DO WE NEED A CONCEPT OF DISEASE?

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ABSTRACT. The terms "health", "disease" and "illness" are frequently used in clinical medicine. This has misled philosophers into believing that these concepts are important for clinical thinking and decision making. For instance, it is held that decisions about whether or not to treat someone or whether to relieve someone of moral responsibility depend on whether the person has a disease. In this paper it is argued that the crucial role of the 'disease' concept is illusory. The health/disease distinction is irrelevant for most decisions and represents a conceptual straightjacket. Sophisticated and mature clinical decision making requires that we free ourselves from the concept of disease.

Key words: clinical decision making, concepts of health and disease, goals of clinical medicine, species design

1. INTRODUCTION

Let me introduce the theme of this paper with the help of a simple analogy. A car owner, CO, is dissatisfied with his car's acceleration and he contacts the garage mechanic, GM, to correct the fault. The following dialogue then ensues:

GM: I have tested your car carefully, but I can't find anything wrong it. The acceleration is not supposed to be faster.

CO: But I have a friend who has a car of the same model, and when I drive his car, the acceleration is distinctly better. There must be a mechanical fault with my car.

GM: I can assure you, that there is no fault. However, there will always be minor individual variations between cars of the same model. Probably, the valves of your friend's car are differently adjusted.

CO: But that means that my car *is* defective after all!

GM: No! There is no fault or defect. The valves are just *differently* adjusted. That doesn't mean that there is anything *wrong* with them.

CO: I don't know how you define "wrong" of "faulty", but to me these words just signal that things are not as good as they could be.

At this point we may consider two different versions of the next scene. In the

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first version a philosopher steps in.

P: Clearly, the source of this controversy is a confusion regarding the concept of mechanical fault and some related concepts like 'defective' and 'malfunction'. The attitudes and activities of garage mechanics depend on how these terms are understood. In order to solve the problem, we must get down to some serious conceptual analysis. Now let me see ... (The philosopher looses himself in thought and stays lost for a year or so.)

In the alternative scene, GH, a friend of CO and a philistine, enters and turns to GM.

GH: Now, let us put an end to this nonsense! Is there anything that you can do to improve the acceleration, and if so, are there any reasons not to do it?
GM: Yes, of course! I can easily adjust the valves. This will increase the petrol consumption of the car slightly, so it will be more expensive to drive it, but it will improve the acceleration. But, as I said, this does not mean that there is anything wrong with the car...
GH: I don't care if there is anything wrong with the car, if there is a defect, a fault or a flaw. Nor do I care if the car conforms to the designer's specifications. CO wants something done to the car and you can do it. It may be necessary to discuss pros and cons and you must agree on a price, of course, but this argument about whether the shortcoming that CO wants changed is to be called fault or not is entirely sterile.

It is often thought that the health/disease distinction has important consequences. Issues such as whether a psychotic person should be held responsible for his actions or if a certain condition should be treated, seem to require that we first make up our minds about whether the individual is diseased or healthy. If so, it may seem that these important clinical decisions depend on how we draw the line between health and disease. It is not surprising, then, that a lot of effort has been spent on attempts to achieve unobjectionable definitions of these terms.[1]

The purpose of this paper is to argue that these attempts are misguided. In contrast, I will claim that we should learn from the philistine above. The health/disease question is irrelevant – we never really need to know whether someone has a disease or not, and consequently, we do not need a definition of 'disease'. My purpose is both descriptive and normative. I argue that the concept of disease does not in fact play the crucial role in clinical decision making that many seem to think. But I also think that the role it does play should be reduced.

I will defend this position by discussing some of the functions that the

concept of disease is supposed to have. I will argue that these functions are better served without reference to health and disease, partly because this distinction does not coincide with any clinically important or morally relevant categories. I will also argue that the concepts 'disease', 'health' and 'illness' do not play any significant role in medical science. The conclusion to be drawn from these claims is, that the concept of disease is superfluous. It may be useful in everyday affairs, where sophistication would be out of place, but in more serious contexts it is misleading and an obstacle more than a help to clear thinking. A strong emphasis on the distinction between health and disease in medical philosophy is thus misguided.

