some of the definitions that have gradually emerged over the course of history.

Legal and forensic medicine was born, grew and developed out of a knowledge of social sciences, preventive medicine, the history of medicine, clinical medicine and, in particular, from so-called public medicine, also known as social medicine. There are many historical references that support this view. We can quote some in order to acknowledge our heritage and evolution, such as the Code of Hammurabi, a set of 282 laws inscribed in stone by the king of Babylon in 1772 B.C., the "Lex Talionis" being a model of retributive justice. History tells us about thanatological practices in Egypt and the Dokimasia in Greece, before the courts. The medical examination of injuries to dead bodies was included in the Laws of Cornelius and Aquilia in Rome. The assessment of injuries was referred to by the Assises of Jerusalem starting in the 11th century. Visiting the injured by court order was dictated by Pope Innocent III in the 12th century. The law of autopsy existed at the University of Montpellier in 1374. The provision of and the need for expert opinions appeared in the *Constitutio Criminalis* of 1532 for cases of homosexuality, witchcraft, murder and manslaughter. Publications on the "business of corpses" used in autopsies appeared chronologically around the publication by Vesalius of his great work "De Humanis Corporis Fabrica libri septem" in 1543.

The first treatise on forensic medicine dates back to 1575 and its author, Ambroise Paré, is considered the father of French forensic medicine. Later, in 1581, Juan Frago, surgeon to Philip II, published his work "Universal Surgery", which was important for forensic medicine.

Paolo Zacchia is considered the father of forensic medicine. Physician to Popes Innocent III and Alexander VII, he was legal adviser to the Apostolic Tribunal of the Roman Rota and head of the medical system of the Papal States. In the period 1621-1651, he published his extraordinary work "Quaestiones Medico-Legales", an extraordinary compilation of practical cases that became a pioneering text for the legal and forensic medicine of his time.

The Spanish reference for legal and forensic medicine was Mateo Orfila, professor and dean of the Paris faculty of medicine, who published his two main works between 1814 and 1817: "Treatise on Poisons" and "Elements of Medicinal Chemistry". As well as acting as an expert witness in many court cases, Orfila also added dissection rooms, a comparative anatomy museum and a pathological anatomy laboratory to the university. Orfila defined legal and forensic medicine as the body of medical knowledge needed to illustrate various legal issues and to guide legislators in the composition of laws. His talent and capacity for work brought us closer to many of the concepts that are raised today in the practice of legal and forensic medicine in the 21st century, a good example being the relationship between forensic practice and the academic life of the forensic doctor.

The first professorships in legal and forensic medicine were established at the Columbia College of Physicians and Surgeons in 1813 and two years later at Harvard University. In this country, it was in 1843 that Pedro Mata y Fontanet occupied the first chair of legal and forensic medicine at the University of Madrid. In contrast to the vitalist currents of the time, Mata was an advocate of experimental analysis, concentrating at that time on advances in physics, chemistry and microscopy. His work entitled "Criterio medico-psicológico" (A Medical-Psychological Criterion), published in 1869, contains some of his most important expert reports. The author of the first treatise on legal medicine and surgery, he was also the sponsor of the 1855 Health Act, which included the post of forensic doctor for the courts of Madrid and the creation of a group of doctors linked to the

Justice Administration, which would culminate in 1862 with the creation of the Corps of Forensic Doctors attached to the District and Examining Magistrates Courts, whose duties would be recognised in the Criminal Procedure Act of 1882.

Pedro Mata drew up definitions of forensic and legal medicine that evolved in line with the scientific advances of his time and defined it in 1844 as: “an auxiliary of justice, the doctor an adviser to the magistrate, his opinion a torch that lights up for the court matters that are opaque to it”. Mata stated that the main purpose of forensic medicine was the preservation of public and private health. As the protection of the state was necessary, it was necessary for the forensic doctor to rule on the different situations of the time, such as fitness for armed service, cases of abortion, assault and mental health. On the last of these, he carried out important research, academic and expert work, as well as social outreach and the humanisation of healthcare for psychiatric patients.

