



Medicine as *Techné* – A Perspective from Antiquity

Bjørn Hofmann

University of Oslo, Oslo, Norway

ABSTRACT

The objective of this article is to investigate whether the concept of *techné* is fruitful as a framework to analyze some of the pressing challenges in modern medicine. To do this, the concept of *techné* is scrutinized, and it is argued that it is a concept that integrates theoretical, practical and evaluative aspects, and that this makes it particularly suitable to analyze the complex activity of modern medicine. After applying this *technical* framework in relation to modern medicine, some of its general consequences are elaborated. In particular, it is argued that the concept of *techné* is appropriate to address the constitutive role of technology in medicine. *Techné* thus appears to be as fruitful a philosophical concept today as it was in antiquity.

Keywords: ethics, practice, *techné*, technology, theory

I. INTRODUCTION

Modern medicine faces fundamental epistemological, ethical and practical challenges. How are we to understand and face these challenges? This article will try to find a theoretical framework for addressing this issue. In particular, it will scrutinize an approach that addresses one of the foremost characteristics of modern medicine: its extensive and constitutive use of technology.

There appear to be many alternative frameworks for facing the challenges of modern medicine. Various theories and models in health care management, in organizational theory or in philosophy have been applied. Some promising approaches refer to ancient conceptions to face the fundamental challenges of modern medicine. For example, one approach has focused its attention on the ancient concept of practical wisdom (*phronesis*) (MacIntyre, 1985; Pellegrino,

Address correspondence to: Bjørn Hofmann, Ph.D., Faculty of Medicine, Center for Medical Ethics, University of Oslo, PO Box 1130, N-0318 Oslo, Norway. E-mail: b.m.hofmann@medetikk.uio.no

1979; Pellegrino & Thomasma, 1981, 1993). An alternative approach, referring to another of the ancient intellectual virtues, conceives of medicine as an art (*techne*). Contemporary commentators have followed the author of *On the art* (Peri techne) insisting that medicine is an *art*. In particular it has been argued that medicine as an art is opposed to medicine as a *science* (Gadamer, 1993; Gillies, 1996; Jonas, 1985; Robinson & Bevan, 1993), and that there is a basic dichotomy in medicine where the subjective, evaluative, particular and intuitive, opposes the objective, factual, general and rational.

However, few of these theories appear to address the pertinent position of technology in modern medicine. Both theories based on *phronesis* and theories supporting the art-science distinction seem to rule out technology as a constitutive aspect of medicine. This appears to be problematic, as technology seems to be at the heart of both the rise and the fall of modern medicine (Le Fanu, 1999). The objective of this analysis will therefore be to investigate whether the ancient conception of medicine can be fruitful as a model for modern medicine. In particular, I will scrutinize whether such a conception can address the puissant position of technology in medicine.

In order to do this I will begin with the claim of the author of *On the art*, that medicine is an art, and ask: what is *techne*? I will start to scrutinize the concept of *techne* in general and the concept of *techne iatrike* in particular. This will be done in order to see whether the concept can be applied to analyze actual challenges in modern medicine, and to outline some general consequences of such a *technical* theory of medicine. In particular I will investigate how this approach addresses the challenges of technology in medicine.

II. THE HIPPOCRATIC CONCEPT OF TECHNE

Although there is an extensive scholarly debate, there appears to be a fair agreement on some key characteristics of the pre-Aristotelian concept of *techne*. To avoid highly interesting, but complex conceptual controversies, I will take these key characteristics as a point of departure.

- i. *Techne* is knowledge of a specific field. That is, it has a determined subject matter and studies the nature of this subject matter.
- ii. *Techne* is oriented to a specific end.
- iii. *Techne* produces a useful result.
- iv. *Techne* requires mastery of general rational principles that can be explained and therefore taught.¹

In short, *techne* “is a deliberate application of human intelligence to some part of the world, yielding some control over *tuchê* [accident]” (Nussbaum, 1986, p. 95). How then do these characteristics of *techne* correspond to the ancient concept of medicine? According to the main conception of the *Corpus Hippocraticum*, *techne iatrike* is characterized as follows:

1. The specific subject matter of medicine is the diseased human body.
2. The end of medicine is to heal and to help the patient.
3. The product of medicine is health for the individual patient.
4. Medicine investigates its general principles and gives a rational account of its actions.

Before I turn to investigating whether such a concept of *techne* can be of any relevance to modern medicine, let me scrutinize these characteristics in some detail.

A. The Subject Matter of Medicine

Medicine had limits determined by the nature of its given subject matter (*pragma*) (*On the art* VIII; *Regimen in acute diseases* 39; *Prognostic* I; Edelstein, 1994, p. 106). Thus, the subject matter, and thereby the limit of medicine, was the diseased body. Physicians who did not recognize this limit of the medical profession were physicians in name only (Edelstein, 1994, p. 102). “If a man demand from an art [*techne*] a power over what does not belong to the art . . . his ignorance is more allied to madness than to lack of knowledge” (*On the art* VIII). The limitation to its subject matter had some practical consequences. Firstly, medicine was a study of *soma* and did not include treatment of the soul or the good life in general.² Secondly, the physician should refuse to treat desperate cases where the disease was too serious or had progressed beyond the possibility of cure. Medicine should keep within its domain and “refuse to treat those who are overmastered by their diseases” (*On the art* III 10).³ Hence, the subject matter represented a delineation of medical activity, being an element in a tradition of self-limitation (*Prognostics* I).⁴

B. The End of Medicine

Furthermore, medicine was characterized by its end: to heal and to help the patient (*On ancient medicine* III; *On the art* VI; *The oath*). The author of *On the art* argues that *techne iatrike* “is to do away with the sufferings of the sick, [and] to lessen the violence of their diseases” (*On the art* III 8-9). The end of

medicine was to rid the patient of the evils of the body, such as weakness (*asteneia*), ugliness (*aiskos*), and sickness (*nosos*). Without this goal *techne iatrike* would not be a legitimate activity.

