

## Is there any scientific imbalance in the academic education of the physician?

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**Abstract.** This contribution follows the talk presented during the 2018 International Seminars on Planetary Emergencies, Science for Peace the World Over at the Majorana Foundation in Erice, Sicily. Over the centuries, medicine has changed the approach to the sick and the disease. Too much focused on the biomedical sciences, it has thus lost the teaching and wisdom inherited from the past. In this paper, we discuss the need to reacquire ancient knowledge and the importance of the educational role of the Human Sciences and the History of Medicine in the mature training of the modern doctor, as claimed in the early 20th century by the Italian doctor Luigi Mangiagalli. As asserted by the American psychiatrist George Liebman Engel, a culture that also includes historical information facilitates the understanding of the present and helps to develop an epistemological and critical sense, which is indispensable in age too intoxicated by so many scientific successes and which appears obstinate in her certainties.

**Key words:** history of medicine, education, physicians, epistemology, Luigi Mangiagalli, George Liebman Engel

This contribution follows the talk presented during the International Seminars on Planetary Emergencies, 51<sup>th</sup> Session, Science for Peace the World Over at the Majorana Foundation in Erice, Sicily, held between 20<sup>th</sup> and 23<sup>rd</sup> August 2018. On that occasion, Dr. Omar Larentis gave the speech during the fifth session entitled Human and Social Medicine, whose chairman were Professor Antonino Zichichi and Professor Adelfio Elio Cardinale.

Physicians of the end of the 20<sup>th</sup> century were deeply focused on illness. They were always reproached for being too interested in the specific observed pathological phenomenon and to lack of a patient's global view (1). Conversely, the physician of previous generation had a better doctor-patient relationship and a more attentive approach to the general condition of the subject (2). He was generally requested to have an extensive knowledge (3). Until the half of the 20<sup>th</sup> century, access to medical studies required indeed a solid humanistic culture, acquired in the grammar school. In this context, in the Thirties, Schedule XVIII was

formulated and the legislator included History of Medicine as one of the exams that could be part of the educational offer of the university (4). Luigi Mangiagalli's (16<sup>th</sup> June 1850, Mortara. IT – 3<sup>rd</sup> July 1928, Milan, IT) teaching was received with his emphasis on the educative significance of the History of Medicine. According to him “*what was necessary was a teaching that coordinates medical studies, summarizes them, demonstrates their connections, studies the historical development of the different medical doctrines and prevents medicine, with its growing hyper specialization, from losing its connection with the society and other branches of science. Moreover, this teaching has to seek for the unity of medical science that is founded on the Physiological Unity. This is the education of the History of Medicine*” (5).

At the end of the 20<sup>th</sup> century, a humanistic background was not necessary for the access to medical training anymore. Thus, students of the new generations are lacking of a historical and philosophical education. This gap is the real problem of contemporary physicians: they are excessively tied to the method

and the dogma of biomedical science. The successes of new scientific theories, based on biomedicine and the charming strength of technologies overshadowed the importance of a critical historical-philosophical approach, which is fundamental for the epistemology of medical science. As already stated, the result was a medical education lacking of Humanities. Therefore, in the last decades, medical departments renewed their teaching models. They felt the necessity of a historical approach in the Human Sciences teaching. On the one hand for giving a major awareness of present ideas and methods, on the other hand for allowing students to understand and appreciate the epistemological discourse over medicine (6).

Nowadays Humanities are not just a mannerism of a professional medical spirit sensitive to the philosophical discourse. They are an essential instrument for the contemporary physician, tied to biomedical rules, in order to act responsibly. Scientists, due to the successes of biomedics, are often lacking of the necessary critical approach. They look at the principles of their science as something destined to immortality. However, history has thought us to be very careful: there were many scientific truths that were later rejected by scientific community itself. This also happened to various biological certainties of last century. The idea that a scientific law can be raised to an absolute truth thanks to irrefutable evidences comes from positivism, a vision still firmly rooted in certain fields.

Fortunately, there are people that have started to think in a different way. Is it really possible to consider a scientific law as an absolute truth? Are there really any rules that naturally and with absolute certainty help us formulate laws from observed data? Nowadays, even fallibility is considered as a chance of improvement and a special defence against dogmatism. Modern science is one of the greatest results of human intellect and today it is asked to put in discussion itself, its unquestionable authority. History teaches us that lots of dogma that were thought to be ironclad which turned out to be false. It is important to have this critical point of view toward the nowadays dogma. Somehow, we should bring new life into the approach of the pre experimentalist era, which was characterised by the harmonious coexistence of different paradigms. Intuition and other heuristic capacities of the physician

teamed up with the more rational physio pathological approach. Today, in several fields of science, there are revolutionary ideas claiming that causal laws are just hypothesis and that validation methods could be both experimental and non-experimental (7).

