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Author(s): Christopher Boorse
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HEALTH AS A THEORETICAL CONCEPT*

CHRISTOPHER BOORSE†

University of Delaware

This paper argues that the medical conception of health as absence of disease is a value-free theoretical notion. Its main elements are biological function and statistical normality, in contrast to various other ideas prominent in the literature on health. Apart from universal environmental injuries, diseases are internal states that depress a functional ability below species-typical levels. Health as freedom from disease is then statistical normality of function, i.e., the ability to perform all typical physiological functions with at least typical efficiency. This conception of health is as value-free as statements of biological function. The view that health is essentially value-laden, held by most writers on the topic, seems to have one of two sources: an assumption that health judgments must be practical judgments about the treatment of patients, or a commitment to "positive" health beyond the absence of disease. I suggest that the assumption is mistaken, the commitment possibly misdescribed.

It is a traditional axiom of medicine that health is the absence of disease. What is a disease? Anything that is inconsistent with health. If the axiom has any content, a better answer can be given. The most fundamental problem in the philosophy of medicine is, I think, to break the circle with a substantive analysis of either health or disease.

Except for a clause on universal diseases, the analysis I wish to offer is that health is normal functioning, where the normality is statistical and the functions biological. A slightly fuller summary appears in the abstract. One result of this view is to distinguish sharply between theoretical health, the absence of disease, and practical health, roughly the absence of treatable illness. Practical health is a less demanding ideal. We shall argue that the literature on health misses this distinction, either by ignoring disease altogether or by assuming with Engelhardt that "choosing to call a set of phenomena a disease involves a commitment to medical intervention" ([10], p. 137). On our view disease judgments are value-neutral, which is our second

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main result. If diseases are deviations from the species biological design, their recognition is a matter of natural science, not evaluative decision.

The influence of values on health judgments has usually seemed most potent in the area of mental health. This is one reason why so much work on the topic is by psychiatrists and psychologists and tends to ignore physical counterparts to the issues it discusses. By contrast with somatic medicine, it is felt, ordinary mental-health practice involves very controversial value commitments, which surface when one deals with any of a whole spectrum of social *causes célèbres* from criminal insanity to homosexuality and feminism. But this "problem of values" is only one aspect of a special pressure on mental-health professionals to deal with foundational issues. Another aspect is the recurrent controversy, most recently revived by Szasz ([35]), about whether the notion of mental health is legitimate at all. Underlying the charge that it is not is the assumption—which I accept but cannot discuss here—that a legitimate notion of mental health must be a faithful analogue of the established physical conception ([4], [13], [35]).

In any case, a strong motivation for trying to sort out various notions of health is the hope of throwing light into this morass of mental-health controversies. But because psychological applications of the health vocabulary are controversial, they will be excluded from the argument below. Our goal in this paper is to analyze health and disease as understood by traditional physiological medicine.[1] The outline of the discussion is as follows. The first two sections introduce the problem by a survey of the main ideas of previous discussions of health (**I**) and some methodological remarks (**II**). The functional account is then presented and defended (**III–IV**), and the last section looks at the prospects for a useful notion of positive health beyond the absence of disease (**V**; cf. [18]). A full treatment of positive health is beyond the scope of the paper, since it logically requires a prior understanding of disease.

I. Major Themes in the Literature. There is a large clinical literature and a smaller philosophical one on concepts of health.[2] We will first look at some main lines of this body of work, which I suggest ignores

[1] The results of the present paper are applied to mental health in [2] and [4].

[2] Two excellent guides to the clinical literature, with emphasis on mental health, are Jahoda's *Current Concepts of Positive Mental Health* ([18]) and Offer and Sabshin's *Normality* ([30]). Philosophers who have written extensively on health and disease include Engelhardt ([10]-[12]), Flew ([13]), Macklin ([21]-[22]), and Margolis ([23]-[25]).

or misrepresents the notion of disease. In a brief survey we cannot discuss individual writers' views except as they illustrate recurrent themes. We can cover seven major themes—elementary ideas that occur frequently in definitions of health—and show that none by itself provides a necessary or sufficient condition for disease. This procedure will expose some problems that a good analysis must solve. It will also give some notion of our functional account's competition, though we naturally cannot go over all the ways one could combine these elements in a complex analysis.

