Introduction
Medicine at the Crossroads

I.1 The Road to Medicine's "Golden Age"

Among our most universal and intimidating human experiences, the confrontation with disease occupies a prominent rank. Throughout history, a plethora of varied forms of folk and professional healing practices have aimed to fight disease, to enhance the ability to cope with it, and to render it meaningful. But during the course of the nineteenth century, the emergence of scientific medicine quickly changed the relatively pluralistic landscape of healing practices. Major discoveries such as the cell at the center of pathological changes and the "germ theory of disease" dealt a deathblow to theories that had dominated Western medicine since the ancient Greeks (e.g., the humoral theory of disease). Advances in physics, chemistry, and biology converged to form a basis for the field of medicine, which rose from a craft based on observation accumulated at the patient bedside to the level of a respectable branch of science. Since then, apart from scientific and technological advances, two mutually reinforcing tendencies have fueled the unparalleled rise and expansion of medicine.

The first is the *socialization of medicine*, which refers to the increasingly organized allocation of public funds to more or less centralized health services. Policymakers discovered the potential of medicine. In times of peace, the efficient functioning of complex industrial economies required a population that was both literate and healthy. In times of war, substantial injections of public funds into centralized health care services helped to sustain civilian morale and keep soldiers in the field. The provision of health services through subsidized medical facilities (e.g., dispensaries and hospitals) and national insurance plans became a way to attain political stability, to moderate the menace of sickness among poor people, and to control dangerous environmental conditions caused by massive industrialization. By the mid-twentieth century, citizens of financially recovering Western European states had access to a variety of state-supported medical

schemes. In the US, a national health program did not develop, but in spite of an ideological commitment to private medicine, the government carried a growing share of health care through the Armed Services, the Veterans Administration, and the Public Health Service (Porter 2002).

The second tendency is what we could call the *medicalization of the social realm*, which refers to a development whereby medicine expands its reach into an increasing number of private and public areas of life. An increasing number of previously nonmedical conditions came to be defined as medical conditions, which required diagnosis, prevention, or treatment (Broom and Woodward 1996; Conrad, Mackie, and Mehrotra 2010). Social movements functioned as promoters for medicalization, helping change the understanding of behaviors formerly defined as deviant (i.e., immoral, sinful, or criminal) into disease symptoms. A number of conditions like alcoholism, psychopathy, eating disorders, sex addiction, and learning disabilities turned from badness to sickness. Alcoholism is a good example of a case in which a new understanding of alcoholism as a disease was chiefly accomplished by the efforts of a social movement (Alcoholics Anonymous), while the medical establishment initially held back. As the reach of medicine widened, emerging statistical knowledge about the distribution of disease and its relationship to other variables (e.g., class, education, housing, diet) gave rise to population-level measures targeting the seemingly healthy (e.g., screening, testing, prenatal care) and to appointing doctors as factory inspectors, medical officers, analysts, and forensic specialists to help implement policies and laws (e.g., food and drug control, workplace safety, sanitation).

Socialization and medicalization played substantial roles in the development of medical science in the twentieth century (Porter 1997; 2002; Le Fanu 2012). Medicine transformed from a small-scale practice into an immense global industry, and from a craft to something that many have regarded as an emblem of scientific progress living up to the ideals of the Enlightenment, overcoming ignorance, and superstition for the benefit of mankind. In particular, the mid-twentieth century is often portrayed as the "golden age of medicine," an era characterized by scientific and therapeutic advances and high levels of public esteem bestowed upon the medical profession. To mention a few achievements, the main dangers to human life before World War II that were responsible for the deaths of millions of people (e.g., septicemia, tuberculosis, pneumonia, tetanus, polio, syphilis, meningitis) became treatable or preventable by vaccination by the 1980s.[1]

[1] When the World Health Organization (WHO) declared the global eradication of smallpox in 1980, medicine won a victory over a disease that is estimated to have killed 500 million people during just the last century of its existence.

The discovery of insulin as a treatment for type 1 diabetes marked a key breakthrough, and so did the invention of high-tech tools that enable early diagnosis (e.g., cytogenetic, biochemical, and molecular testing) and formerly inconceivable forms of surgery (e.g., organ transplants, laser surgery).

