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The Disease Concept and the Medical View of Man

Abstract

Every medical scientist is by necessity a reductionist, but the reductionistic model must be chosen with great care. Otherwise it may prove impossible to solve the scientific problem. This paper reviews a series of medical models of the nature of man and of human disease, including simple mechanical models, models based on systems theory and models recognising man as an autonomous being.

Introduction

Medicine distinguishes itself from most other academic disciplines in one respect: it is not defined not so much by its subject matter as by its practical purpose.

An activity can only be called medical if it is serves one particular goal: the promotion of health and the elimination of disease in human beings (Wulff, Pedersen and Rosenberg 1986).

This statement raises two fundamental issues: what is the view of man which characterizes contemporary medicine and what is the resulting concept of disease and health? In other words, what is our theory of man and which models do we use when we do our research and treat our patients?

The answers to these questions depend on the particular medical problem which we wish to solve, and I shall discuss a series of models of increasing complexity.

1. Man as a simple model of plastic and bits of wire

The most simple model which I have ever encountered was the one used by an anatomist. He wanted to study the function of the mandibular joint, and for that purpose he had made a simple model of plastic and a few bits of wire. This example may serve to introduce the concept of reductionism.

A reductionist model of man is a model which leaves out some of those properties which we believe constitute a human being, and this model is certainly an example of extreme reductionism. The anatomist reduced a human function to a simple mechanical device made of plastic and bits of wire. The anatomist, however, acted very sensibly, as this simple model was quite satisfactory for that particular research project. One should never make things more complicated than absolutely necessary, and the simple model actually proved very valuable.

The anatomist got the help of a mechanical engineer who knew nothing about anatomy and physiology, but immediately understood the model and was able to apply his theoretical knowledge to this research problem.

One may say that the anatomist was a methodological reductionist, i.e. a person who uses a simplified model to solve a particular problem. There is no reason to believe that he was a theoretical reductionist, i.e. a person who actually believes in a reductionistic theory of man.

2. Man as a grandfather clock

The anatomist's model is much too simple for most purposes. It may be more appropriate to compare man with a complex machine, e.g. a grandfather clock. That is an analogy with ancient roots because already in the 18th century the British philosopher John Locke compared the mechanisms of nature with the mechanisms of a clock. The human machine is, of course, much more complicated than a grandfather clock, it is an extremely complex physicochemical machine, but that is irrelevant to my argument.

If we regard man as a complex machine then it is easy to explain what is understood by a disease: it is simply a mechanical fault in the machine. This may well sound a little simplistic, but in fact the current disease classification is based on the clockwork model. Most of the diseases which we diagnose in our patients are defined as mechanical faults, or, as we say in our medical language, they are defined as anatomical or physiological disturbances. Most papers in the British Medical Journal, the New England Journal of Medicine, or Dutch medical journals can be fully understood within this simple framework of thinking.

Doctors try to diagnose their patients' diseases which implies that they try to pinpoint the fault in the machine, and then they try to repair that fault by means of drugs, surgery and so forth.

3. A grandfather clock which is rusting.

However one must be careful not to oversimplify matters. The function of grandfather clocks depends on the environment, and the clock will rust if the rain water is dripping through the roof of the old farmhouse.

In much the same way it has been known for a very long time that the function of the human machine also depends on the environment. There is a long tradition for seeking the external causes of disease in the form of miasmata, bacteria, air pollution etcetera.

This search for the environmental causes of disease is obviously important as it serves a prophylactic purpose. The diagnosis of the fault in the machine serves a therapeutic purpose, but in order to prevent disease we must also determine those factors which started off the disease process.

In short, we have learnt to regard man as a complex physico-chemical machine which may function either normally or abnormally – which may be either healthy or ill. We have learnt to regard the development of disease as a unidirectional causal process. The environmental and genetic factors initiate the disease process, and then follows the complex chain reaction of functional and structural disturbances inside the human body. This chain of events, which is called the pathogenesis, leads to the mechanical fault that defines the patient's disease, and that mechanical fault causes the symptoms and signs, which we observe at the bedside.