All seven ideas below certainly represent features of fatal or debilitating illnesses such as malaria, smallpox, cholera, tuberculosis, cancer, and so on through the list of famous scourges of mankind. That is, they apply to what one might call the paradigm objects of medical concern. More interestingly, I think one can also say that most of them suggest an underlying assumption that the concept of health can be read off from its role in medical *practice*. This is a natural assumption, since the most obvious fact about medicine is that it is a clinical discipline which treats a special population of patients. One easily supposes that healthy people are those who do not need medical treatment, unhealthy ones those who do. To be a disease is to be the sort of thing doctors (ought to) treat. Some writers take this assumption as a complete analysis, while others go on to try to say *what* sort of thing doctors treat, e.g. painful or disabling conditions. But we shall argue that the assumption does not fit the traditional view of health as the absence of disease at all. According to our account, the judgment that something is a disease is a theoretical judgment that neither entails nor is entailed by any therapeutic judgment about people's need for medical treatment.

1. *Value.* Health is, on the whole, certainly desirable. It is easy to view this value as part of the concept of health, or even as essentially all of it. On the latter view physical health is physical well-being or welfare, an identification often made in discussions of health.

On the one hand, however, there are whole broad classes of undesirable physical conditions, conditions that restrict one's physical well-being, which do not appear as diseases in medical texts. It is undesirable to be mildly below average in any valuable physical quality, e.g. height, strength, endurance, coordination, reflex speed, beauty, etc. It is undesirable to have such universal human weaknesses as a need for sleep and regular access to food and water. These conditions are not diseases. Yet one could never distinguish them from diseases on grounds of disvalue alone. As any short person knows, shortness may reduce a person's quality of life much more, in the long run,

than a minor allergy or viral infection. It cannot be undesirability alone that makes a physical condition a disease. On the other hand, it is clear that diseases can be desirable under some circumstances. Cowpox could save a person's life in the midst of a smallpox epidemic; myopia would be advantageous if it meant avoiding the infantry. Sterility, in a world without contraception, might be a heavenly blessing to parents of large families. It therefore remains to be seen how values can enter into the concept of disease, let alone constitute the whole of it.

2. *Treatment by physicians.* It is often supposed that diseases are, if not undesirable conditions, then undesirable conditions that doctors happen to treat. Certain human ills, for historical or sociological or technical reasons, fall within medical practice. Those that do are *ipso facto* diseases; there is no other content to the notion of disease. As medical practice varies over time with evolving social institutions and values, so will the inventory of unhealthy conditions. But no *a priori* limit is put on this variation by any fixed further analysis of the concept of disease. At best, one can generalize about what kinds of conditions we tend to see as requiring medical treatment (cf. [10] - [12]). This view, a sort of medical positivism, is one of the stronger trends in the literature.

It does seem natural to cite realities of medical treatment to explain why certain undesirable conditions do not count as diseases. If there were a standard medical treatment for shortness or the need to sleep, then, surely, these conditions would be diseases. The reason they do not appear in a medical book is that there is no treatment for them. But this explanation does not survive scrutiny. Many recognized diseases are equally untreatable. Actual treatability, the existence of effective therapy, is far too strong a condition on disease. The positivist approach must appeal instead to some broader notion of "falling within medical practice." Yet shortness falls within medical practice in the sense that patients complain of it to their doctors. What seems to be lacking is only the medical judgment that it is a disease, as opposed to a region of the normal range of variation.

In a similar way, medical usage presents a converse difficulty for any practical definition of disease. Besides regarding as disease some conditions they cannot treat, doctors also treat some conditions they do not regard as disease. Among standard medical procedures are circumcision, cosmetic surgery, elective abortions, and the prescription of contraceptives. None of the conditions so altered appears in the AMA *Standard Nomenclature* ([37]), the latest attempt at a comprehensive listing of diseases. Nor are they listed as diseases by other

medical texts. One will search in vain for such a disease as unwanted pregnancy, and it would be absurd to call foreskins on male babies—a part of normal male anatomy—an innate disease. The performance of sex change operations hardly makes male gender, or female, a disease. The fact is that physicians distinguish, even among conditions they treat, between some they consider pathological and others they do not.[3] In traditional medical thought, a condition does not become pathological as soon as a patient or a society wants it changed. Treatment in medical practice is neither necessary nor sufficient for something to be a disease.