It is important to point out that the talk of a "golden age" sometimes underestimates the effect of factors such as better living standards on improvements in health (McKeown 1976; for a discussion, see Bynum 2008; Kaplan and Milstein 2019) and that "revolutionary narratives" about advances sometimes interfere with more nuanced and critical analyses of therapeutic successes and contributions to longevity (Farmer, Basilico, and Messac 2016). But while it is important to keep in mind that most of the gains in the first half of the century are associated with improved nutrition, sanitation, housing, and public health measures, medical advances (new drugs, devices, and procedures) have been a significant source of increases in longevity since World War II (Cutler, Deaton, and Lleras-Muney 2006b; Fuchs 2010).[2] This is true even if these successes coexist with numerous areas in which cures continue to elude medicine's reach (e.g., cures for influenza, fibromyalgia, cancer, Parkinson's, schizophrenia), or in which available interventions are of limited effect (e.g., statins, type 2 diabetes drugs, selective serotonin reuptake inhibitors [SSRIs]).

I.2 The Criticism of Medicine and the "Age of Disappointment"

Echoing themes from earlier criticisms of medicine as well as adding new aspects, the beginning of the twenty-first century has witnessed the emergence of a critical movement that advocates the reevaluation of medicine's efficiency and societal role. Even though the social determinants of health are now more widely acknowledged (Aronowitz 2019), leading medical professionals, epidemiologists, and historians, as well as some voices among the general public, express doubt that the status medicine enjoys in contemporary Western societies is justified (see, e.g., Porter 2002;

[2] Estimating the impact of medical advances in improving life expectancy is a highly complex issue and it is difficult to control for nonmedical factors. Perhaps Fuchs's conclusion, which attributes to medical advances the primary role in increasing life expectancy, is too optimistic, and improvements in life expectancy are probably not best pursued via investments in medical services (Kaplan and Milstein 2019). However, the more modest view that medicine has made a significant contribution is hard to deny. Studies focusing on a smaller number of conditions offer a clearer picture: half of all health improvements between 1960 and 2000 are due to medical care (Cutler, Rosen, and Vijan 2006a; Cutler et al. 2006b) and a considerable part of the reduction in infant mortality can be interpreted as resulting from improved neonatal medical care for low birth-weight infants (Cutler 2004).

Stegenga 2018; Broadbent 2019). For example, in a publication in *The Lancet*, prominent gastroenterologist Seamus O'Mahony (2019a) argues that we have entered the "age of disappointment," characterized by declining trust in medicine and growing criticism of it.

Three forms of criticism stand out, each highlighting challenges to contemporary medicine. First, *skeptics*, who rank among the most prominent and respected physicians and epidemiologists, maintain that confidence in the effectiveness of many medical interventions ought to be low (see Stegenga 2018). Numerous medical interventions are unsuccessful, and many others do not fare considerably better than a placebo. Moreover, we often see evidence suggesting that an intervention is effective even when it is not, in part because the institutional structure producing medical research is biased in favor of positive evidence and against reporting negative findings.

Second, critics maintain that *overmedicalization* occurs, meaning that medical resources are improperly used to address political, social, and personal problems and turn these problems into pathological conditions (Parens 2013). The expansion of the category of what demands medical intervention is often driven by predominantly social judgments about what is considered appropriate (in terms of body, behavior, personality, etc.). This contributes to the explosion of the costs of medical treatment, and leads to overtreatment (Scott 2006; Conrad 2007).

Third, critics target what might be called *objectification* in medical care. Increasingly technologically mediated interaction contributes to discounting the personal experience of illness and the psychological and social dimensions of ailments (Cassell 2004; Marcum 2012; Topol 2019). It predisposes seeing the body of the patient as a system made up of interacting and separately operating parts, increasing the likelihood of medical professionals forgetting that they are engaged with persons in vulnerable states (Engelhardt and Jotterand 2008). These issues lead to an increasing dissatisfaction in patients, which may be one of the reasons for the growing popularity of complementary and alternative medicine (Astin 1998; Bivins 2010).

Taken together, the charge is that medical science is less trustworthy than generally thought (skepticism), medical means are used to address nonmedical problems (overmedicalization), and medical care is inadequate (objectification). The criticism is thus comprehensive because it targets medicine both as medical science and medical practice, claiming that medicine has diverted from its course such that its aim fails to be realized in the current institutional settings.