These somewhat provocative formulations are intended to clarify the position of this paper by having the main thesis stand out in sharp contrast to other views. Some qualifications are necessary, however. In saying that the concept of disease has no functions, I am not suggesting that the word should never be used, or that everything that philosophers have written about it is useless. My point is rather that the discussion of certain morally or socially important issues, such as whether some kinds of antisocial behaviour should be treated or punished or whether medical insurance should cover this or that condition, has been too much focussed on how we should define the words "disease" and "health", and to little on the issues themselves.

Nor am I suggesting that the concept of disease cannot be explicated. On the contrary, I think that some version of what is sometimes called the "mechanical model" of disease, that is the view that disease is a deviation from some kind of ideal design, is essentially correct and captures quite well what medical scientists and practitioners actually mean by the term "disease". An eloquent spokesman for this conception of disease is Boorse ([1 –3]). In his version of this view, a disease is a state of an organism that "interferes with the performance of some natural function – i.e. some species-typical contribution to survival and reproduction" ([2], p.62). Health is the absence of disease, i.e., functioning in conformity with the "species design".[2]

Concepts which are of central concern in science, often become subject to extensive intra-scientific discussions about their proper interpretations and definitions. Indeed, these discussions are sometimes so extensive that they leave only marginal room for philosophers of science. It is striking, however, that the concepts 'disease', 'illness' and 'health' attract very little interest from clinicians or from medical scientists, and are mainly discussed by philosophers, social scientists and public health officials.[3] I think that this is an indication of the irrelevance of these concepts in medicine.[4]

2. WHY CONCEPTUAL ANALYSIS?

There are several good reasons for seeking definitions of scientific terms, and they are not easy to separate. One of them is that certain concepts have such a central role in scientific theories, that they are indispensable for the derivation of those empirical and applied statements (lower-level laws, individual statements, etc.) which the theory is supposed to cover. Terms like "force", "adaptation", "money supply", etc. require precise definitions because definitions of these terms have important intellectual and practical consequences. The definition of the money supply, for instance, determines the empirical content of certain economic theories, and will affect predictions of future inflation as well as the choice of an appropriate economic policy. For each possible definition of "money supply" there will be a distinct set of empirical consequences of the theory in which the term appears. Some of these consequences will be true and others false. The definition is therefore a necessary step in formulating the content of the theory and in making it more determinate. Although important, such definitions are usually not of great philosophical interest.

Clear definitions of such terms may also be necessary for the understanding of scientific theories. In order to understand a certain theory it is usually not enough to master a certain formalism and being able to calculate certain quantities with the help of the theory's equations. One must also grasp the ontological and epistemological character of the entities which figure in the theory. An understanding of modern physics, for instance, requires not only acquaintance with Einstein's energy-equation or the equations of quantum theory. It is also necessary to understand the concepts of space, time and motion which lie behind the theory of relativity, just as it is necessary to free oneself from certain traditional conceptions of locality, causality and observation, in order to understand quantum physics. In these cases, philosophical analyses of the central concepts are probably helpful.

A different kind of reason for caring about definitions, is the value that some concepts have in intellectually organizing a certain body of knowledge. Examples of such terms are "learning" and "memory" in psychology and neurobiology. Should we say, for instance, that a dog that has learned to salivate in response to the sounding of a bell, has also memorized something, or should this term be reserved for 'higher' forms of learning? Should changes in the excitability and strength of muscle cells induced by training be called learning? It does not matter much from a theoretical point of view which processes are called learning, but it may be useful for scientific communication to have a common terminology. Discussions of this kind are aimed at establishing terminological conventions, however. This is natural and legitimate, but it is usually not regarded as philosophically very important, and it is not the same

thing as a conceptual analysis.