The physician, like all other craftsmen, had a purpose: to re-establish bodily order (*kosmos*), i.e., health and strength.⁵ Contrary to the intervention and manipulation of modern medicine, the task of the ancient physician was to recognize disease and assist (*therapeuein*) nature in its natural healing capacity (*vis mediatrix naturae, katastasis*).⁶

Medicine was a result of the necessity to help (Longrigg, 1993, pp. 102-103). As stated in *The oath*: “I will use treatment to help the sick according to my ability and judgement, but never with a view to injury and wrong-doing”. Medicine was concerned with the good of the human body. The love of man made the physician love his art (*Precepts VI*).⁷

The end of medicine was not only the patients and their bodies in general. Its aim was to fulfil the needs of a particular patient (*Regimen in acute diseases IX*) and to take into account the particular situation (*On ancient medicine XI; XII*). It was medicine’s concern for the sufferings of the individual person that made it a *techne* (Jaeger, 1989, p. 543). The physician was not only to know how the *pharmakon* influenced the body in general, but also how it acted on the particular patient (*On ancient medicine XX*).⁸

Hence, the end of medicine was not the universal, but the particular (Gadamer, 1993, pp. 11–49). The reason for this relationship is that the *techne iatrike* related to its subject matter in a special way (Jonas, 1985, p. 149). The subject matter of medicine was at the same time its end: the diseased human body. In bringing the body back to its equilibrium and order medicine displayed its end (Jonas, 1985, p. 146).

C. The Result of Medicine

Medicine was also characterized by having a defined result (*ergon*) (*Precepts II*) and the result of medicine was health (See also (*Charmides*, 165d1-d2; 166a3-7; *Republic I*, 346d). Health was conceived of as bodily balance, arrangement and order. It was its productive activity that granted medicine its paradigmatic status as *techne*. It was the product of its activity, rather than its argumentation, which counted (Edelstein, 1994, p. 103), and the result of *therapeia* was related to the end of medicine. In the same manner as medicine’s end was not patients in general, health was not a general result, but a particular product related to the individual patient.

Furthermore, it was the productive trait of ancient medicine that made the author of *On ancient medicine* reject the monistic theories of the natural philosophers. Disease could not be explained and treated by monistic laws of air (Diogenes of Apollonia) or water (Hippon of Samos) (Longrigg, 1993, pp. 85–87). That kind of theoretical activity was not productive in the same manner as *techne*.

D. The Rational Account of Medicine

The author of *On the art* defended medicine against prejudice and religious belief by insisting that medicine was an art (Joos, 1957). *Techne* vouched for medicine's rational account and distinguished it from mere speculations and religious influence. That is, *techne* was an epistemic guarantee for an activity and answered for a homogenous knowledge of a defined subject matter (See also *Minos* 316c3-d9).

The author of *On the art* takes intelligence to be an important criterion in order for something to be an art (*On the art* I). Disease is mastered by the eye of the mind and tracked by reason, and its causes and treatment are understood by intelligence (*On the art* XI). The physician had to recognize and understand the symptoms, estimate their powers and infer from this the right prognosis (*Prognostic* XXV). He had to have scientific insight in the discussion and use of remedies (*Regimen in acute diseases* III).

Hence *techne* was closely related to both *logos* and *episteme* and had a theoretical and rational provenance (*On ancient medicine* XII, Jones, 1931, p. xxiii; Lenk & Moser, 1973, pp. 47–49; Roochnik, 1996, p. 52). In particular, medicine was dealing with generalizable facts (*Precepts* 2). It thus included knowledge of 'universal' and 'necessary' things. If this was not so, medicine would again be subject to mere speculation (*On the art*). Thus, even though medicine to some extent was different from (pure) *episteme* it was constitutively related to it.⁹

How, then, was this general knowledge of *techne iatrike* characterized? *Techne's* general knowledge was related to the causality (*aition*) of its subject matter (Mitcham, 1994, p. 118). In particular, it was related to the causes of disease in the human body. Every disease had to have a natural cause (*On the art* V, VI; *On airs, waters, places* XXII; *On the sacred disease* I, V). Whatever caused the disease disturbed the balance of nature. (For example, turbid urine disturbed the balance and caused headaches (*Aphorisms* IV, LXX).) It was knowledge of the cause, converse of both self-government (*automaton*) and accident (*tuche*), that made medicine a *techne* (*Diseases* I). Moreover, because

medicine was a *techne* investigating the causality of disease, systematic treatment of patients was possible (Joos, 1957, p. 242). *Techne iatrike* was man's skilful contribution to the removal of the disturbing causes of disease. With the knowledge of the history of disease (*anamnesis*) and its present state (*diagnosis*) the physician was able to predict the course of disease (*prognosis*) and know the right time for treatment (*kairos*). In this way the physician could assist nature. A knowledge-based *techne* therefore shared the same goal and had the same effect as nature itself (Joos, 1957, p. 249).