I.3 The Aims of the Book

The sheer scope and depth of the criticism and the problems it highlights suggest that medicine has reached a critical threshold and indicate that medicine's scope and role in society is fated to be altered in the twenty-first century. This situation provides a fertile ground for addressing fundamental, philosophical questions about medicine. In particular, the different strands of criticism seem to converge on fundamental questions, namely about (a) the nature of medicine and (b) the aim of medicine, while also implicating central concepts in medicine such as health and disease. First, whether medicine can be justifiably accused of failing as a science (skepticism) will depend on what its nature is, that is, to what extent it can be adequately described as science. Second, whether the charge of overmedicalization is warranted will depend on what the aim of medicine is. If medicine is aimed not merely at fighting disease, but at enhancing well-being in the widest sense, then the charge might not be justified. Third, whether the charge of objectification is vindicated will depend on what the aim of medical care is. If it is merely the removal and prevention of disease, then the charge might not be justified.

If these considerations are on the right track, then we may presume that a systematic philosophical examination of these fundamental questions carries the potential to assist in the approaching deliberation about the future of medicine as a science and clinical practice. Aspiring to assist such a deliberation, this book pursues three main goals. It offers:

(1) an account of the *nature* of medicine

(2) an account of the *aim* of medicine

(3) a *Moderate Position* based on these two accounts that rethinks the challenges to medicine and outlines possible solutions.

Much of the current literature operates with more or less implicit assumptions about the nature and aim of medicine. With respect to the question about the nature of medicine, one influential view is that medicine is something other than science, as it merely applies science and does not pursue knowledge for its own sake (see, e.g., Pellegrino 1998; Miller 2014; Miller and Miller 2014). With respect to the question about the aim of medicine, the standard view is that the aim of medicine is to cure diseases, or at least to deliver proper care by using the arsenal of available medical interventions. However, as we shall see

in the course of this investigation, neither of these answers, nor recent alternatives, is satisfactory, which obstructs productive debates about medicine. Instead, this book proposes and defends more precise formulations of three broad theses about the nature and the aim of science and medicine:

Systematicity Thesis:	Medicine is science, that is, systematic inquiry.
Understanding Thesis:	Scientific inquiry in medicine aims at understanding.
Autonomy Thesis:	The primary purpose of understanding in medicine is to promote health, pursued to the extent that it serves or is at least consistent with the final aim of promoting autonomy.

To reach its first two goals, the book gathers support for these theses. Doing so involves illuminating norms and values that are constitutive of medicine, which, when suitably explicated, offer valuable impulses for dealing with the challenges that critics draw attention to. Helping to reach the third goal of the book, the theses will allow us to assume the *Moderate Position* with respect to the challenges, which provides a better comprehension of them, points toward possible solutions, and helps rethink the proper boundaries of medicine and the appropriate use of medical resources.

To reach its objectives, the book outlines a particular way of philosophically engaging science and medicine that guides the investigation. It develops an approach, best described as a *normative philosophy of medicine*, which focuses, for example, not only on what medicine is, but also on what it should be, and not only on how medical knowledge is deployed, but how it should be deployed. The approach operates with *three levels of analysis* and shows that the current criticism and challenges to medicine require addressing basic questions on all three levels. The approach can be located at the intersection of two different philosophical approaches to medicine. One largely pursues analytic aspirations, clarifying metaphysical and epistemological issues in order to analyze theoretical and practical aspects of medicine. The other largely pursues normative aspirations, aiming to comprehend ethical issues in health care and apply ethical reasoning to assist decision-making. Neither of these is entirely suitable for the tasks of this book, as the separation of analytic and normative considerations would risk overlooking how fact and value are often inescapably joined in the realm of medicine.

I.4 The Structure of the Book

Chapter 1 lays the groundwork and contributes to comprehending normative issues in medicine by offering an analysis of three prominent forms of criticism that target contemporary medicine. First, the chapter explores *skeptical criticism*, which maintains that except for a few "magic bullets," confidence in the effectiveness of medical interventions ought to be low (see Stegenga 2018). Second, the chapter surveys the criticism of *overmedicalization*, defined, as opposed to the neutral term "medicalization," as the improper usage of medical resources to address political, social, and personal problems. Engaging critics (e.g., Moynihan and Cassels 2005; Conrad 2007; Le Fanu 2012; Parens 2013), five reasons are presented for thinking that overmedicalization is problematic. Third, the chapter explores the charge of *objectification*, which raises vital questions about medical care (e.g., Cassell 2004; Haque and Waytz 2012; Capozza 2016; Topol 2019). The chapter clarifies this criticism and explores technological mediation and deindividualization in health care environments as contributing factors.