3. *Statistical normality.* In clinical language, diseases or pathological conditions are also called abnormal, and healthy conditions normal. An obvious idea that fits some features of medicine well is to interpret this normality statistically. Textbook normals for clinical variables like height, weight, pulse and respiration, blood pressure, vital capacity, basal metabolism, sedimentation rate, and so on are certainly statistical means surrounded by some range of "normal variation." In some cases, such as our example of shortness, the width of the normal range also seems to be a statistical matter. Where normal variation in height ends and dwarfism or giantism begins may depend only on parameters of the population distribution. In other cases, however, as when a text gives 95mm Hg as maximum normal diastolic blood pressure, the boundary of the normal range may reflect higher morbidity or mortality outside it ([27], p. 539). Medical writers frequently say that their quoted normal values represent, not the average person, but the average healthy person. This seems unfortunate for the project of using statistical normality to analyze health. But there is a persistent intuition that the average person—or at least the average heart, lung, kidney, thyroid, etc.—must be normal, or we would have no way of telling what the normal person or organ should be like.

I will return to this intuition when we construct our functional account. Here we note only that statistical normality fails as a necessary or sufficient condition of health. It cannot be necessary because unusual conditions, e.g., type *O* blood or red hair, may be perfectly healthy. It cannot be sufficient because unhealthy conditions may be typical. No doubt the average person or organ is healthy in a practical sense of displaying no indications for treatment, but that is not the same as complete freedom from disease. Some of

[3]The pathology of a disease is its morbid anatomy, i.e. the structural changes in body tissues that underlie its signs and symptoms. 'Pathological', however, can be a synonym for 'diseased' and 'abnormal'. The two usages are related by the medical assumption that every disease has some pathology, known or unknown.

what medical texts consider disease processes are at work in virtually everyone below the level of clinical detection. There are also particular diseases—atherosclerosis, minor lung inflammation, perhaps tooth decay—that are nearly universal. In spite of these difficulties we will give statistical normality an important role in our view, which shows that necessary and sufficient conditions are not the only possible components of an analysis.

4. *Pain, suffering, discomfort.* Another theme of many discussions is that health contrasts with the pain and discomfort of illness. This idea suggests a focus on medical practice rather than theory, and in fact on patients who come complaining of symptoms. Even within medical practice, routine physicals can disclose asymptomatic disease of many kinds—tuberculosis, diabetes, liver cirrhosis, breast cancer, various forms of heart disease, syphilis, and so on through a long list. As textbooks of medicine constantly mention, a complete absence of "subjective distress" is compatible with severe internal lesions. It has been said that pathologists doing autopsies in cases of sudden death often find it a mystery why the victim was not dead years before. At any rate, there is no reason why a disease process must be evident to its bearer via pain or discomfort. Conversely, pain and discomfort occur in normal processes, e.g., teething, menstruation, and childbirth.

5. *Disability.* If not all diseases cause physical suffering, perhaps any disease must at least tend at some stage to cause disability. The notion of disability is broad enough to have some hope of covering the field of disease and possibly subsumes pain as a special case. The most extreme disability, death itself, one judges to be some sort of analytic opposite of health. An interesting proposal that employs this notion along with others discussed above is by Dr. Lester King, who unlike many medical writers presents something resembling an analysis.

> Disease is the aggregate of those conditions which, judged by the prevailing culture, are deemed painful, or disabling, and which, at the same time, deviate from either the statistical norm or from some idealized status. . . . The ideal itself is derived in part from the statistical norm, and in part from the ab-normal which seems particularly desirable. ([19], p. 197)

The logic of this formulation does not, however, seem to fit King's stated intentions, since pregnancy is a painful, disabling, and unusual condition that he does not wish to count a disease. The vagueness

of the clause about ideals also presents an acute problem for testing King's analysis against cases.