Thus, medicine was based on general principles and was to give a rational account of its activity. One basic way of doing this was to explain the causality of disease. The rational criterion of medical activity did not prescribe or favor a particular theory to be "medical", but enabled one to differentiate medicine from mere speculations.

Before I apply ancient medicine as a model for modern medicine, let me briefly study what made ancient medicine a social and intellectual model in antiquity. In particular, how did the characteristics of *techne iatrike* (1–4) contribute to medicine's paradigmatic position?

III. THE PARADIGMATIC STATUS OF ANCIENT MEDICINE

It would be wrong to give the impression that there was one general and consistent conception of medicine in antiquity or even that we can give a coherent and consistent conception of any of the many medical schools of the time. However, there appears to be a wide agreement that medicine had a special theoretical, practical and evaluative status in antiquity. As my objective is to apply the conceptual framework of ancient medicine to modern conditions, let me therefore briefly investigate some of the ways in which medicine was applied as a paradigm in antiquity.

A. Medicine as a Model for Other Arts

Medicine was applied as a model for the other arts (*technai*). For example, Plato extensively refers to medicine. The authority of the art of government was modeled by the disinterested *technical* attitude of medicine (*Statesman* 293b5-c3). Furthermore, just as medicine was based on knowledge of the nature of the body, so would an art of rhetoric have to include knowledge of

the nature of the soul (*Phaedrus* 270b10f; Solbakk, 1993, p. 122). The difference between medicine and cooking was applied to illustrate the difference between *techne* and flattery (*kolakeia*). The real *techne*, like medicine, was able to give a rational account of its activity with respect to a defined subject matter. It was not just following a recipe (*Gorgias* 464d4-e1; 521e3-4; *On ancient medicine*; Jaeger, 1989, p. 544). Hence, medicine represented a paradigm of true knowledge and a norm of a real *techne* (Heinimann, 1961). The characteristics (1–4) appeared to contribute to this paradigmatic position. “Since antiquity, medicine has been regarded as the very model of an art, of a rational activity whose powers were all bent towards a clear and identifiable end” (Kass, 1975, p. 12).

B. Medicine as a Norm of Order

The *techne* of medicine represented a certain conception of health, which was applied as an intellectual norm of natural arrangement and order. In *Corpus Hippocraticum* health was recognized as a natural balance of the elements (*krasis*) (*On ancient medicine*). In particular it is conceived of as a proper mixture of humors: “All these substances [humors], then, are always present in the body but vary in their relative quantities, each preponderating in accordance to its natural characteristics [*phusis*]” (*On the nature of man* VII). Medicine addressed the natural arrangement (*taxis*), order (*kosmos*) and balance (*isorropon*) of the human body (*Prognostics* XXI, *On the nature of man* VII, *On the articulations* XXXIV).¹⁰ Accordingly, the task of the physician was to forecast, and if possible assist, the natural process of restoration of nature’s balance (*Prognostic* I).

Hence, the end of *techne iatrike*, health, was conceived of as a natural arrangement, order and balance in the human body, and disease was any disturbance of this optimal situation.¹¹ This conception of health was applied as an intellectual norm of nature in general. It was, for example, used to give an account of the principles for the creation of the Earth (*Timaeus* 41d5-7) and for the teleology of nature (*Timaeus* 42d5-6; e7-9). Phenomena in nature did not happen by chance. In the same manner as the body was an ordered system, guided by some admirable reason or intelligence, nature behaved according to arrangement and order (*Philebus* 28d; Longrigg, 1993). Plato’s investigation of the human body in *Timaeus* was “to demonstrate that the universe works in accordance with reason and moral law” (Longrigg, 1993, p.114).¹²

Moreover, nature was not run by accident (*tuche*) or by self-determination (*automaton*), but by *techne*. It was a result of divine craftsmanship in the same

way as the artifacts of an artist were the result of that particular art (*On the heart* VIII; *Sophist* 265c-e). Hence, nature could be conceived of as an intelligibly ordered system by way of a medical model. The world was the result of the productive activity of a divine craftsman in the same manner as health was the result of the physician's work, and the philosopher could understand nature in the same manner as the physician understood the human body.

C. Medicine as a Moral Model

Ancient medicine not only explained the arrangement, order and balance of nature, but was also applied as a norm for human action. The *techné* of medicine, differentiating good from bad in the realm of the body, was applied as a model of how to discern good and bad in general.¹³ The competence of the professional (*technikós*) was used as a model for facing ethical challenges (Heinimann, 1961, p. 105). For the Platonic Socrates, medicine was the paradigm case that made it possible to establish scientific ethics (Hoffmann, 1922, p. 1076; Heinimann, 1966, p. 105; Solbakk, 1993, pp. 226-7). Accordingly, “[t]he healing of diseases, as well as the preservation of health provided an analogy which served to emphasize the validity of certain significant ethical concepts and thus helped to establish the truth of philosophy” (Edelstein, 1994, p. 350).¹⁴ In his pursuit of a *technical*, and in particular medical, model of morality, Plato appeals to the characteristics of *techné* (1-4). Hence, the Platonic Socrates tried to establish a *technical* foundation of ethics. Even more, medicine appeared to be a model for philosophy in general.

D. Medicine as a Norm to Philosophy

The author of *On ancient medicine* argued that medicine was the basis for any understanding of man (*On ancient medicine* XX). To be able to discuss general issues concerning the human being, one had to know the art of medicine. Medicine was basic to philosophy.