This traditional model may be very useful, but it presents at least two important difficulties. Firstly, human beings do not resemble each others as much as a series of machines made at the same factory. The medical scientist is always confronted with the problem of biological variation and clinical medicine is usually decision-making under uncertainty. That is why statistical decision theory and clinical epidemiology are very important disciplines.

Secondly, the model does not tell us what is to be understood by normal and abnormal function – what is to be understood by health and disease. One may say that a machine functions abnormally, if it does not function according to the specifications from the factory, but what are the specifications of the human machine?

4. A thermostat

But the mechanical model must be refined. We know that the temperature of the body is kept fairly constant, that iron is absorbed from the gut according to the needs of the organism and that the hormone concentrations in the blood are regulated by means of delicate feedback mechanisms. Homeostasis is an important concept.

It is not sufficient to think in terms of unidirectional causal chains, and to say that the clinical picture which we observe at the bedside is the end result of a chain of events. It may be more appropriate to compare the human machine with a very complex thermostat. Then one may say that health represents the normal equilibrium of that thermostat and that disease represents an abnormal equilibrium. Then the human organism is regarded as a complex closed system where all processes are interrelated, and then the unravelling of causal relationships becomes a very complex matter, as one

must imagine that a disturbance of any particular process may spread to the whole system like the ripples on the surface of a pond.

That idea may help to explain why so much medical research gives unpredicted results and why so many projects prove futile. We try to reduce people's cholesterol intake in order to reduce their risk of arteriosclerotic disease, but we tend to forget that we are dealing with a system and that interference with the cholesterol level may have many other effects. We seek the causes of all sorts of diseases as if the causal chain always started with one specific cause – as if we were seeking the hole in the roof which caused the old grandfather clock to rust – but often we seek in vain. We just end up by having demonstrated a multitude of statistically significant risk factors.

One must also take into account that a thermostat is a self-regulating system, which means that it always tries to establish the normal equilibrium. In that way the thermostat model illustrates the well-known fact that the human system when it is disturbed – when it is ill – tries to re-establish the normal equilibrium called health.

This line of thought has clinical implications: The doctor who thinks in terms of unilateral causal chains will try to interrupt the disease process in order to cure the patient. The doctor who regards disease as an abnormal state of a complex thermostatic system will try to support the normal defense mechanisms of the body. In fact, our predecessors in the early part of the last century who were brought up in the Hippocratic tradition thought in that way. They always tried to support what they called the vis medicatrix naturae.

The anatomist who studied the mandibular joint received the help of an engineer who knew something about simple mechanical devices and in much the same way medical scientists who regard the human organism as a self-regulating closed system may benefit from the help of experts in systems theory.

I believe that this is to some extent a novel idea from a medical point of view, but in a wider perspective it is not so new. The mathematical ideas which led to modern control theory were developed in the last century and we are still thinking within the conventional framework of Newtonian physics. We are thinking in terms of reversible processes in a closed system and we are not taking into account the constant interaction with the environment.

The workings of a thermostat can be predicted by studying the engineer's blueprint, and those molecular biologists who believe that they can predict the workings of the human organism by studying the genetic code seem to be reasoning within this reductionistic framework.

5. Man as a living organism.

We do not usually say that man is a complex machine – be it a clockwork or a thermostat. We say that man is a biological organism, i.e. a living machine. But what does that really mean? In the old days there was no doubt. Then people believed in the existence of a special vital principle, which is present in all living beings, which serves to animate these beings and to maintain their life processes. But we do not believe that any more. We do not believe that those phenomena of nature which we call living are characterised by anything which cannot be explained in physico-chemical terms.

It is as if the word 'living' has lost its meaning in our culture, and it is very odd that this important philosophical problem, at least until recently, has received so little attention in texts on medical or biological philosophy. This deficiency of modern thinking may be one of the reasons why we treat animals and the living environment as we do.

I must admit that I cannot tell you what the word 'living' means. Perhaps it only refers to our belief that all living things have the same origin – that they are related in some distant way.