In some manner, an analysis of disease using disability must solve the following sorts of problems. It must be broad enough to include minor skin diseases such as athlete's foot, eczema, and warts, either under the heading of disability or some other one. It must include disabilities like myopia and color blindness, but not the inability to swim, fly, or see in the dark like a cat, though the latter failings could be more harmful than the former. It must count adults, but not babies, abnormal if they cannot walk. If a notion of disability meets these tests and a few others, I think it will converge on our notion of dysfunction below, and so no more will be said about it here.

6. *Adaptation.* For a biologist, the standard abilities of organisms are adaptations to their environments. A growing movement in the literature, shown in the work of writers as diverse as J. A. Ryle ([31]), Rene Dubos ([8]), and Heinz Hartmann ([16]), identifies health outright with a biological notion of fitness or adaptation. The notion cannot, however, be "Darwinian fitness," or pure reproductive success. Parents hardly become healthier with each successive child, nor would anyone maintain that the healthiest traits are the ones that promote large families. Fitness or adaptation here must be a relation between organism and environment only indirectly related to bearing progeny. These accounts typically emphasize that an organism well adapted to one environment may not be well adapted to another. From this it is concluded that health is relative to environment, and the conclusion is pursued in either of two directions. Adaptation may be made a positive ideal of maximum enhancement of the abilities useful in each person's unique circumstances. Or one may develop the negative theme that conditions which would be intolerable in one person's situation may be tolerable or beneficial in another's. In the negative vein Ryle, for example, writes as follows:

> The small stocky Durham miner—poor though his general physique may appear to be from the combined effects of heredity, malnutrition in childhood, and occupational stress in adolescence—is probably better adapted to underground work and life than would be the more favoured and robust candidate for the Metropolitan police force.
>
> . . . what we call normal or (better) normal variability in biology and medicine must always be related to the work required of

> the organism or its parts and to the medium in which they have their being. ([31], pp. 3,4)

Although the force of Ryle's example is clear, the moral it illustrates might dismay a miners' union general counsel. The issue is whether Ryle would deny what his case suggests—that some of the Durham miner's adaptations to his work are manifestations of disease. The thesis that a condition is not a disease if it helps you on the job would hardly make a good principle of labor law. On the contrary, it is a medical truism that symptoms of disease, e.g. inflammation, may be adaptive responses to environmental insult. As we saw, on the usual view of disease it is quite possible for diseases like cowpox or myopia to be advantageous in special environments. They do not thereby cease to be diseases, for the judgment that they are is a judgment about types of condition and mentions no particular environment. So Ryle's "normality" is best interpreted as the practical normality of requiring no medical attention. It cannot well be interpreted as the theoretical normality of freedom from disease.

It is still clearer in the positive variations that adaptation is not freedom from disease. All sorts of abilities—violin playing, tightrope walking, impersonating a President—may enhance people's ability to live well in their particular environments. But that does not mean that the lack of these abilities would be pathological for them or anyone else. Ordinary medical thought uses no such notion as "pathological for person X in environment E," though "bad for X in E" of course makes sense. The relativity of adaptation to environment, which is its main attraction, is also what makes it unpromising for an analysis of disease.[4]

7. *Homeostasis.* Finally, the notion of homeostasis has wide, and probably excessive, influence as a clinical concept of health (cf. [9]). The importance of homeostatic regulating mechanisms in body physiology was emphasized by Claude Bernard ([1]) and Walter Cannon ([6]). Bernard looked at physiological processes as serving to maintain equilibrium in the *milieu intérieur,* while disease processes were disruptions of the equilibrium, or homeostatic failures. Certainly many aspects of normal and abnormal physiology fit this model. Countless biological variables like blood temperature, acidity, speed of flow,

[4]Hartmann introduces the notion of the "average expectable environment." He also distinguishes adaptedness from the process of adaptation, as any careful discussion of this topic must. In a short space we cannot do justice to such distinctions or to the complexity of Hartmann's view.

and composition with respect to innumerable substances and organisms must be kept within narrow limits in a state of health.