Definitions may also be important for purely practical reasons, even when they lack theoretical importance. A good example is intelligence. Because intelligence does not figure in any important psychological theory, there is no need to understand what the word "intelligence" means in any deep sense. There is no theory in which intelligence is a central variable which determines the value of some other variable and which is used to derive empirical statements. People, including psychologists, employ the term differently, but there is no harm in this and there has been no need to agree on a single usage. Neither is there any reason to think that there is some hidden 'true' meaning of intelligence that can only be uncovered by philosophical analysis. There is, however, a strong practical reason to define the term precisely in scientific discussions of intelligence. In order to evaluate and interpret a statement about intelligence, we need to know exactly what the writer/speaker means by the term. Hence the use of operational definitions.

The mere fact that a term is frequently used in a scientific discipline, however, does not mean that it is also theoretically or practically important, or that philosophers or scientists should spend time in clarifying its meaning. Ecologists frequently speak of forests and deserts, biologists of animals and plants, physiologists of cells and hormones and economists of money markets and industries. All of these terms are vague. Yet, neither scientists nor philosophers think it important to enquire about the meanings of industry, hormone, plant or forest (except, perhaps, when the need for operational definitions arise).

It is my contention that none of the above motives for conceptual analysis apply to the concepts of disease and illness. There is no biomedical theory in which disease appears as a theoretical entity and there are no laws or generalizations linking disease to other important variables. Therefore, there is no need for an analysis that makes a theory more determinate or understandable, and there is no need for operational definitions.

It might be claimed however, that the concept of disease, although it is not a theoretical term in any scientific theory, still has a somewhat similar role in social and moral discourse. There may be no scientific laws about diseases, but there are certainly many *rules*, both moral and legal, about medical intervention and responsibility for ones actions, which are logically tied to concepts of health and disease. Conceptual analysis will therefore be necessary for making this system of rules determinate.

The line between health and disease is thought to be important primarily in the following contexts:

1. Before the physician can legitimately initiate a diagnostic investigation or begin medical treatment, he requires that a patient really has a disease. The

classification of patients into diseased and healthy would thus determine which patients receive medical treatment.

2. In those cases where the cost of the medical intervention is to be covered by others than the patient, say an insurance company or the state, a disease classification is usually required. Insurance schemes or welfare arrangements usually also compensate the diseased for economic losses. Here too, it is required that the recipient of such compensation really has a disease.

3. Having a disease frees one of certain normal moral obligations, for instance the obligation to work. The way this is arranged may vary from country to country. In poor countries, it will mainly be an increased willingness on the part of the healthy to help the diseased. Some countries have compulsory insurance schemes, which not only pay for medical treatment but also entitle the individual to economic compensation during the period of illness. In these cases the moral right is also a legal right. Normally we also recognize other moral rights, such as the right not to take part in domestic chores, the right to complain, to have a bad temper, to expect certain services, etc.

4. Some diseases, particularly mental illnesses, free the bearer of the disease from moral responsibility and legal liability.

It seems to be tacitly assumed in much writings on disease, that the same disease concept can make the distinctions which are relevant in all four of these contexts. An exception is Boorse [1] who emphasizes the difference between disease and illness. A disease for Boorse is "roughly, a state of the organism that compromises some physiological function, whereas an illness is a disease which is (a) undesirable to its bearer, (b) a title to special treatment [cf. 2 and 3 above], and (c) a valid excuse for normally criticizable behavior" ([2], p. 61). Thus, it is implicit in this view that having a disease is not sufficient or necessary for having a right to special treatment or a valid excuse for normally criticizable behaviour. However, this complication has no direct bearing on my main thesis and will be disregarded.

It may seem that the health/disease distinction is crucial in all of the four contexts above. In the next section I will argue that this is an illusion.