Furthermore, medicine provided an analogy and a model for philosophy. Martha Nussbaum has pointed out how ancient medicine was a model for and legitimated ancient philosophy. A “medical” philosophy was to help people in handling difficulties in their lives (Nussbaum, 1994). “Empty is that philosopher’s argument by which no human suffering is therapeutically treated. For just as there is no use in a medical art that does not cast out the sickness of bodies, so too there is no use in philosophy, unless it casts out the

suffering of the soul” (*Epicureus*; Usener, 1887, p. 221, here cited from Nussbaum, 1994, p. 13). The philosopher had to be as wise and as useful as the physician.

IV. THEORETICAL, PRACTICAL AND EVALUATIVE ASPECTS OF *TECHNE*

Hence, medicine was applied as a model for human activity in several ways. Firstly, it was a norm for other arts. Secondly, it served as a model of nature. Thirdly, medicine served as a model for ethics, and lastly and most generally, medicine was a model for philosophy. One of the reasons for this paradigmatic position of *techne* was that its characteristics (1–4) represented criteria of demarcation. They were applied to distinguish various types of activity, in particular to differentiate a real *techne* from other activity and to set limits to a *techne*.

Another reason for its paradigmatic position might be that the characteristics of ancient medicine were diverse. *Techne* was a concept involving descriptive, evaluative and practical issues. The demand for a rational account of its activity (4) appears to be an epistemic criterion. This was an important issue for the author of *On the art* in order to defend medicine against speculative activity. Correspondingly, medicine should be productive (3), which appears to be a practical issue, differentiating it from pure science. Additionally, medicine should have a defined end: to heal and help the particular patient (2). This apparently is an evaluative issue.¹⁵ The author of *On ancient medicine* defends medicine against the natural philosophers who reduced all medical questions to relations of basic substances. It was exactly medicine’s evaluative aspects that made the author defend medicine against mechanistic conceptions (Joos, 1957, p. 243, 249). Additionally, medicine was to have a defined subject matter (1). This can be conceived of both as an epistemic and a practical issue. The subject matter limited both medicine’s area of knowledge and its area of action.

Altogether, these four criteria represented a *norm* of how a real art should be, and constitutively integrate epistemic, evaluative and practical issues. This constitutive integrative complexity appears to be an important reason why medicine was frequently referred to in ancient debates about social life and human virtues, and it may explain medicine’s paradigmatic position. How then can this ancient conception of medicine be of any value for us today? One

way to investigate this is to analyze some of the major challenges of modern medicine in the perspective of *techne*.

V. FACING CHALLENGES

I have no intention to cover all challenges in modern medicine or to treat the selected examples in great depth. The point will be to indicate the fruitfulness of the concept of *techne iatrike* as a norm to modern medicine. The examples are selected to cover a certain variety of challenges.

A. Limits to Medicine: Its Subject Matter

The subject matter represented a limit and demarcation of ancient medicine. There appears to be a general agreement on the need to delimit modern medicine, and there is a cry for setting limits to its activity due to economic, ethical, legal or practical reasons. However, the means and criteria for limiting modern medicine appear to be controversial.

Following the conception of *techne iatrike*, the subject matter of medicine is the diseased human body. Accordingly, issues beyond the diseased human body do not belong to the realm of medicine. This sets limits to medicine's concern for people's well-being. To try to see *dissatisfaction* with a PET scanner, to cure people's anxiety about their health with diagnostic X-ray, and cure *unhappiness* with paroxetinhydroklorid would thus be beyond the scope of *technical* medicine. In particular, the restriction to *soma* addresses the issue of *somatization*. Modern medicine is accused of uncritically transferring the methods successful in somatic medicine to all cases of illness. Hence the *subject matter* of the diseased body might be a fruitful criterion to delimit medicine.

Moreover, there was a limit to this subject matter itself. The physician should not treat the diseased body that was beyond the level of cure. This appears to be a fruitful reminder also to modern medicine, which is accused of *overtreatment*. The need to set limits to medical *hubris* appears to be as relevant for the potent, interventional and technological medicine of today as it was in antiquity. To restrict medical activity to the treatable diseased human body thus appears to be a relevant restraint.

B. The End of Medicine: Helping the Patient

Another major challenge to modern medicine appears to be to handle the threat of *medicalization*. Medicalization can be interpreted in many ways.

Modern medicine can through new methods detect new diseases and treat conditions that were earlier left untreated. In this manner medicine has increased the number of diseased people in society (Aaron & Schwartz, 1984). It has made conditions that were earlier conceived of as part of everyday life subject to medical treatment. Furthermore, medical methods are not perfect. There are false positives “making people diseased” who have not experienced any illness.¹⁶ Additionally, medicine’s predictive and preventive capacity has promoted intervention in “healthy” people’s lives to prevent development of disease. This might also be conceived of as a form of medicalization.

What appears to be common to the various aspects of “medicalization” is that it makes something subject to medical diagnosis or treatment that is not perceived by the person in question or that was earlier a part of his or her everyday life. Medicalization has made medicine be accused of being too eager to treat in terms of *futile treatment*, *overtreatment* and *curative bias*. With respect to these challenges, the ancient concept of *techne iatrike* might represent a fruitful restraint by asking: *whom* does this medical action serve? Is this particular patient the *end* of the treatment? These questions can assist us in delimiting medical activity and help us to handle hard cases, e.g., where to stop life support. Does further treatment with a respirator actually benefit the patient or is it done e.g. due to fear of judicial consequences?