Homeostasis cannot, however, profitably be viewed as a general model of biological function. Many life functions are not homeostatic unless one stretches the concept to cover every goal-directed process.[5] Perception, locomotion, growth, and reproduction upset an equilibrium rather than maintain one. To say that their ultimate aim is internal equilibrium is unfounded; it is equally true, or truer, that the ultimate aim of internal equilibrium is perception, locomotion, growth and reproduction. Thus there is no point in trying to view corresponding diseases such as deafness, limb paralysis, dwarfism, or sterility as homeostatic failures. One can see why various equilibria are crucial to life without confusing homeostasis with the broader idea of normal functioning.

All the ideas discussed in this section have, in fact, some connection with normal functioning, i.e. with the typical *modus operandi* of the internal physiological machinery of a species. Breakdowns or malfunctions of this machinery—what we shall argue constitute disease—would tend to diminish health on all seven views. Most of the connections are empirical ones. The mode of internal functioning typical of our species, by definition typical, has by natural selection given us abilities adapted to a way of life in our environment that we value. Most serious failures in these internal functions would cause disability, pain, and suffering undesirable enough to justify seeking medical care. But our discussion suggests that a direct attempt to analyze abnormal functioning will better fit the medical notion of disease than the ideas of this section. Before this attempt is made, some summary remarks may help clarify its goal.

II. Remarks on the Problem. 1. *Generic usage of 'disease'.* Our project is, as we have said, to analyze the notion of *disease* behind the view that health is the absence of disease. It should be clear from the beginning that this view employs a much broader usage of 'disease' than any outside medicine. Until now I have tried to postpone this issue by my choice of cases, perhaps unsuccessfully. But health cannot possibly be the absence of disease unless at least the following are diseases: not only infection syndromes like malaria and syphilis, but also birth defects like spina bifida, growth disorders like cancer, functional impairments like limb paralysis, and all kinds of injuries

[5] The difference between homeostasis and goal-directedness is discussed by Sommerhoff ([33], 196–7).

and causes of death. The AMA *Nomenclature* ([37]) lists as diseases many conditions to which lay usage would never apply the term: obesity and inanition, seasickness, broken bones, gunshot wounds, foreign bodies in the stomach, supernumerary toes, animal bites, and drowning, electrocution, asphyxiation, incineration, and "general crushing." Some medical sources have separate headings for diseases and injuries; the broad usage of 'disease' is not invariable even within medicine. It is, however, well-established—exactly as well-established as the principle that health is the absence of disease.[6] The principle is impossible on any usage that distinguishes diseases from injuries, since it would then imply that one can be perfectly healthy and dead.

In order to analyze the broad medical usage, we will take medical reference works that employ it as more or less authoritative about what counts as a disease. An unusually comprehensive source is the *Nomenclature*, which aims to provide a code number for every disease recognized by clinicians. This book is invaluable as a compendium of thousands of test cases for an analysis of disease. It also includes some perfectly normal conditions, such as emmetropia or correct lens refraction, though perhaps only under codes indicating their normality. This concession to statistical convenience[7] suggests that the *Nomenclature* should not be regarded as completely authoritative about what conditions medical thought sees as diseases. Its evidence must be combined with the usage of 'disease' and 'health' in the discursive context of medical textbooks and research papers. An analysis of disease should, I think, be viewed as an explanatory theory of this whole body of usage and judged accordingly.

2. *Illness and disease entity.* Besides any lay conceptions of disease, there are at least two other narrower notions from which our generic target idea needs to be distinguished: *illness* and *disease entity*. Neither medical nor lay usage would describe a person with athlete's foot, warts, color blindness, or even all three at once as *ill*. But medical sources do call each of these conditions a disease. This means that some distinction, not a sharp one, is observed in medicine between disease and illness. I have argued elsewhere ([2]) that being ill involves

[6] According to the historical sketch in [40], the broad usage dates back at least to 1855. In that year William Farr, the first official British medical statistician, employed it in his proposal to the Paris Congress. It would be interesting to have further information on its history.