3. THE IRRELEVANCE OF DISEASE

3.1. Disease as a Ground for Medical Treatment

It is beyond dispute that the medical profession and medical science owe their existence to diseases, and the fight against disease is traditionally regarded as the purpose of medicine. It may, therefore seem reasonable to claim that "choosing to call a set of phenomena a disease involves a commitment to

medical intervention" ([4], p. 137). This is only approximately correct, however.

Medical treatment may seem to be motivated by disease, but that is not the true reason. Even if treatment is usually directed against those states we call diseases, there are many exceptions, and these are likely to become less exceptional as a consequence of economic development and the growth of medical knowledge. There are several states, normally classified as diseases, which are not treated, because they are not associated with any discomfort or danger to the patient. Nothing is usually done about benign tumours like birth marks or small fibromas, for instance. Some clearly pathological conditions, such as sterility, are even induced intentionally.

It is also easy to find examples of healthy conditions which nevertheless fall within medical practice. Cosmetic surgery is growing in importance and will probably continue to do so. Sex change operations are not motivated by the conviction that gender can be a disease. If and when 'cures' are found for, say, male baldness or normal intelligence, they will become major medical articles. Many physicians are occupied with attempts to give people supernormal functions or capacities, as illustrated by sports medicine and research on longevity.

It would be wrong to dismiss such examples as mere pedantry. It is true that disease is so frequently associated with demand for treatment, usually because of suffering or potential suffering, that it is generally practical to use the disease label as a justification for medical intervention. I have no quarrel with this everyday usage of the term "disease", but we must not let it mislead us into thinking that it is having a disease *per se* that is crucial rather than the potential benefits of treatment. It may be true, at least as an approximation, that "The object of medical theory and practice is treatment of disease"([11], p. 69). However, it would also be approximately true that the object of a car mechanic's work is to repair mechanical faults in cars. But this does not mean that the car mechanic would not know what to do without a precise definition of "mechanical fault" or that the existence of a fault is the basic criterion for deciding if something should be done with a car. As previously noted, what I want done need not be motivated by any fault at all. What matters, ultimately, is what my wishes are with the car and whether it is within the mechanic's power to help me. Analogously, although we may sometimes talk imprecisely as if having a disease was a sufficient reason for seeking medical treatment, it is not really the presence of a disease that is crucial, but the fact that some medical intervention may be beneficial and that it is within the physician's power to help the patient.

It is a frequent complaint of the so called "mechanical model of disease", that is the view that disease is a deviation from some ideal 'design', that it leads doctors to focus all their attention and efforts on correcting 'mechanical faults'

and forgetting that this may not always be in the best interest of the patient. In extensive cancer treatment, for instance, the benefits to the patient are often outweighed by the suffering caused by the treatment, such as hospitalization, disfigurement, worry and sheer loss of time. It is not only a question of side effects in the traditional sense, but also that the medical intervention may hinder rather than help the patient achieve her ultimate goals in life. Such considerations are often put forward as a criticism of a particular theory of disease, the mechanical model, and not of the concept of disease as such (e.g. Wulff, et al. [12]). As stated previously, I think that the mechanical model, particularly the version of it formulated by Boorse [3], is about as close as it is possible to get to a correct explication of what doctors mean by "disease". At the same time, I strongly sympathize with the general view of the ultimate goals of clinical medicine expressed by Wulff, et al. [12]. The proper reaction, however, is not to reject this particular analysis of 'disease', but instead to realize that this concept is a straightjacket that should be abandoned rather than being replaced by another one.

3.2. Medical Insurance

The line between health and disease will determine whether the cost of medical intervention and the cost of not working for a living is to be borne by the individual or by an insurance company (or, which in Sweden is the same thing, the state). Here too, the emphasis on the health/disease distinction is misleading. The rationale of medical insurance, like all other insurance schemes, is to spread the risks more evenly for events which are costly, difficult or impossible to predict, outside the control of the individual and undesirable by almost everyone. It is considerations of these criteria which are relevant in deciding whether a certain condition should be covered by the insurance or not.