The criterion of medicine’s *end* can also guide us in the challenging growing area of diseases labelled “lanthanic diseases” (Feinstein, 1967), that is, diseases that are detected by technological means, but where the person having the disease does not experience it in any way. It has been widely acknowledged that persons who otherwise are well can become ill and diseased when they come to know that they have a positive test.¹⁷ That is, medical knowledge that is obviously intended to do good, can actually do harm. A way to handle this according to the second criterion of *techne iatrike* would be to ask whether gaining knowledge and breaking bad news is concerned with the person in question as an end.

Moreover, modern medicine is widely criticized for being too scientific and ignoring the individual patient. It is accused of having become so exhilarated with its success in acquiring and accumulating general knowledge that it ignores the fundamental difficulty in generating general knowledge from and for particular cases (Gorowitz & MacIntyre, 1976). The *technical* focus on medicine’s primary *end* appears to address this problem. Although *techne iatrike* emphasizes the need for general principles and the necessity to be able to give a rational account of its activity, this is directed towards its *end*: to heal and help the particular person.

C. Having a Particular Product

One of the important characteristics that differentiated *techne* from pure science was that it had a productive result. What legitimized medical activity was that it resulted in health for the particular patient. Accordingly, medical activity that did not have this productive character was in danger of becoming medical *hubris*. Applying this to modern medicine, all activity that is not productive with regard to the patient's health is beyond the scope of *technical* medicine. For example, treatment that is futile and does not result in better health for the person (overtreatment) should as such be discarded.

It may be argued that euthanasia concurs with the first criterion, as it may be conceived of as a means to end peoples' bodily diseases. However, it appears to be difficult to conceive of euthanasia as producing health. It ends people's pain, but it also contributes to ending their lives. However, as long as it does not produce health, it should be expelled. This also concurs with other principles of ancient medicine, e.g., the non-maleficence clause of *The Oath*.

What about human enhancement: is this not a productive activity enhancing a person's health? Contrary to euthanasia, human enhancement does not appear to reduce or end a person's health. However, trying to enhance some human characteristics disagrees with the traditional conception of *health* conceived of as a natural arrangement, order and balance, where too much as well as too little is bad for the human being (See also Jonas, 1985, p. 146). It does not address the diseased human body in order to regain its natural arrangement and order. Hence, human enhancement is not a natural task of medicine because it is not directed towards medicine's subject matter (the diseased human body) and because it does not produce health. Correspondingly, the *technical* approach rules out challenging issues in the bioethical debate such as circumcision and piercing as well as a wide range of plastic surgery.

One of the ever more pressing challenges to modern medicine appears to be prioritization. This has become highly relevant due to comprehensive abilities, high expectations and limited available resources. Two of the main criteria for rationing are effectiveness and cost-benefit, which accord well with the criterion of a productive result: We should prioritize according to what results in health (e.g., methods that result in diagnoses which do not correspond to available treatment do not produce health). To know that you have a disease that cannot be cured does not make you healthy.

Additionally it appears to be important to notice that the result of *techne iatrike* is not a general product, but is related to its end. It is not *health* in

general, but *health* of the particular patient. This means that a *technical* approach poses restrictions towards actions that do not aim at the particular person. This seems to have relevance for *health promotion*. The concept of *techne iatrike* limits how far medicine can go in promoting people's health on a general level. Intervening in people's lives without producing health in the particular case (for example, to make large parts of a population use drugs that are not likely to help the individual person) would thus be beyond the scope of *technical* medicine.

D. Giving a Rational Account of its Activity

The criterion of rationality was relevant to ancient medicine because it facilitated the exclusion of mere speculations. It seems to be of importance also today in at least two different ways. Firstly, the rationality criterion can be applied to rule out religious speculations in the same manner as in antiquity. There appear to be forms of alternative medicine that are based on intuition or revelation and where it seems to be difficult to give a rational account of their methods. Revelation and intuition cannot be taught or assessed. Other forms of alternative medicine try to give rational accounts of their activity in terms of modern physics. However, this appears to be done in a manner that the physicists themselves do not recognize, but specify as mere speculations. Thus, the rationality criterion might be applied to rule out alternative forms of medicine.

Secondly, the criterion can be applied to rule out scientific speculations. Modern medicine, although appearing to be *omniscient*, does not know all aspects of human bodily disease. Although it is a central task to find general principles of the diseased human body, it appears to be as important to realize the limits of these general principles today as in antiquity. Deductive speculations appear to be as dangerous a form of medicine as some forms of "alternative medicine". Sudden infant death syndrome (SIDS) may serve as an example. Physicians deduced that in order to be able to reduce the incidences of SIDS, babies should sleep on their stomachs. This was widely recommended to parents. However, instead of decreasing the rate of SIDS, the rate significantly increased. The ability of modern medicine to give a rational account of its activity is not to be found in its deductive capacity, but in its ability to account for reproducible results. Within this framework there was no rational account for recommending parents to let their babies sleep on their stomachs in order to prevent SIDS. Thus, the rationality-criterion can be applied to rule out scientific speculations as well as religious conjectures.¹⁸

Additionally, ancient physicians were aware that their knowledge was of a particular kind: although it was general knowledge, it was related to practical and productive activity. Correspondingly, modern medical science, qua *medical science*, is related to practical application of knowledge. Medical knowledge, being *medical*, constitutively has clinical implications.

Thus, the criterion of rationality sets limits to the activity of medicine and represents a defense against *hubris*. This seems to be highly important in a time when *Corpus Medicorum* is more extensive than ever, and we are faced with ever more cases where we do not know enough (e.g., cases of illness, without any manifestations of disease).