[7] Despite such concessions, in hospital recordkeeping the *Nomenclature* lost out to a version of the *International Statistical Classification* [40], which proved more efficient. The introduction to [40] repeatedly stresses that a statistical classification does not try to be a nomenclature. Perhaps the *Nomenclature* should not have tried to be a statistical classification.

having a disease serious enough to be somewhat incapacitating, which thereby supports normative judgments about treatment and responsibility. Not every disease makes its bearer ill. Another difference is that if one views illness thus as disablement by disease, one should probably follow some authors in taking illnesses to be particulars, i.e. dated episodes in the life history of a person, rather than universals. The WHO *Manual* seems to have this view in the following excerpt:

> . . . an individual afflicted with a disease may experience only one period of illness during the interval of observation, or may have repeated illnesses from the same disease. In addition, during the same period of illness, an individual may suffer from two or more distinct diseases. ([40], 6th rev., xxxv)

Diseases in the sense to be here analyzed—e.g. cystic fibrosis, bronchial asthma, trichinosis—are universals, or types of unhealthy condition that occur in more than one person.

Roughly corresponding to philosophical debates over universals, there have been recurrent controversies in the history of medicine about whether diseases or only ill patients are real ([10], [17]). Sometimes the issue was whether diseases are independently existing external entities; at other times it was whether disease taxonomy is artificial or natural. Our legacy from these controversies is the term *disease entity*, used to mean a natural unit of disease classification. Today the strictest definition of a disease entity would be a constellation of signs, symptoms, and pathology with specific etiology and prognosis. It is part of the ideal of a medical nomenclature or textbook to divide the realm of unhealthy conditions into disease entities of this sort. But in practice, because of limitations of medical knowledge, the division can only be carried out so far. Thus conditions like fever, diarrhea, breathing difficulty, or hypoglycemia would not be accepted as specific diagnoses, since they are common to many identifiable diseases, but the *Nomenclature* does reluctantly accept acidosis and glycosuria when no more specific diagnosis can be found. So some of the "diseases" listed in medical sources are surely not disease entities in a strict sense. Our generic notion of disease looks wider than that of disease entity.

Fortunately, if our goal is to understand health as the absence of disease, we can abstract entirely from this problem of individuating diseases. Complete freedom from disease is the same however the field of diseases is split up into units. As a side effect of this abstraction, though, our analysis of disease will include conditions like fever, diarrhea, dyspnea, hypoglycemia, and so on, which are not considered individual diseases by medical sources. In this respect alone we make

no attempt to be faithful to the customary extension of 'disease'. The reader should bear this restriction in mind.

3. *Intrinsic vs. instrumental health.* One last distinction is vital to our target conception. It is convenient to call it the distinction between intrinsic and instrumental health, or between what is a disease and what tends to produce one. The term 'unhealthy' is used in both senses, often with no risk of confusion. When one speaks of unhealthy habits, like smoking, or unhealthy environments, like New York, these are of course items that produce poor health, not exemplify it. But among physical states, it is easy to confuse diseases with dispositions to become diseased under certain conditions. A good example of the difference is the vermiform appendix. Having an appendix can be instrumentally unhealthy in the sense that with it one can get appendicitis. But the disease here is appendicitis, not the appendix itself. Although people with appendixes may be less likely to be healthy in the future than people without, their intrinsic health is no less until appendicitis strikes. Another case is Lucrezia Borgia, who supposedly acquired a high tolerance for arsenic by taking gradually increasing doses. She was then able to poison her enemies at dinner while diverting suspicion by eating the same dishes herself. Whatever the physiological basis of her tolerance, it was not intrinsically a gain in health, but it made her the healthiest person at the end of the meal. Similarly, someone with a mutant immunity to the common cold might be more often healthy than ordinary people. But that is because the immunity prevents disease—not because the lack of such an immunity is one.