Refractive errors in the eye are clear cases of disease, but in most countries, eyeglasses are not covered by medical insurance. One reason is that errors of refraction are cheap to diagnose and to correct, which means the administrative costs of the system would outweigh the economic benefits to the patient. Another reason is that the condition of unpredictability is only weakly met. So many people need eyeglasses, eventually everyone, that there is little point in trying to spread the risks further.

Although having bad looks is not a disease, the cost of cosmetic surgery is sometimes paid for by the state in Sweden. The reason is, that being considered ugly often causes considerable distress and is also outside the control of the individual. When the appropriateness of this is questioned, the objection is usually not that bad looks is not a disease, but rather that this practice is a danger to the system. It might be difficult to resist the potentially limitless demand for

cosmetic surgery, that this would invite by people with only very relative and minor complaints about their appearance.

It is necessary for medical as well as other kinds of insurance to contain safeguards against exploitation. The system must discourage the insured to behave in a way that increases the risk of the events covered by the insurance. In Sweden, it has been proposed that conditions incurred because of abnormal risktaking (for instance fractures caused by skiing accidents or diseases related to smoking) should be exempted from medical insurance, or that such behaviour would justify higher premiums.

In none of these cases is the definition of 'disease' crucial, except in the sense that, however we decide to define the scope of the insurance, this definition must be consistently applied. Difficult cases are usually dealt with by special clauses, which, as the eyeglass example shows, do not always coincide with the health/disease distinction. They are certainly not dealt with by philosophical discussions about the true meaning of 'disease'.

3.3. Disease as a Ground for Special Rights

The special rights that we grant the ill are motivated by disease or illness only in a superficial sense. If we take the right not to work, as for instance in the right to sickness benefits or the moral right to be spared from household chores, it is not justified by disease *per se* but rather by the discomforts, pains or anxiety, or by the risks of future discomforts, that might result from working. When there are problems in drawing a line, as when a doctor is considering whether a patient can work or not, or when parents find it difficult to decide if a child should be forced to go to school, the problems are not solved by appeals to a definition of 'disease'. The solution lies in facts about the nature of the work in question and the nature of the discomfort.

Exactly the same considerations explain why most of us think it proper that old people should be granted special privileges and be spared certain forms of work. The discomforts and risks are the same, although old age is not a disease.

3.4. Mental Illness and Responsibility

The most important case of disease as a moral excuse is the exemption from moral responsibility and legal liability that is usually accorded the mentally ill. If a morally objectionable or criminal behaviour is caused by a mental illness or disease, we do not hold the person in question either morally responsible or legally liable for his actions. Thus, it might be thought, the line between health and illness has important consequences for how we treat people who break the rules of social conduct.

To understand this, we must consider the reasons for the fact that mental illness has come to be regarded as morally relevant. The social function of punishment, whether it be imprisonment or milder forms of social sanctions such as raised eyebrows or verbal criticism, is to influence the wrongdoer. Punishment serves to discourage potential criminals and to reinforce, in those who have already committed crimes, the consequences of their actions. Although we may not think much about it in everyday matters when we become morally outraged about something, this is surely the social and biological source of our moral emotions in this respect.

Obviously, punishment can only be effective in influencing people who are able to calculate the future consequences of their actions – appraise the probable outcomes of a certain action, weigh the pleasure/displeasure of these consequences, and let these judgments influence their behavior in the situation at hand. Apparently, most of us also realise, even if we sometimes find it difficult to control our emotions, that the mentally ill lack this ability, and that punishment is therefore ineffective. In their case, punishment can only lead to meaningless suffering, which the mentally ill cannot avoid by choosing a different course of action.