With the passage of time and experience, he updated his definition to recognise the scientific and social advances made at the time and understood forensic medicine to be: “The body of scientific, mainly medical and physical knowledge the purpose of which is to give their due value and genuine significance to certain legal facts and to contribute to the formation of certain laws”. Later on, he qualified this statement: “Forensic medicine is the art of applying the knowledge and precepts of the various main and secondary branches of medicine to the composition of laws and various legal questions in order to illustrate and interpret them appropriately.”

Legal and forensic medicine is therefore an auxiliary science for the law and "with the law", as its contributions have a theoretical and doctrinal character that allows us to consider, according to Professor G. Calabuig, that we are dealing with: “a body of medical and biological knowledge needed to solve the problems posed by the law, both in the practical application of the laws and in their improvement and evolution”.

The importance of legal and forensic medicine is endorsed not only by its history but also by the nature of its actions, such as the scientific method used, its relationship with other police-related, legal and social sciences; its particular financial, health-related and social repercussions, as well as the mandatory nature and importance of its interventions. All this has permitted the specific contents of legal and forensic medicine to be consolidated in the form of specialised areas of knowledge, such as:

Medical Law

Criminalistics

Forensic Thanatology

Forensic Pathology

Forensic Laboratory

Forensic Sexology

Neonatal Forensic Medicine

Psychiatric Forensic Medicine

Forensic Toxicology

The Forensic Medical Clinic

Legal and Forensic Psychology

It seems obvious that there is a need for close collaboration between the professionals in each of the above-mentioned areas, as their ability to solve presumed crimes, possible causes of death, prepare expert reports or carry out complex forensic and police investigations depends on these professionals, such as the recovery of the body, biological sampling, the legal autopsy report, analytical and molecular research, ballistics, imaging, photographic analysis and many others, which also require the use and application of complex instrumental techniques.

New areas of applied knowledge have been added to all these already classic specialities, which even require the inclusion of new professions, such as engineering, biological computing, biotechnology and genetics, among others, and which are justified by the new needs, social and health-related requirements of a legal and forensic medical nature that require constant updating, as can be deduced from some considerations which, by way of example, appear in the scientific literature:

- The importance of clinical autopsies justifies the fact that pre-mortem error rates, such as misdiagnosis, can be detected in up to 10% of clinical autopsies, with 25% being classified as significant errors. It is even more important in legal and forensic medicine to identify them as these studies lead to a broadening of the cause of a death that is suspected to be from violence or criminality. The autopsy stage is essential to the investigation that takes place at the crime scene and the removal of the body. If autopsy means "to see with one's own eyes" and the 'autoptes' is the direct witness, the eyewitness, in both cases the new technologies give greater breadth and depth to what we see.
- Deaths with judicial involvement range between 5-7% of overall mortality, which includes all deaths from external causes and sudden or unexpected deaths.
- External causes are a leading cause of preventable mortality, accounting for about 9% of all deaths worldwide. In Europe, external causes account for slightly more than 7% of all deaths each year and in Spain external causes are the seventh leading cause of death, responsible for almost 4% of total mortality and the leading cause in those under 45 years of age.
- The main causes of unintentional injuries, accidents, are injuries from road accidents, which account for about 16% of deaths from external causes, followed by poisoning with 13% and falls with 10%. Injuries from road accidents are one of the leading causes of premature death and disability in the world, with the scientific literature suggesting that 50 million may be injured, of which 1.3 million die, and they are also one of the leading causes of death in adolescents and young people. In Europe, 120,000 deaths and 2.4 million wounded and injured are reported. According to the World Health Organisation, it is currently the ninth leading cause of death, but the growing trend could make it the leading cause of death by 2030. In the case of deaths in childhood, we know that the majority of fatal accidents between 2-4 years of age are due to drowning, suffocation or crushing, and in

children under 2 years of age are due to falls or poisoning. Mortality due to adverse reactions to psychoactive substances accounts for just over 50% of deaths in prisons.