This intrinsic-instrumental distinction is often of no consequence in medical practice. Usually physician and patient want to eliminate conditions that are unhealthy in either sense. But failure to draw the distinction is fatal to an analysis of health as the absence of disease. If whatever can cause disease were itself disease, everything would be a disease, since any causal connection is possible in a special environment. The correct strategy is to deal first with intrinsic health by examining what physicians call disease. An analysis of promoting or conducing to health then automatically follows, but not conversely.

4. *Positive Health.* The category of instrumental health accommodates some, but not all, of what various groups advocate under the heading of *positive health*, or health "beyond the absence of disease." An example of what has been thought to develop positive health is a program of physical fitness training. If physically fit people are healthier only in being less likely to get any disease, then positive health is

nothing but instrumental health. The ideal involved is lifelong freedom from disease, and fitness is valued as a means to this end. A true positive conception enters only if fitness is held to be healthier in itself, not merely in virtue of its side effect of greater resistance to illness. We can only examine this possibility briefly in the final section, since there is little point in discussing positive health until some clear conception of disease is at hand.

III. A Functional Account of Health. 1. *Orientation.* The intuition behind our account of health and disease will be a simple one, as simple as the ideas of section I but distinct from all of them. It is that the normal is the natural. Temkin, in his lucid survey of the history of medical conceptions of disease, finds this idea characteristic of the whole classical medical tradition that culminated in Galen:

> Such a concept of health and disease rests on a teleologically conceived biology. All parts of the body are built and function so as to allow man to lead a good life and to preserve his kind. Health is a state according to Nature; disease is contrary to Nature. ([36], p. 398; cf. [28])

Another expression of the same view from a modern source is quoted by King ([19], p. 494):

> There is a definite standard of normality inherent in the structure and effective functioning of each species of organism. . . . Human beings are to be considered normal if they possess the full number of . . . capacities natural to the human race, and if these . . . are so balanced and inter-related that they function together effectively and harmoniously. ([26]), p. 434, 437)

Without being able to discuss any part of the history of medicine here, we will argue that the contemporary inventory of diseases shows this ancient conception still at work.

From our standpoint, then, health and disease belong to a family of typological and teleological notions which are usually associated with Aristotelian biology and viewed with suspicion. Often this suspicion is excessive. Informal thinking in the life sciences constantly uses typological and teleological ideas with profit, and much recent philosophical work has been done on concepts of function and goal-directedness in modern biology. This work suggests that aseptic substitutes can be found for ancient notions that continue to have a scientific use. I think one should see that the analysis below is essentially just such a substitute for the idea that diseases are conditions foreign to the nature of the species. Our version of the nature of

the species will be a functional design empirically shown typical of it. The ancient view that an ideal can be simultaneously empirical and normative, which pervades the *Republic* and also more contemporary mental-health literature, will have no role at all below. The denial that health is essentially evaluative may be our largest departure from the classical tradition.

With these preliminary remarks, I now state the proposal of this section to show where the discussion is going. I will then lead up to it by developing each detail in turn. This formulation omits a clause about environmental injuries, which I postpone to the next section because it is more speculative than anything in this one.

1. The *reference class* is a natural class of organisms of uniform functional design; specifically, an age group of a sex of a species.

2. A *normal function* of a part or process within members of the reference class is a statistically typical contribution by it to their individual survival and reproduction.

3. *Health* in a member of the reference class is *normal functional ability*: the readiness of each internal part to perform all its normal functions on typical occasions with at least typical efficiency.

4. A *disease* is a type of internal state which impairs health, i.e. reduces one or more functional abilities below typical efficiency.

2. *Functions.* Biologists regularly use functional language to describe the role of traits in the life of organisms. For example, they report that the function of the peacock's tail is to attract a peahen, the function of gills in fish is respiration, and the functions of the human hypothalamus are too numerous to mention. A large philosophical literature now exists on the problem of analyzing these biological function statements. To defend any view on the topic is beyond our scope, but at the same time the content of a functional account of health depends on one's view of functions. I will therefore sketch an account of functions that I have elsewhere argued in detail ([3]; cf. [14]). This account is typical of the literature in taking biological function statements to be value-free; only a few discussions have made them evaluative ([24], [34]; cf. [39]). It is also not the only account to see physiological functions as causal contributions to an organism's survival and reproduction.