These examples by no means prove that the concept of *techne* can be applied for resolving all the challenges of modern medicine. However, they indicate that the concept can be fruitful for analyzing and facing some of them. Before I turn to some of the limitations of this approach, let me briefly investigate two other aspects of this *technical* approach: how it views the art-science distinction and the role of technology in modern medicine.

VI. *TECHNE* AND THE ART-SCIENCE-DISTINCTION

It has become common to distinguish between medicine as *science* and medicine as *art*. Medicine as *science* is frequently conceived of as being concerned with general, descriptive, objective and biological issues, whereas medicine as *art* is conceived of as dealing with particular, evaluative, subjective and personal issues. It is argued that these conceptions are opposite and represent an inevitable dichotomy in modern medicine.

How does this science-art conception of medicine relate to the Hippocratic conception of *techne* as scrutinized here? It appears to be difficult to equate *medicine as art* (in the modern sense) with *techne iatrike*. *Techne*, being a rational activity concerned with the diseased body as its particular subject matter, corresponds to *medicine as a science*. On the other hand, having the individual person as its end and the health of the particular patient as its result, *techne* corresponds to *medicine as an art*. Furthermore, as argued, *techne* integrates epistemic, evaluative and practical aspects, which does not explicitly correspond to the concept of either “art” or “science”.

Thus medicine today seems to be neither only “science” nor only “art”. As “pure science”, medicine fails to recognize its purpose and its legitimacy: to help individual patients. As “pure art”, medicine might lose sight of its limits

and its ability to give a rational account of its activity. Thus, medicine conceived of as *techne* seems to be able to bridge the conceptions of medicine as *science* and as *art*.

VII. TECHNOLOGY IN MODERN MEDICINE

As indicated in the introduction, one of the reasons for investigating the concept of *techne iatrike* as a model for modern medicine was its potential for addressing the constitutive role of technology in modern medicine. How, then, does the concept of medicine as *techne* deal with the challenge of one of the most influential factors of modern medicine: technology? Does the arrant technology of medicine not reinforce the science-art dichotomy? Does technology not threaten medicine's position as an *art* and consolidate it as a *science*? Or even more, does not technology threaten medicine as a *techne*?

I think we have good reasons for rejecting such concerns, because the concept of *techne iatrike* appears to be particularly suited to handle the aspect of technology in medicine. Firstly, the term "technology" stems from *techne*. Hence, there is at least an etymological relationship between "techne" and "technology", indicating that historically there is some connection between medicine and technology.

Secondly, there has been an extensive debate in modern philosophy of technology on the status of technology. However, there appears to be a reasonable agreement among scholars that technology is a theory-based, value-laden and productive activity. That is, technology combines epistemic, evaluative and practical issues in the same manner as did the *techne iatrike*. Many of the challenges concerning modern technology do occur in the realm of medicine. This is not accidental. Medicine appears to be a field that brilliantly exposes the complexity of technology. Hence, technology, in the same manner as medicine, is a complex activity integrating epistemic, evaluative and practical aspects. Therefore, technology appears as an integrated part of medicine. It does not introduce a different conceptual framework to medicine, nor does it require a special handling.

Thirdly, definitions of technology emphasize its productive, purposive and rational characteristics. This corresponds well with the criteria of *techne* (i-iv). A specific technology has a determinate subject matter, is oriented to a specific end, effects a useful result, and masters general principles that can be

explained and taught. Thus the criteria of *techne* seem to be highly relevant for a modern conception of technology.

Consequently, a concept of *techne iatrike* might offer a framework to assess technology as a constitutive part of medicine. This seems to be fruitful, as it appears to be extraneous to assess medicine as an activity without technology or to assess medical technology as something external to medicine.

Additionally, in the same way as ancient medicine can be applied as a perspective to analyze modern medicine, (including the aspect of technology), the concept of *techne* can serve as a perspective to analyze technology in general. There is a parallel between the relationship between ancient and modern medicine, and the relationship between *techne* and technology.

In this manner medicine might be a model for the modern *techne* in the same way as Socrates applied it as a model for the ancient *techne*. In the same manner as the author of *On ancient medicine* claims that to know the world one has to know medicine (*On ancient medicine* XX), we could argue that in order to know technology, we have to understand medicine. Hence, there is a reciprocity between medicine and technology: On the one hand technology is a constitutive part of modern medicine, on the other hand medicine can be a model for technology in general.

So far some examples have been applied in order to indicate the fruitfulness of the concept of *techne* in modern medicine, and some implications have been drawn. Now, the time has come to address some of the limitations and possible pitfalls of this anachronistic approach.

VIII. SOME LIMITATIONS

Firstly, it is obvious that my approach does not represent a full-fledged theory. It is more like a conceptual tool for structuring and analyzing some of the pressing problems in modern society. Furthermore, as a method my approach is not historically, descriptively or evaluatively neutral. It is a practical as well as a theoretical and evaluative approach. Hence, the method of this study is itself a *techne*. Its subject matter has been the challenges of modern medicine, its end has been to try to find a framework to analyze these challenges, and its product could hopefully be a way of facing the challenges. To this add that a rational account of the method has been provided.

Another possible limitation is that my investigation clearly does not present a monistic approach. It integrates a variety of different aspects (theoretical,

practical and evaluative), and could as such be accused of being eclectic. It would be hard to reject such an accusation. However, the complexity of the approach can be conceived of as a reasonable prerequisite of a model of modern medicine. The challenges in medicine appear to be complex, and it is not unreasonable to try to face complex problems with a complex approach.