- The main causes of intentional injuries are suicide and homicide. In Spain, suicide is the number one external cause of death, with 4,003 deaths in 2021. It is three times more frequent in men than in women, although we must recognise the difficulties in recording the real causes of death in these cases.

The great complexity of legal and forensic medicine in the context of security is obvious, as it requires not only a high level of expertise but also of organisational ability.

Maintaining law and order as well as protecting the society it serves are the common goals of legal and forensic medicine, which involves a direct and important responsibility for public safety.

This is the moment at which, to better understand the meaning of the term responsibility, we need to look again from the viewpoint of etymology, because *respondere* has to do with accepting, assuming, contracting, facing, and the legal duty to respond, even to compensate. It also means to respond and answer, feel, regret, gravitate, but we must not forget to add that, to face up to the new disruptive changes in legal and forensic medicine, it will be necessary to recover and update the meaning of responsibility in the sense of *respondeo*, a Latin verb that refers to commitment, i.e., qualified, responsible professionals are those who are able to make a commitment time and again, and not only because they are able to handle highly complex technologies but also because they apply high ethical values to their duties. So, with good reason, we are talking about a discipline that deals with the application of medical and scientific principles to legal and judicial issues, bringing together medicine and law.

The New Challenges of Legal Medicine and Forensic Science

Science is the scientific knowledge that results from an inquiry-based activity. Science means knowledge – "knowing" – and uses a method, a "way".

Research is an activity aimed at obtaining new knowledge, which in many cases will be applied to the development of new technologies. It is a complex intellectual process that requires a systematic approach based on its hypotheses and objectives, and proper organisation. Results are therefore obtained, the interpretation of which must be discussed based on similar, bias-free evidence from the literature. In the field of legal and forensic medicine in particular, scientific research must link together science, technique, innovation and practical and professional experience. It must therefore be characterised by being multidisciplinary, since it approaches the object of study from different disciplines; interdisciplinary, because it provides integrated theoretical and methodological criteria; and, finally, cross-disciplinary, as knowledge is incorporated because of the convergence of the disciplines involved, which are affected by both the activity of professionals and of researchers.

The accumulation of findings or knowledge that are related with each other in an orderly way turns science into a systematic body of knowledge in which, in order to know more, further research needs to be done, and in order to find out more about something, the

concept of natural observation has to be overcome. In this way, in accordance with this need to research, technique is introduced into the scientific method, and the technical products, whether goods, services, methods or processes, seek for and enable new knowledge to be discovered that can only be "observed" by applying different techniques.

A dependence therefore arises between science and technology, which is defined by the fact that in order to get to know and discover new knowledge, technical procedures must be invented; and in order to invent technical methods, prior rational knowledge must be acquired.

This scientific-technical or technical-scientific reality has determined the expected improvement of "observation", and consequently makes it possible to bring continuity to the ongoing trajectory of scientific knowledge, as it permits the acquisition of new knowledge, which cannot be achieved without incorporating techniques into the scientific method. This improvement involves a new way of knowing, characterised by the act of giving invention a place in the scientific method. Facing up to these new challenges with scientific and professional values should keep us away from creating sophistry, in the sense of arguing in a false or erroneous way, giving the appearance of truth, and also from blunders, i.e., a lack of wisdom or of aim in our decisions.

In daily practice, the act of legal and forensic medicine has been permeated by the new concept of technoscience as the terminological expression of the complementarity between science and technology that seeks to highlight the creative nature of their way of doing things. New realities have emerged that leave behind the division between basic science and its subsequent applications that only innovation places in the daily routine of the professions practising legal and forensic medicine. Although there are many examples associated with technoscience, we will cite those related to molecular biomedicine and medico-legal biopathology because of the extraordinary advances made in recent years and their predictive capability. They include the study of toxicological biomarkers as applied to the investigation of homicide or suicide; on-site toxicological analyses in drug trafficking, road safety and the prevention and control of special occupational risks; the use of molecular biomarkers in different biological fluids in the investigation of the date of death or associated with histopathological studies; as well as genetic studies linked to people trafficking and their identification. Today, there is a multidisciplinary, specialist area of expertise located in the legal and forensic medicine laboratory.