One of the turning point established by the scientific revolution was the belief that an objective knowledge of reality could be reached. However, we have to keep in mind that there exist different kind of models in which is allowed a debate among conflicting truths. As already stated, a historical approach allows to realize how medical and scientific conquers influenced morals and led to the deterioration of the doctor-patient relationship. Necessarily, the new frontiers in medicine are connected to the development of a huge modern sensibility towards bioethical issues. Therefore, the teaching of Human Sciences and History of Medicine have been included in Bachelor's and Master's degree programmes of other fields of study. Students must acquire the ability to identify the most important aspects of the History of Medicine.

Unfortunately, traditional manuals cannot provide the most important medical notions. Faculties must offer a background knowledge that allows students to comprehend the contemporary issues in medicine, including ethical ones. The very ambitious project of the scientist has always been the reach of the highest degree of knowledge of the system under investigation. The maximum grade of knowledge of an object is certified by the truth that describe it. What is the epistemological statute of Medicine? In other words, what level of truth or certainty Medicine can strive for?

George Liebman Engel in his article appeared on Science in 1977, described his impression on a conference on psychiatric education he took part in. According to him, there were a lot of psychiatrists eager to be ascribed to scientific medicine. There was a clear aspiration of some psychiatrics to flow into biomedical model, because, reporting Engel's words, psychiatry seemed: "*a jumble of non-scientific convictions, a variety of schools of thought, a mixture of metaphors, rule's confusion, propaganda and politic exploitation for mental health and other esoteric purposes*" (8).

Conversely, the other branches of medicine seemed to be mature and well defined, thanks to their solid foundation in biological sciences, huge

technological resources and incredible successes in clarification of pathology's aetiology, development and treatment. Somehow, psychiatry seemed to envy other medical specialisations, by trying to embracing the medical model of illness. A model that has always been quite abstracted from the prevailing doctrine of psychiatry. In his article Engle also reported that in a Rockefeller foundation seminar of the same period someone spur medicine to "*concentrate on true pathology and not to get lost in psycho – sociological patterns... and not to get obsessed with problems related to theology and philosophy. Another participant asserted that there should be a clear distinction between the organic aspects of pathology and the psycho – social elements of the human illness*" (8). To him, medicine should deal only with the first elements. Engel disagreed. To him not only psychiatry but all medical branches must avoid to bound themselves to a modelling of disease that is inadequate with respect to the complexity of natural phenomena.

The concept of disease influenced physicians attitude towards the patient. In fact, if illness is to be defined merely by somatic parameters, physicians will be no longer interested in all those aspects outside the limits set by biological authority. Now, we should ask ourselves, why the sophisticated dominant medical model is not capable of giving satisfactory explanations on the aggressiveness of certain pathologies, as well as for their aetiology. From its origin, the medical practise has been a delicate knowledge acquiring process, on the reliability of whom depends the therapeutic strategy. The physician collects both subjective and objective data and during his work encounters sometimes a conflict between clinical reasoning and the logic of research. Not always what is true in the framework of the theory is true in reality. And this is not a trivial assertion but rather a truly deep mental and cognitive conflict: clinical discipline is a form of knowledge aiming to taking action, conversely the knowledge driving scientific research aims to the knowledge itself.

We believe that biomedicine, when dealing with clinical medicine, has to conceptualise its own way to obtain knowledge, its own episteme. This episteme should not be regarded as something incontrovertible and indisputable, it should be a kind of knowledge continually put in discussion by different theories, new problems and doubts. This kind of episteme should

benefit from scientific methods, but not be tied by their ideological dogma. One has to bear in mind that the discussion over medicine is not just of philosophical nature. We should breath new life into the ancient doubt of Isidoro di Siviglia about the distinction between Trivio and Quadrivio. Is clinical medicine a science? Is it just a Science? Is it the application of different sciences or is it something even different? There are several different ways through which a science can reach a scientific knowledge: each outlines its own theoretical scientific foundation with its own rules and its own view over science.