It might also be argued that I have only selected some of many characteristics of *techne*. This is obviously correct, and has been done partly to avoid some of the conceptual controversies and because it would be naive to believe that we could use all aspects of ancient medicine as a model in philosophy, ancient or modern alike. Hence, I intend neither to present a genuine ancient concept of *techne* nor to enter the scholarly debate on the concept of *techne*: I only try to indicate that aspects of ancient medicine can be a fruitful framework for discussing challenges in modern medicine.

Moreover, it might be argued that the characteristics of *techne* selected as a norm for medicine lack a theoretical foundation. This is obviously right. The concept of *techne* or its four criteria are not explicitly part of any significant modern philosophical framework. However, as argued, *techne* appears to have played an important role in ancient philosophy, and ancient concepts have been applied as foundation for theories in modern philosophy in general, and in biomedical ethics in particular (e.g., the concept of phronesis). Hence, there are reasons to believe that the concept of *techne* might be theoretically fruitful although it is not a theoretical concept of modern philosophy.

There are of course difficulties in interpreting the four criteria of ancient *techne iatrike* (1–4). What, for instance, is the definition of “disease” when we insist that the subject matter of medicine is “the diseased human body”, or what does “rationality” mean when we claim that medicine is to give a rational account of its activity? The meaning of concepts such as “disease”, “rationality”, “end”, “subject matter” and “health” obviously represent crucial and difficult medico-philosophical issues. However, the aim of this article is more modestly to investigate the feasibility of a *technical* model of modern medicine.

Another weakness of this approach is that there might be discrepancies between the criteria of a *techne*. For example, if the main criterion is that the product of medicine is health, *euthanasia* is beyond the limits because it does not contribute to the health of the patient. However, if the criterion of the end of medicine is made the major criterion and it is interpreted as helping the person, it might be argued that *euthanasia* might be approved

of, that is, criterion 3 contradicts criterion 2. The difficulty is that the concept of *techne* does not contain a prioritized order of criteria. In this particular example I argued that the *end* of ancient medicine was both to *heal* and to *help*, and that it was to produce health, so euthanasia might be ruled out on this ground (criterion 2 and 3). However, the contradiction between different criteria is clearly possible. How should we face such situations? One way would be to rely on other principles of ancient medicine conforming to the criteria of *techne*, for example, the principles of beneficence, non-maleficence and justice found in *The Oath* or the concept of natural arrangement, order and balance at the basis of *techne iatrike*.

Another approach would be to compare the *technical* approach with that of principlism in bioethics. The concept of *techne* meets the same difficulties as the four principles of bioethics: coherence. However, following the same route as defending the principles, one could appeal to criteria for balancing and infringement. Furthermore, the *technical* approach appeals to medical tradition in a manner that parallels principlism and that could even support it.

Additionally, criterion 2 was concerned with the *end* of medicine. Hence, the *technical* approach to modern medicine might be conceived of as a way to define the goals of modern medicine. To identify common goals for modern medicine has turned out to be a difficult task (Hanson & Callahan, 1999), and this analysis in no way pretends to have solved the issue. More modestly, it has tried to find some criteria for delimiting what is, and what ought not to be within the area of modern medicine. The analysis has only been concerned with the end in relation to the treatment of the particular patient and does not presuppose a general goal for the health care system.

IX. CONCLUSIONS

The objective of this article has been to investigate whether the conceptual framework of *techne iatrike* might represent a fruitful tool to structure and analyze some of the challenges in modern medicine. It has been argued that the framework of *techne iatrike* integrates theoretical, practical and evaluative aspects, and that this makes it suitable to structure and analyze a complex activity such as modern medicine. Additionally, it has been argued that this *technical* approach is particularly suitable to investigate the influence of

technology in medicine, and that it also represents a framework for analyzing technology in general.

One important aspect of this analysis is that it employs concepts from medicine itself. It is not based on an external philosophical framework, which is applied to the case of medicine. This shows that medicine has resources to face its challenges within its own conceptual framework. In the same way as philosophy finds its conceptual origin and inspiration in antiquity, medicine might well find ancient medicine to be more than just a supply of remarks for festive occasions.

Furthermore, the conceptual framework suggested in this article is complex. The concept of *techne* integrates theoretical, practical and evaluative aspects. This corresponds well to the complexity of modern health care.

Additionally, the concept of *techne* represents a normative approach. It presents norms of what medicine should be. However, this does not mean that it subscribes to a particular normative theory, e.g., to a particular kind of normative ethics. There might be deontologic and teleologic, as well as virtue-ethical, aspects of this *technical* approach: The norm of *techne* represents a *duty* to the good physician, its focus of attention is on the *end* of its activity, and it can be conceived of as a way to educate the *professional character* of the physician.

Furthermore, the analysis reveals a particular relation between medicine and philosophy. On the one hand, philosophy can still be of value to medicine. In the same manner as ancient philosophers applied medical metaphors to argue that philosophy was useful, modern philosophers can argue that philosophy can be of value to medicine. That is, philosophy can be “therapeutic” in that it can diagnose some of medicine’s problems and propose prognosis and treatment. In particular, a philosophy that takes into account theoretical, practical and evaluative issues appears to be useful to the complex activity of modern medicine. Hence, philosophy might again be applied to regulate and legitimate medical actions as it did in antiquity. On the other hand, it illustrates that medicine can still be of importance to philosophy. Medicine might gain a prolific position in philosophy and “save” more than just the branch of moral philosophy (Toulmin, 1986).