We should remember that all living things depend on each other. We eat plants and other animals, we depend on the oxygen production in the rain forests of Brazil, and they certainly depend on us. We are part of ecosystems. The history of this planet has seen the disappearance of numerous species, including the dinosaurs, and if we had been able to dissect the last members of that species, then undoubtedly we should have been able to diagnose their diseases. In other words, disease may be the result of maladaptation in the environment.

Only a few thousand years ago man was a hunter. Since then his living conditions have changed dramatically, and it would not be surprising if these changes caused maladaptation in the human system. Perhaps we should look at the degenerative and malignant diseases which dominate the disease spectrum today in this manner. But our living conditions are still changing. The way of living of future generations will be very different from our way of living, and it is a safe prediction that these changes will lead to the development of new diseases. Aids will not the last surprise for the human race and there will be no Health for All by Year 2000 or later.

All these ideas cannot be fully grasped within the conventional mechanistic framework of thinking, be it in terms of a grandfather clock or a thermostat. We are forced to take into account that a biological organism is not a closed system, but an open system in constant interaction with its environment.

That is an idea which is bound to have far-reaching consequences, as will be explained by some of the other contributors to the symposium. I shall confine myself to a few comments.

It is not sufficient to consider the self-regulation of a thermostat which has been constructed once and for all according to some blueprint; one must also consider the self-organisation (the structural changes) in open systems which constantly exchange matter and energy with the environment. Some diseases may be likened to an abnormal equilibrium of a functioning thermostat whereas others, such as malignant diseases, must be likened to the structural changes in a thermostat which got overheated. This interest in structural changes may also be needed to understand normal growth and the degenerative diseases of old age.

We must transcend the limits of classical Newtonian physics and thermodynamics, and consider non-linear, irreversible processes, and we must take into account the biological implications of the unpredictability of chaotic processes.

Possibly, this new field of research where mathematical theory formation and empirical observation go hand in hand, will revolutionise biological thinking.

6. Man as a psychophysical being

But man is more than a biological organism. He is also a sentient being, a being which can feel, perceive, and remember. These properties which characterise man, and to a varying extent other animals, are obviously very important, but they are at the same time mysterious properties.

Philosophers have never been able to solve the mind-body problem and scientists have done no better. Obviously, mental processes are closely linked to neurophysiological processes in the brain, but what do the words 'closely linked to' really mean?

The scientist bases his theories on the objective or observable, but mental processes are exclusively subjective, private and non-observable. Many attempts have been made to solve this riddle, but they have all failed.

Some philosophers have compared the relationship between mental processes and neurophysiological processes with the relationship between computer software and computer hardware, and for some research purposes this model may be useful. But we are still faced with a reductionist model. It does not catch that which is essential, the subjective character of mental phenomena. The computer does not feel anything when it calculates a correlation coefficient.

The body-mind problem is still a riddle, and most scientists have chosen the easy way out. They exclude the mental sphere from their framework of thinking. They have chosen to ignore that man is a psychophysical system and not just a physical one. Some medical scientists go so far that they regard it as unscientific to take an interest in psychosomatic phenomena. They have chosen to ignore what we all know: that our blood pressure rises when we are scared, that people cry when they feel distressed, and that they

blush when they feel embarrassed. Such scientists only study the somatic part of the process and say that the increase in blood pressure is explained by the production of adrenalin, but of course they have not explained anything at all. They have not solved the crucial problem, how the *feeling* of fear causes something somatic, the production of adrenalin.

But regardless of all the problems, our model of man is hopelessly incomplete, if it ignores subjectivity. The American philosopher Thomas Nagel once wrote an essay with the title: 'What is it like to be a bat?' (Nagel 1979). In other words, what would it feel like being a bat, flying round in complete darkness, navigating by means of the wonderful ultrasonic sense? Nagel simply states that this question can only be answered, if we view the world from the viewpoint of the bat. If we accept the subjectivity of the bat. Similarly, doctors must again and again ask this question: What does it really feel like to have that disease? And this question can only be answered from the subjective viewpoint of the patient.

The scientist only accepts the objective point of view – objectivity is a criterion of scientific thinking – but as Thomas Nagel puts it: 'The objective point of view is the view from nowhere' (Nagel 1986).