This way of justifying the relief from responsibility nowhere requires that we draw a line between the healthy and the mentally ill. The crucial line goes between those who are likely to be influenced by the responsibility and those who are not. Notice that this line also explains similar treatment of the mentally healthy. Relief of responsibility by this criterion will also be accorded children and animals and even completely rational people whose actions have had negative consequences which, because of their unpredictability, could not have been avoided by rational calculation. It is true that the mentally ill have subnormal mental functions, but this is not the primary fact. The crucial consideration is the inability of the individual to be influenced by the consequences of her actions, not the reason for this disability.

4. DISEASE AS A THEORETICAL CONCEPT

Let us, finally, consider the view that the concept of disease plays a role as a theoretical term in physiology. As we have observed previously, it is not a theoretical term in the same sense as, say, "electron", "force" or "gene". It could be argued, however, that the concept of disease plays a role in medical and biological thinking, because it helps to define an area of interest. Such an idea seems to lie behind Boorse's "physiological" conception of disease. The "subject matter of comparative physiology", according to Boorse, "is a series of ideal types of organisms: the frog, the hydra, the earthworm ... For each type a

textbook provides a composite portrait of what I will call the *species design*" ([3], p. 557). By implication, it is suggested that physiology deals with understanding the workings of the healthy organism. Analogously, it could be argued that the subject matter of evolutionary theory is the healthy organism. The explanatory power of the theory is limited to the healthy organisms conforming to the species design. Evolution by natural selection can only explain that which contributes to survival and reproduction, not that which detracts from these goals. Although there is some truth in the statement that the healthy organism is the subject matter of some parts of science, I also think that this is misleading and that it would be a dangerous straightjacket if scientists felt limited by it.

Physiologists take it as their main business to study anything that is physiologically important. The goal of this research is to produce a body of knowledge that can explain, predict and control important physiological phenomena, regardless of the reasons for this importance. Usually, this means normal or at least common physiological phenomena, but that is only because scientific importance is partly of function of the range of applicability of a certain finding.

For instance, in investigating the wiring of the nervous system of a certain species, a scientist will occasionally come across an animal with an atypical nervous connection. He will usually disregard the anomaly, not because it violates the species design and thus falls outside the scope of physiology, but rather because the anomaly, by being unusual, cannot be necessary for understanding how the nervous system works in most animals. The criterion at work, however, is range of applicability, not health. If the anomaly could help explain an extreme psychological trait, say a violent disposition, it would be interesting because violence is socially important quite irrespective of whether it should be regarded as unhealthy or not.

One of the most important tasks of physiologists is to study how an organism defends itself against various threats to its health or how the body reacts when it actually has a disease. The workings of the immune system, of nociceptive reflexes or DNA repair mechanisms are of central importance. It might be objected that these are examples of normal functions and that it is part of the healthy organism to have these mechanisms. However, it is sometimes also of importance to study how the organism reacts when it does not possess any specially designed defence mechanism. The reaction of the body to toxic substances, to weightlessness in outer space, to exchanging air with oxygencarrying fluids and to diving are all examples of physiological projects that transcend the idea of the organism functioning in accordance with the species design.

An essential aspect of all theories of disease is that the concept applies to the whole organism. However, the organism is loosing its central theoretical role in modern evolutionary theory, and the idea of a species design is therefore also

becoming obsolete. This becomes apparent when we consider properties which have both advantages and disadvantages to the organism. Take for example the gene that causes sickle cell anemia (cf. e.g. [13]). A heterozygous carrier of this gene (i.e. someone who has single copy of the gene) has an increased resistance to malaria. This might be called the function of the gene. But a homozygote (who carries the gene on both chromosomes), will develop sickle cell anemia, which is a serious disease by any definition. The gene lives on in the population at a certain equilibrium frequency. If more people carry it, the risk that a child will get it from both parents increases. If fewer people carry the gene, the risk becomes smaller and the relative advantage of resistance to malaria increases.