For all these reasons, in order to improve and ensure public safety, it will be essential to take on and resolve with determination new models of inter-professional relations and the essential setting up of multidisciplinary work teams. Therein lies the quality and excellence of legal and forensic medicine in this century.

Recognise the Road Travelled. -

The enactment in 1968 of the Regulations governing the National Corps of Forensic Doctors gave a charter to a consolidated area of knowledge, which in 1985 culminated in the creation, in Organic Law 6/1985, of the Institutes of Legal Medicine and Forensic Sciences to provide assistance to the different jurisdictional bodies, with a special expert function. It was further improved by Organic Law 16/1994 on the Judiciary and the Regulations of the Institutes of Legal Medicine in 1996 and the National Corps of Forensic Doctors in 1997. Royal Decree 355/214 created the Forensic Medical Council, a

consultative and scientific-technical advisory body in the area of legal medicine and forensic sciences, the purpose of which is to advise and contribute to ensuring that the expert response prepared by the Institutes of Forensic Medicine has the quality required by the jurisdictional function. Chapter three includes duties and responsibilities as important as these: “To promote the coordination, communication and information of the Institutes of Legal Medicine among themselves and with the General State Administration, the Autonomous Regions and the National Institute of Toxicology and Forensic Sciences, in order to disseminate and apply the knowledge and technological advances that are produced in the field of forensic medicine, promote the harmonisation of the forensic medical service and the development of this branch of medicine as a practical and research science, with the aim of achieving the maximum effective guarantee of forensic medical activity throughout the territory of the State. To promote the generation of high-quality research procedures, projects and programmes for all the Institutes of Forensic Medicine. To collaborate on initial and continuing training plans for forensic doctors and to submit to the Ministry of Justice and the Autonomous Regions with jurisdiction in matters of justice the proposals it deems appropriate in terms of planning the training of forensic doctors. To promote specialisation in legal and forensic medicine within the Institutes of Forensic Medicine.”

Also, more specifically, the European Union and the Council of Europe have been developing different standards to improve the quality of forensic practice, e.g., standards for the accreditation of forensic laboratory service providers (Standard ISO/IEC 17025) and their technical competence that affect each of the stages of the process, pre-analytical, analytical and post-analytical.

It is clear that legal medicine and the forensic sciences have undergone a disruptive change in the last 20 years thanks to the incorporation of new technologies as well as a greater awareness on the part of judicial and professional institutions of the need to apply the knowledge of forensic sciences to the outcome of judicial proceedings, in which expert reports have demonstrated their acknowledged efficiency and verifiable scientific validity, capable of responding to the police-related and legal issues that may arise. Although we recognise the significant progress made in recent years, there is still a long way to go, as legal and forensic medicine, represented in Spain mainly by the Institutes of Legal Medicine (IML) and the National Institute of Toxicology and Forensic Sciences (INTCF), generates information that is underused, in my opinion, as it could even be of great importance to public health in terms of healthcare and epidemiological implications, including its impact and effect on human rights.

For its part, public safety includes the set of necessary measures taken by a government or a society to protect its citizens, as well as to maintain law and order, with the state law-enforcement agencies responsible for investigating crimes and protecting the community from violence and crime, including protecting it in the event of emergency situations, natural disasters or terrorist attacks. Its close relationship and collaboration with legal medicine and the forensic sciences is clearly an imperative of our time, if we are to talk of and tread the path of excellence.

Identifying the New Reality through Technology. -

We should understand technology as the scientific knowledge and the set of technical resources handled by technologists (people trained in the theory and practice of a technical

profession) applied to engaging in an activity. In technology there is science and the technical, concepts that are also linked to an orderly and purposeful economic and socio-cultural framework.