That is, there appears to be a fruitful reciprocity between medicine and philosophy, today as in antiquity. Medicine might be applied evaluatively in philosophical argumentation, and philosophy can be fruitful to the analysis of fundamental challenges to medicine.

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NOTES

1. It is worth noting that these characteristics of *techne* are not unique to the Hippocratic authors, but that they can be recognised in a vast variety of ancient literature. Nussbaum shows how corresponding characteristics played a prominent part in the philosophy of Aristotle, the Epicureans, Sceptics and Stoics (Nussbaum, 1994, pp. 46-47). Accordingly, Roochnik investigates the characteristics of *techne* in a broad range of ancient literature (Roochnik, 1996).

The objective of this article is to stay close to the Hippocratic authors. To illustrate that the Hippocratic conception of *techne* was not extraordinary in antiquity some references to other ancient authors are provided, mainly to *Corpus Platonicum*. Hence, the article deals with a pre-Aristotelian conception of *techne*, which deviates from the Aristotelian conception in several aspects. Although it would be interesting to make a comparison between the Hippocratic and the Aristotelian conceptions of *techne* this is beyond the scope of this article.

The Hippocratic texts may be complex and divergent. However, they comprise what has been conceived of as the teaching of one of the most prominent ancient schools of medicine. Among the texts referred to in this article are *Prognostics*, *Regimen in acute diseases*, *Epidemics I* and *III* which are generally attributed to Hippocrates and written between 430 and 415 BC, *On the nature of man*, which is probably from the first quarter of the fourth century BC and is ascribed to Hippocrates and his son-in-law Polybus, *Aphorisms*, which are in part written by Hippocrates and are dated to about 415 BC, *On ancient medicine*, which is probably written by Hippocrates or a dedicated Hippocratic writer during the period 430–20 BC, and *On the art*, which is from the end of the fifth century BC, probably written by Hippas.

2. Related to the issue of whether medicine should treat the soul, see also (*Charmides* 156d5-157a2; *Republic* 610a4-7).
3. See also (*Republic* II 360e4; 361a1-2; Pindar *Pythians* 3.55-58).
4. Although it might be argued that medicine's self-restriction was a result of ancient physicians' self-interest, self-restriction was at the basis of medical self-conception. For a discussion on self-interest in ancient medicine, see also note 7.
5. (*On diseases of women* I.3; *Prognostics* XX). See also (*Gorgias* 477b5-7; 477e12-478b1; 503d4-504c2; *Eryxias* 401c7-9).
6. (*On ancient medicine*, *Epidemics* I, III, *On joints* LXXX; Edelstein, 1994, p. 227; Mitcham, 1994, p. 121). See also (*Laws*: X 889c-d; *Cratylus* 389a-390b).
7. Edelstein opposes an altruistic interpretation of medicine arguing that *The Oath* as well as the passages in *Precepts* VI are fundamentally professional regulations. To secure the

- economic foundation of the profession, the physician had to win the trust of the patient (Edelstein, 1994: 6–63; 87–110). The traditional interpretation of *Corpus Hippocraticum*, however, and the application of medicine in the *Corpus Platonium*, strongly suggest that medicine must also have had other goals than economic. See for example (*Republic* I, 342C; *Lysis* 218e9-219a1; *Gorgias* 452a10-11).
8. This is confirmed in *Corpus Platonium*: “The one essential condition is that they [the doctors] act for the good of our bodies to make them better instead of worse, and treat men’s ailments in every case as healers acting to preserve life” (*Statesman* 293b12-c1). See also (*Republic* I 342d2-6).
 9. To the Platonic Socrates *episteme* and *techne* appeared to have been synonymous. This point I owe to Professor Jan Helge Solbakk.
 10. The profoundness of balance in general is illustrated in *On the articulations*, where it is stated that it is better for a man to break both legs than only one, because the person will be in better balance with himself (*On the articulations* XXXIV).
 11. That is, health and disease were exhaustive and mutually exclusive concepts.
 12. However, the medical metaphor goes one step further. The organs of the body were tools, *organa*, of nature (Xenophon *Memorabilia* 4,6). With these tools nature breathed and regulated the temperature and the humours of man. Thus the body was an ordered product of nature. At the same time its organs were tools for sustaining this very same order.
 13. Medicine, being concerned with the arrangement and order of the body, was a model for the arrangement and order of the soul (*Gorgias* 504b4-d3). As medicine dealt with the good and the bad in the body, health (*hygieia*) and disease (*nosos*), it was the model for the relationship between the congenital bad (*emphuton kakon*) and congenital good (*emphuton agathon*) (*Republic* X 608d12-610c1; Hoffmann, 1922: 1076-1077; Solbakk, 1993: 226-227).
 14. Medicine was also applied as a norm of social relations (*Republic* VIII 567c4-5).
 15. The productive aspect of medicine appears to be normative as well. The result of medicine should be health, which frequently is conceived of as a normative issue.
 16. To these cases add what have been called *pseudodiseases* (Helman, 1985), that is, diseases that are indicated by markers and that the person would never have experienced during his lifetime if left untreated. Additionally there is type I error, that is, accepting a treatment that does not work, which makes people undergo futile or harmful treatment.
 17. This has also been called “the information paradox” (Evans, 1993).
 18. In the same manner as the author of *On ancient medicine* rejected the natural philosophers’ monistic approach, we ought to be careful to submit to strongly deductive systems in medicine. In the same manner as ancient medicine realised it was an empirical activity, the success of modern medicine appears to depend on the same self-restrictive insight.

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