The last part of the chapter draws on work on criticism (e.g., Popper 2000), arguing that two features unite the three predominant forms of criticism. The first feature is that the criticism is *social* in the sense that its object is a social practice and not merely the actions of individuals engaged in the practice (see Haslanger 2018). The second feature is that the criticism is *internal* in the sense that the standards of evaluation employed are internal to the practices criticized and not external and independently justified. It is argued that the three forms of criticism build on the implicit assumption that medicine fails to meet *its own* internal standards: it has diverted from its course such that its aims are not adequately promoted in current institutional settings. But then, the different strands of criticism seem to converge on more fundamental questions about (a) the aim of medicine, (b) the nature of medicine, and (c) the key concepts of health and disease. The vast majority of the chapters in this book (Chapters 3–7) are predominantly dedicated to addressing these fundamental questions.

In order to achieve these aims, Chapter 2 presents and defends a particular type of philosophical engagement with medicine that guides this book: *the normative approach*. In a critical dialogue with existing work on normativity in the philosophy of science (e.g., Sober 2008; Kitcher 2011; Kaiser 2019), the chapter outlines a normative approach to the philosophy of science that distinguishes between *three levels of analysis* (i.e., aims, nature, and key concepts), corresponding to the types of questions

that current challenges to medicine raise. This grounds a particularly attractive *normative approach to philosophy of medicine* that considers philosophy of medicine as a proper subdiscipline of philosophy of science.

The approach deserves the label "normative" for several reasons. It uncovers norms linked to the aims, nature, and key concepts of medicine, assesses to what extent they are actually fulfilled in practice, and offers corrections based on these findings. Moreover, it allows for evaluating the merits of the current criticisms of medicine, and parts of the chapter are dedicated to showing how its three levels of analysis can contribute to addressing the criticism and challenges to which Chapter 1 drew attention. But, it is important to highlight that – consistent with what Chapter 1 said about internal criticism – the approach is normative in a particular manner: it is a second-order philosophical inquiry that is *continuous* with normative elements that are already more or less explicitly present in medical science and clinical medicine. This aspect, call this the Continuity View, breaks with an influential tradition in the philosophy of medicine, which sometimes openly advocates, and sometimes implicitly assumes, that philosophy is discontinuous with science and that philosophical work on medicine is therefore "detached from the method and content of medicine" (Pellegrino 1986, 13; 2001). The chapter offers a defense of the Continuity View against objections that could be launched by proponents of a traditional view in the philosophy of medicine like Edmund Pellegrino. It is shown that due to its scope and the three levels of analysis it highlights, the normative approach displays important advantages compared to traditional accounts and is particularly well positioned to help reach the goals of the investigation in this book.

In order to approach particular questions about the nature of medicine and the extent to which it is a genuinely scientific enterprise, Chapter 3 addresses the general question about the nature of scientific activity with special attention to medicine. While one influential view is that medicine is something other than science, as it merely applies science and does not pursue knowledge for its own sake (see, e.g., Pellegrino 1998; Miller 2014; Miller and Miller 2014), one main task is to defend the *Systematicity Thesis*, according to which medicine is science, that is, systematic inquiry.

The chapter starts by consulting the literature on the "demarcation" problem in the philosophy of science. It is argued that the failure of well-known approaches should not lead us to abandon the issue, but rather to pose the demarcation question in a different manner and proceed without entertaining essentialist expectations and hence ahistorical or discipline-independent necessary and sufficient conditions. Science is best seen as a

family resemblance concept, and the most promising way to consider the sciences as united is not through some intrinsic property, but a relational property that only admits differences of degrees to nonscientific inquiries. The *Deflated Approach* adopted in this chapter is based on Paul Hoyningen-Huene's (2013) account of systematicity as a necessary condition for science. It is shown that medicine (i.e., medical science *and* clinical medicine) meets the requirement for systematicity. Of course, the fact that medicine fulfills a necessary criterion for science does not establish that it is one, but as it displays systematicity on all the considered dimensions and is more systematic than its everyday counterpart, we have good reasons to think of medicine as science. In the last part of the chapter, it is shown that the *Systematicity Thesis* is able to differentiate medicine from activities widely recognized as pseudoscience. In a critical dialogue with recent work (e.g., Oreskes 2019), the chapter shows that homeopathy does not exhibit the type of synchronic and diachronic systematicity that characterizes scientific endeavors and it therefore remains susceptible to a variety of biases. Systematicity helps generate reasoning and inquiry that produce reliable knowledge and understanding.