In our case, the act of legal and forensic medicine has a growing complexity that determines not only the handling of the new technologies that are cascading in at great speed, but is also a determining factor in the emergence of new areas of knowledge supported by the applied sciences, which in turn determine and demand a constant updating of professional and academic profiles, as well as of new professions that use these technologies. This is the case of augmented reality, virtual reality, simulation, inverted learning and gamification, many of which are also applied to problem-based learning. All of this has an impact on the work of legal and forensic medicine, criminology and police investigation, which is affected by digitalisation, systems biology, nanotechnology, biocomputing, robotics, biomolecular archaeometry, medico-legal biopathology, digital osteology and taphonomy, among many others.

As a paradigmatic and controversial example, I would like to cite forensic genealogy, as an application of genetic genealogy, since it currently has a variety of scientific, ethical and legal implications. Unlike databases for the purposes of criminal investigation, obtained as part of criminal investigations, and the study of corpses or missing persons, forensic genealogy is based on data provided voluntarily in order to complete family trees. The combination of DNA analysis technologies with other genealogical research tools may permit the identification of suspected criminals, but it also requires penetrating into the territory of privacy, which leads to legal controversies, as individual rights and duties may collide, to the extent that public security may also be compromised.

We are therefore faced with a dilemma arising from the great progress made by the new technologies for DNA research, at all their stages: pre-analytical, by obtaining and handling complex samples; analytical, through the massive parallel automated sequencing of single nucleotide polymorphisms; and, finally, the post-analytical stage, when the results can be interpreted by developing special software that permits the construction of internationally shared molecular databases, as in the case of GEDMatch and FamilyTreeDNA. Perhaps the most striking application of these new technologies can be found in the solving of the case of the "Golden State Killer", in which in 2018 a retired policeman was arrested, who was blamed for 13 murders, 50 rapes and more than 100 robberies, after being identified thanks to forensic genealogy.

In any case, the application of these techniques will require detailed legal regulation in the future.

The New Human Potential and Its Relationships. –

In this century, the act of forensic and legal medicine requires innovation and teamwork as the driving force for the necessary change to a two-way relationship between the academic and professional worlds.

Without innovation it is not possible to create knowledge; its absence often leads to pathologies such as stale academicism or proud and hollow arrogance, culminating in social irrelevance. Innovation is not just about solving technological needs, it is about implementing a culture of anticipation in the organisation, which requires an exercise in

scientific humility, which is needed to contain the desire to prevail and the ability to curb hasty analysis and decision-making. It is not surprising that 'innovate' has to do with the prefix in-, inside, and the verb 'novate', which refers not only to replace but also has the meaning, in the form of a parable, of "earth removed and put into cultivation", without forgetting that cultivation is a term related to culture.

Out of reflection on these considerations there may emerge the change that is so necessary and hoped for in these new times, which is teamwork. It will require identifying a professional leadership supported by and from the "Auctoritas", that is to say, the publicly recognised professional and moral authority, which requires great courage and strength from the institutions to make it possible.

The latter is, in my opinion, necessary in the field of legal and forensic medicine, in order to be able to establish a close link between the study and research carried out by universities, which we will call academia, and professional experience, i.e., the professionalism that is closer to daily practice.

A good example is the experience developed in 2020 by the Forensic Capability Network, in which law enforcement professionals also work in academia, creating tools capable of improving the security, efficiency and transfer of knowledge in the practice of legal medicine and forensic science.

In this sense, together with other authors, we propose the concept of the "pracademic" ("practitioner academics"), to refer to professionals who are, or have been, academics and who work or combine their activity as academics in universities or different training and research centres. In the field of specialised clinical health training, including undergraduate training, we understand this concept very easily, both in the training of medical and nursing staff. The work of Bartunek and Rynes in 2014 and the regulatory report on Forensic Sciences published in 2019 were already calling for a change in the collaboration between academia and professionals, proposing an urgent need to establish new relationship models, which must be initiated by the institutions. This is what we will call a new culture of inter-professional relations, for which the aim is to create effective partnerships and overcome the perception of snobbery – in the sense of presumptuous, unnecessary and inefficient – already overcome in the field of technoscience.