So we have to accept that man is not only an open system in interaction with the environment – he is a psycho-physical system – a system which includes purely physical processes, purely mental or psychic processes, psychosomatic processes and somatopsychic processes.

The nature of the relationship between mental and somatic processes still remains a puzzle, but we must explore the suggestion that they have one thing in common: the transmission of information (Foss & Rothenberg 1988).

7. Man as an autonomous being

The idea that man is a psychophysical system is still compatible with the idea of determinism, i.e. that man does not have a free will. But can we accept that point of view?

Today medical ethics is regarded as an important medical discipline, and we stress that it is very important to respect the autonomy of the individual patient. That way of thinking is linked to a completely different view of man. Autonomous man, as described by the philosophers Søren Kierkegaard and Immanuel Kant, is a being, which is conscious of itself, which can reflect, which can make moral choices, which can plan ahead and act freely in accordance with its self-chosen values.

The actions of autonomous man are not predetermined in the same way as other phenomena of nature. Do we accept this alternative point of view, which conflicts with conventional scientific thinking?

I think it is necessary for a number of reasons. Firstly, the theory is supported by all intuition. We all know what it means to be free to act in

different ways in a particular situation, and it is very difficult to accept the idea that our free decision was not free at all but determined in advance. Secondly, the theory is the basis of all moral thinking. Ideas like human dignity, responsibility, guilt, rights, duties etc make little sense, if man is not autonomous.

Thirdly, the idea of autonomy constitutes the very basis of the idea of democracy, that is the way in which we wish to organise our society. And fourthly, the concepts of health and disease only obtain their full meaning within that framework of thinking.

The disease is not just the fault in the machine or the disturbance of the system. Rather, it is the way in which the autonomous person interprets the symptoms and incapacities in the context of his or her own life. The key concepts of medicine – health and disease – require that we regard man as an autonomous being – as a person.

So, once again we must extend our model of man. The human system includes a very special type of mental processes which are willed. We can generate changes in our own system and we can generate changes in the environment. It is up to us to decide whether or not we shall release freon into the atmosphere and in which way we wish to influence the mental state of other people.

According to this view *man represents an open system, which interacts sociophysically with the environment.* The system comprises physical processes, causally determined and willed mental processes, as well as psychosomatic and somatopsychic processes, and it interacts with the environment in the following two ways: 1) social interaction with other people and 2) physical interaction with the living and lifeless environment.

Conclusions

I have discussed a number of models of increasing complexity, and all of these, except possibly the last one, may be labelled reductionistic, as they disregard some of the constituent properties of man. In my introduction I distinguished between theoretical and methodological reductionism, and this distinction is an important one.

A theoretical reductionist is a person who actually believes that a reductionistic model correctly represents the nature of man, and such a belief must of course be condemned. In the field of medical research it has the effect that important health problems are ignored, and in the case of medical practise it leads to a dehumanisation of the patient-doctor relationship.

A methodological reductionist, on the other hand, is a person who uses a simple model for the solution of a particular research problem or clinical problem, and that is, of course, fully acceptable.

However, all medical practitioners and scientists must choose their model with great caution. If they choose one, which is too simple, then they face one of two dangers: It is possible that they will not be able to solve their problem at all, or, which is worse, it is possible that they find solutions which only make sense in terms of a narrow view of man, which they do not themselves accept.

The choice of model also serves to determine the research methods which we use. If we think in terms of the mechanistic models then obviously we must do the traditional kind of scientific or quantitative research. If, on the other hand, we want to take into account mental processes and, especially, if we regard man as an autonomous being, then the objective scientific view will be hopelessly inadequate. It is no longer a question of observing the patient and of finding the causes of the symptoms, it is a question of understanding a fellow human being. Therefore, it is necessary to use the humanistic or qualitative research methods which have been developed in the human sciences, especially anthropology. I look forward to the day when we shall see a better balance between quantitative and qualitative research in our medical journals.

Scientific knowledge of the human system is not an aim in itself, but only a tool which serves a purpose that transcends natural science.

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