The defense of the *Systematicity Thesis* helps clarify the nature of medicine in terms of systematic, scientific inquiry. But what is the aim of scientific inquiries in medicine? Focusing on the *epistemic* aim of inquiry, Chapter 4 seeks to make a critical step toward answering this question by focusing on medical science, which, as described in Chapter 3, encompasses clinical as well as medical laboratory research, and only counts as properly *medical* if it displays a *practical orientation,* that is, if it is ultimately motivated by contributing to the maintenance of health and the diagnosis, prevention, and treatment of disease. The main thesis of the chapter, the *Understanding Thesis*, holds that inquiry aims at *understanding*, while the question of what special kind of understanding is at stake in medicine is the topic of subsequent chapters. Drawing on recent debates in epistemology (e.g., Kvanvig 2003; Pritchard 2010; Grimm 2014) and in a critical interchange with prominent work in the philosophy of science (Kitcher 2001; 2008; 2011; Bird 2007; 2019a; 2019b; Douglas 2009; Potochnik 2017), the arguments presented in favor of the *Understanding Thesis* break with an influential view that, due to its practical orientation, inquiry in medicine differs *in kind* from scientific inquiries, leading them to the conclusion that "medicine is not, and cannot be, a science" (Munson 1981, 189; Pellegrino 1998; Miller and Miller 2014). The chapter shows that the success of this argument depends on faulty assumptions about the aims of scientific inquiry. It is argued that the

practical orientation of inquiry in medicine does not render it different *in kind* from scientific inquiries, and does not prevent it from being a science. However, there are important differences in degree, which make a difference for what counts as progress. Finally, the *Understanding Thesis* has some implications for thinking about responsibilities in scientific inquiry, which are clarified by *extending systematicity* to include considerations about the choice of an inquiry.

The starting point of the subsequent chapters ensues from a number of points made in previous chapters. If the *Systematicity Thesis* and the *Understanding Thesis* are correct, then we may derive the broad suggestion that (i) the aim of medicine is to understand pathological conditions, which (ii) serves the final objective to contribute to the endeavor of supporting human agency. After all, if the epistemic interest in understanding is motivated by practical interests, and if pathological conditions are in general detrimental to human agency, then it makes sense to assume that the goal of understanding pathological conditions is to be able to intervene (i.e., cure, treat, prevent them) in a way that promotes our abilities as agents. However, both (i) and (ii) deserve more detailed consideration, as much will depend on *what exactly* the character of understanding is in medicine and *how exactly* medicine contributes to supporting human agency. For this reason, Chapter 5 focuses on (i) while Chapter 6 deals with (ii).

Chapter 5 starts out with exploring a simple suggestion that has roots in the *Understanding Thesis,* and its main task is to shed light on the specific kind of understanding that medicine has as its aim. Taking into consideration work by Alex Broadbent (2019), current debates on the epistemology of understanding (e.g., Kvanvig 2009; Grimm 2012; Khalifa 2017), and recent scholarship on the aims of inquiry (e.g., Kelp 2021), the chapter first describes in more detail what it means to understand something, distinguishes types of understanding, and considers the history of scurvy to explore what understanding a disease involves in the context of medicine. The main hypothesis here is that *objectual understanding* of a disease (i.e., biomedical understanding) requires grasping a mechanistic explanation of that disease.

To see how causal and constitutive relationships are comprehended in the sciences, the chapter draws on an influential account of causation (Woodward 2003; 2010; 2015) and on work on mechanistic explanations in the biological sciences and neuroscience (Thagard 2003; 2005; Craver 2007; Nervi 2010; Kaplan and Craver 2011; Darrason 2018). However, alluding to debates on methodological principles in the humanities and