With regard to the university, we must remember that it has always been a research and teaching community, and one for interdisciplinary dialogue, the aims of which are intellectual and ethical, both in research and in teaching, learning and decision-making. The university is not only a seismograph of scientific reality but also of social and cultural reality. All these are reasons and responsibilities of sufficient importance for universities to engage in a permanent dialogue with professional practice.

In regard to professional experience, as occurs in the clinical field of medicine, I would like to state that in the field of legal and forensic medicine, it is necessary to determine, promote and consolidate professional and scientific competence, and this will only be possible if we are able to understand that being competent means having the knowledge, skills and attitudes to make decisions in complex situations. Knowing how to do something with attitude can only be defined by action, by the professional work required by the act of legal and forensic medicine.

The new human potential that we must identify, train and care for requires that the older generations are capable not only of understanding but also of believing that these new forms of multidisciplinary action have the necessary significance, so that the different institutional bodies value the scientific and operational importance of the new roles of the academic-professional relationship, which requires innovation and creativity to determine the contents and structure of this partnership, capable of improving practical performance and research in terms of quality, validation and professional excellence. We must not forget that the practice of legal and forensic medicine is also impregnated with the use of new technologies and study methods that require the intervention of interdisciplinary teams, capable of generating "more than professional polarisation, a fruitful pollination".

To all that has been said about the relationship and the relevance of this structural collaboration, it remains to add the reward, which, as J. Morrissey argues, lies not only in mutual professional recognition but also in shared publications, knowledge transfer, the development of joint programmes, and professional and personal promotion, in order to achieve the best performance both in practice and research and to promote quality and excellence in collaborations between law enforcement agencies and the academic world.

In this country, such collaborative places can be developed and located through the National Institute of Toxicology and Forensic Sciences and the Institutes of Legal Medicine and Forensic Sciences of our different autonomous regions. They are related to university chairs and institutes for teaching and researching legal and forensic medicine, in areas such as criminology, forensic psychology, anthropology, toxicology and molecular biology.

Fortunately, this relationship has been expanding, coming ever closer to the same areas of practical knowledge and other complementary areas with the law enforcement agencies. To tread path of excellence in the practice of legal medicine and forensic science, in the 21st century, more than ever, it must be interdisciplinary and inter-institutional, or it will never be. In this area, among the many different types of collaborations that already exist, I am pleased to congratulate the University Centre of the Guardia Civil on its initiative of publishing its own institutional scientific journal in 2023. An innovative project, qualified to make this new era possible for the legal and forensic medical sciences and to contribute to the promotion of science and research.

From the point of view of medicine, I will end by recalling that the act of legal and forensic medicine is also an act of medical and social healthcare, defined in the code of medical ethics as: "...Any lawful activity carried out by a legitimately qualified medical professional, whether in the form of care, teaching and research, expertise or otherwise, aimed at curing a disease, alleviating a condition or promoting health as a whole. This includes diagnostic, therapeutic and pain-relieving acts, as well as the preservation and promotion of health, by direct or indirect means."

The future of the act of legal and forensic medicine will not only be healthcare but also teaching, because we learn from it and teach it, and research, because it requires a transfer of knowledge capable of innovating and developing new initiatives. So, the act of legal and forensic medicine must be managed correctly, effectively and efficiently in accordance with the requirements of quality and solvency demanded by its applied nature, its interaction with the law and its social responsibility. It must therefore be conducted, exposed and defended in the forum, i.e., in the public court.

Humanisation of the Medico-Legal Process.

Clinical medicine has historically understood that the act of medicine must be human, humanised, not because it is legal and forensic medicine, but because it has important implications for the lives of individuals, victims and families, as well as for society.