Scientists have developed a sceptical feeling towards ontological studies (9). The predominance of empiricism during the last centuries has given metaphysics even a negative connotation: it has been regarded as something obscure, dealing with supernatural and being beyond scientific understanding. Something not reliable. Lots of people think that it is not worth to spend time, money and efforts in general, on aspects that are not provable within the framework of the conventional scientific method. We have come even to a nihilistic view of so called non conventional medicine often rejected because its investigations do not belong to what is considered science. On the one hand it is well established that in western countries biomedicine laid the foundation for a scientific approach to the treatment of disease; on the other hand, it has become our peculiar point of view toward disease: our standard model. Such model has been very successful and understands disease in terms of the deviation of biological and somatic variables, that are measurable, from their standard values (10).

The conceptual tools available in order to define biological systems are thus of physical nature; same for the experimental tools set up to study the biological systems. The model used to study diseases is thus a scientific one: it implies a set of rules and assumptions, agreed among the community that constitute the operational schema according to which research has to be carried out. But not every model of knowledge has to be "scientific" in the strict sense: in a more general sense a model is just a set of rules and convictions used to explain phenomena in order to have some kind of control over them, thus mitigating doubt and restlessness towards what seems unpredictable. The more

shattering the phenomena the more necessary is the achievement of a system of rules in which it can be understood. Physicians' mind, In our culture, is permeated by this point of view even before they started their education in the university, which maybe uncritically strengthen it. This model has been raised to a cultural imperative and often oversteps its boundaries. It has become a dogma. In science a model has to be revisited or even abandoned when it is no more capable of explaining satisfactorily all the experimental data. Conversely, a dogma requires that contrasting data should be rejected or at least adapted and interpreted in order to straighten out the contrasts.

The biomedical dogma requires that every disease has to be defined as an alteration of underlying physical processes. This approach, especially in the treatment of mental diseases didn't always give reliable results. In the light of this medicine must reevaluate its own status of "real science". Lots of medicians hope that medicine will reach the status of "lab-sciences", such as physics, characterised by the so called scientific method. Unfortunately, the majority of physicians are convinced that medicine has reached this status already. The mental process the physician uses in order to formulate hypothesis and conclusions includes reasonable explanations regarding the existence of real causes and disease conditions. The overall process is a sequence of aim – oriented steps, requiring different types of reasoning, which can deal each individual clinical case. This process can be seen in the light of the scientific paradigm: input data are observed, standardised, classified in order to set up ensembles useful to obtain diagnostic conclusions (11).

But optimal conditions are rarely satisfied in reality and it is not possible to trust blindly the outcomes of the application of statistics and this is also due to the number of variables that participate. Often, diagnostic conclusions obtained by this method are just working hypothesis. The physician evaluate a possible diagnosis by considering its pros and cons; each possible diagnosis acquires more or less significance by the comparison with the others. And clearly it has to exhibit an internal coherence. Thus the process is more rhetorical – dialectical rather than scientific probabilistic. The goal is to make a specific diagnosis much more persuasive with respect to the others. This traditional

medical approach could sound as just an exercise of clinical dialectic in comparison with the domination of strong sciences. Nevertheless, it becomes fundamental when a physician is asked to formulate a diagnosis on a clinical case over which there is no possibility to carry out any additional objective observations and tests. An in-depth education on non-scientific method acquires is of great relevance in clinical reasoning.

An education in dialectic reasoning is very important. This humanistic contribution is indeed fundamental in shaping minds capable of the flexibility required in clinical and therapeutic decisions. Unfortunately, medical pedagogy is oriented towards other directions, although the dialectical argument in clinical – pathology is more similar to differential diagnosis than the blind application of the scientific model.

Medicine is considered as a science in the traditional point of view, thus binding it to the method, to inductive logic to the validation of data to the method and finally to theories developed over such data. Medicine is solid in seeking explanations of clinical phenomena within theories and pathological mechanisms, but there are paths on which the efforts don't bring results and medicine should use different scientific gateways. We have to keep in mind that the real purpose of medicine is patient's good and not clinical phenomena interpretation. Medical explanations elevate the discipline above empiricism, but this is not its real mission. Medicine's purpose is not nature laws discovery. In fact, physician has the moral principle to choose the Right in questions studied with scientific methods but that not only depend by scientific considerations. Physician's work allowed scientific and non-scientific reasons. The dominant biomedical model today originated from Morgagni's pathological anatomy and led to molecular biology. It treats disease as a deviation from the standard values of measurable somatic variables. A real, well, a good, medician should be aware of his limits and of the limits of his art. The physician can use only his intelligence when is faced with illness, many times he must quit at technology and at the biomedical science. Clearly, he has to dominate medical science but in his mind it must be clear that being a scientist is not enough to attend patients. Physicians are the people that can understand best the limits of "scientific medicine" because they are completely aware

of the complexity of biology and of all the aspects that still do not have an answer.

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