Now, the question whether this gene is part of the species design or not becomes quite impossible to answer and the functionalist disease concept consequently becomes meaningless. The gene has evolved by natural selection because of its survival value, but it has this value only if most organisms do not carry it. It is because of difficulties of this kind that modern evolutionary theory tends to regard genes, rather than organisms, as the units of evolution [14 – 15]. The main point here is not that, because the idea of species design cannot be upheld, the concept of disease also breaks down. The point is rather that the species design does not matter. The idea of the healthy organism, an organism which conforms to a specifiable design, is not necessary in order to identify theoretically important problems. Indeed, the example shows that we have to transcend this idea in order to understand the physiological importance of the sickle cell gene.

The example is probably not unique. Evolutionary theory implies that a gene that has lived on in the population must have escaped the pressures of natural selection. A gene that reduces survival value thus constitutes a problem, which can be solved if we can point to an advantage. This means that we can expect future medical science to identify benefits of some of those genes that increase the probability of heritable diseases like affective disorders, rheumatic diseases, diabetes and many other conditions.

5. CONCLUSION

I have tried to argue that a more precise definition of 'disease' will not help us to identify more clearly those people who need treatment, have a right to sick leave or should be relieved of moral responsibility, and I have also argued that there is no need for a theoretical concept of disease in physiology. The reason is not that the concepts 'health', 'disease' and 'illness' are vague, or that there are really many concepts of disease. The reason is that too much emphasis on these concepts tends to focus attention on secondary issues and muddle the really

important ones.

Diseases are to the clinicians what gardens are to gardeners or cars to garage mechanics. These terms are handy to point to a certain area of competence, but the gardener does not need a definition of "garden" to help him decide what to do about plants on a balcony and the garage mechanic does not need a definition of "car" to be able to decide if he should try to fix a lawnmower. "Disease" is a useful term, because, like "car" it gives a brief simple reference to a certain class of things which *to some extent* coincide with an area of competence. It is not identical to this area, however, and a deeper understanding of what this area is requires knowledge of the competence itself and how it can be used, rather than of the objects on which it is normally used.

To some extent it is true that the concept of disease plays a certain role in medical thinking, but this role is much smaller than many seem to recognize, and it is particularly small in sophisticated medical thinking. By this I mean that, in medicine, as in other practically oriented disciplines, we have use for certain crude concepts and rules of thumb, which we gradually leave behind us with increasing knowledge and maturing understanding. The young medical students who begin their studies with the idea that diseases are unpleasant abnormal conditions which should be treated and which entitle the patient to medical insurance, are not completely wrong. Statistically speaking, they will certainly more often be right than wrong, but as we have seen, there are many exceptions to these rules which the students will gradually learn to recognize as they mature. However, the maturation does not consist in their acquiring a more sophisticated view of health and disease, but in their replacing 'health' and 'disease' with other concepts, better suited to their purpose.

NOTES

[1] See e.g. [1 – 7]. For further references see e.g. the comprehensive monograph by Nordenfelt [7].

[2] This is a grossly simplified statement of Boorse's theory, of course. His definition is based on a sophisticated analysis of biological function and it includes clauses which enables it do deal successfully with many of the most difficult cases. The reader should consult in particular his [3]. Boorse's theory has been criticized by several writers, e.g. [6 – 9]. These writers have found serious difficulties in his position. My own view is, that Boorse's theory is very close to being a correct explication and I doubt that a better one can be found.

[3] Although this is true of the *general* concept of disease and the health/disease distinction, it does not mean that doctors have no interest in the definition of particular diseases or disease entities. Indeed, the latter is a daily topic of conversation.

[4] When Caplan in a recent paper complains that there are very few problems defining the boundaries of the field philosophy of medicine, he points to the debate about the concepts of health and disease as "The only real contender for this title [of defining problems]" ([10], p. 73). If I am right, and this problem of defining the concepts of health and disease

should cease to occupy philosophers, it might seem that there would be nothing left for philosophy of medicine. But, as will be clear below, some of the truly important issues will reemerge in a new guise, mainly as problems of applied ethics.

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