The María Moliner Dictionary refers to 'humanise' as: "To make a thing more humane, less cruel, less harsh for Man ... to become more humane, or less severe. To become human."

Synonyms abound that relate to the expression 'becoming more humane': affable, affectionate, benevolent, benign, soft, charitable, understanding, communicative, acquiescent, considerate, cordial, indulgent, magnanimous, merciful, propitious, sensitive. Human applies to those who feel solidarity with their fellow human beings and are benevolent or charitable towards them. It all also has to do with the practical practice of legal and forensic medicine.

Humanise is a verb, an "action word", which is conjugated to restore the dignity and rights of patients, and it does so in terms of a vocation, a calling and pre-occupation, through a set of acquired competencies, which are not only professional, based on commitment, responsibility and testimony. It follows that humanising is an action that generates a new event and gives meaning to professional life.

The "humanised" act of legal and forensic medicine will always be an unfinished, incomplete and limiting process, but it will not be possible to exercise it without the professional exercising it militantly in regard to his or her values and ethics.

The new technologies and new management models seem to demonstrate the illusion that we have gone beyond the concept of the individual medico-legal act, that of a single professional, to enter into a complex process, a kind of polyhedron filled with faces and edges on which the light of legal and forensic medical knowledge breaks down, is reflected and refracted, allowing responsibilities to become so diluted that they can hardly be identified and are blurred by the application of a decision protocol or algorithm.

The act of legal and forensic medicine must not only be highly qualified and secure, it must also be humanised, when examining an injured person, informing a family about the results of a cause of death, giving expert evidence in a trial, cooperating with different colleagues in the investigation process, handling privacy and confidentiality, institutional loyalty or ethical commitment. Therefore, in recognition of this new era in legal and forensic medical sciences, I would like to stress the importance of values and professional ethics. To paraphrase Professor Adela Cortina: "Ethics is not only a matter for individuals, but also for organisations... and they have to assume it not only as a duty of justice but also as a matter of prudence."

One of the etymological meanings of ethics is the "place where one lives", both for general ethical culture and for ethics applied to the different professions and areas of knowledge. We are facing a renewal of the concept of responsibility and the recovery of ancient and modern values. This subtle caste of subjectivities, as defined by Ortega y Gasset, must be found in the environment of the act of legal and forensic medicine that we have defined. It is a scientific and technical act and will therefore have, among other necessary values,

rigour, verifiability and originality, efficiency and usefulness. It is a social act affected by the values of prestige and excellence. It is also particularly legal, which is why the values of legality, security and disclosure are essential. It is also political and therefore permeated by the values of equality, freedom and solidarity. Lastly, it is a highly moral act and therefore it is essential for it to express values such as altruism, autonomy and honesty.

In a more restrictive approach, I understand the act of legal and forensic medicine of our times to be multidisciplinary and inter-institutional, which has to lead to the exercise of and competence in common values that have to do with the professional competence linked with continuous training and honesty and trust, which are governed by confidentiality. In addition, there must be an adequate and effective inter-professional and inter-institutional relationship between the university and professional forensic practice that is capable of enabling acts of legal and forensic medicine imbued with quality and comparable criteria, adequate access to resources and appropriate professional regulation.

Conclusion:

The new paradigm of the act of legal and forensic medicine in the 21st century must be based on the professional excellence of those who practice it with involvement, equity, innovation and ethics. To these we must add the capacity of the institutions that endorse it with renewed demands for these times, for planning, sustainability, integration and coherence. It is then that the act of legal and forensic medicine will be fully accredited for the demands and needs of the courts. This is a new building that professionals and institutions must construct with the bricks of time and the cement of the patient, since, as Gregorio Marañón said: "... scientific progress does not flow continuously like a river into the sea, but advances like the tides, ebbing and flowing, equally precise so that at last the waters reach where they should..."

As occurs in the scientific method, in the act of legal and forensic medicine, humility is the food of critical thinking, which brings Jacinto Benavente's reflection up to date: "The fact that we are considered better than we are forces us to be better than we are."

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