In my view the basic notion of a function is of a contribution to a goal. Organisms are goal-directed in a sense that Sommerhoff ([33]), Braithwaite ([5]), and Nagel ([29]) have tried to characterize: that is, they are disposed to adjust their behavior to environmental

change in ways appropriate to a constant result, the goal. In fact, the structure of organisms shows a means-end hierarchy with goal-directedness at every level. Individual cells are goal-directed to manufacturing certain compounds; by doing so they contribute to higher-level goals like muscle contraction; these goals contribute to overt behavior like web-spinning, nest-building, or prey-catching; overt behavior contributes to such goals as individual and species survival and reproduction. What I suggest is that the function of any part or process, for the biologist, is its ultimate contribution to certain goals at the apex of the hierarchy. That is why the function of the heart is to pump blood rather than to produce heart sounds, and the function of the kidney is to eliminate wastes rather than to keep the bladder full. It is the former effects, not the latter, which typically contribute to the organism's highest-level goals.

To some extent, however, these highest-level goals of organisms are indeterminate and must be determined by a biologist's interests. It is a feature of the Sommerhoff analysis that whenever goal G causes G' within the range of environmental changes for which an organism is directed to G, that organism is also directed to G'. This phenomenon occurs constantly in biology. Most behavior of organisms contributes simultaneously to individual survival, individual reproductive competence, survival of the species, survival of the genes, ecological equilibrium, and so forth. As a result, it appears that different subfields of biology (e.g., genetics and ecology) may use different goals as the focus of their function statements. But it is only the subfield of physiology whose functions seem relevant to health. On the basis of what appears in physiology texts, I suggest that these functions are, specifically, contributions to individual survival and reproduction. This assumption has definite consequences for our health concept and should therefore be kept in mind. Whatever goals are chosen, function statements will be value-free, since what makes a causal contribution to a biological goal is certainly an empirical matter.

3. *Reference class and species design.* We assume, then, that the physiological functions of a trait are causal contributions it makes to its bearer's survival and reproduction. For a definition of physiological function, we need at least one further qualification. Clearly physiological function statements are about a trait's *standard* contribution in some population or reference class, e.g. a species. A text may say that the function of the human lens is to focus light on the retina. This claim is not falsified by the existence of people with cataracts, or no lens at all. Similarly, one case of an animal's life being saved by some character would not be enough to make this

effect a biological function. One squirrel might catch its tail in a crack *en route* to being run over by a car, but that would not make defense against cars a function of the squirrel tail. The statement about the human lens is true because it is overwhelmingly typical of members of the population for their lens to contribute to their survival and reproduction in that way. In general, function statements describe species or population characteristics, not any individual plant or animal.

As a result, the subject matter of comparative physiology is a series of ideal types of organisms: the frog, the hydra, the earthworm, the starfish, the crocodile, the shark, the rhesus monkey, and so on. The idealization is of course statistical, not moral or esthetic or normative in any other way. For each type a textbook provides a composite portrait of what I will call the *species design*, i.e. the typical hierarchy of interlocking functional systems that supports the life of organisms of that type. Each detail of this composite portrait is statistically normal within the species, though the portrait may not exactly resemble any species member. Possibly no individual frog is a perfect specimen of *rana pipiens*, since any frog is bound to be atypical in some respect and to have suffered the ravages of injury or disease. But the field naturalist abstracts from individual differences and from disease by averaging over a sufficiently large sample of the population. The species design that emerges is an empirical ideal which, I suggest, serves as the basis for health judgments in any species where we make such judgments (cf. [19]).

It would be a mistake to think that this notion of a species design is inconsistent with evolutionary biology, which emphasizes constant variation. The typical result of evolution is precisely a trait's becoming established in a species, only rarely showing major variations under individual inheritance and environment. On all but evolutionary time scales, biological designs have a massive constancy vigorously maintained by normalizing selection. It is this short-term constancy on which the theory and practice of medicine rely. Medical diagnosis and treatment of, say, pancreatitis requires confidence that the patient is enough like other people to have a pancreas, located near the stomach, and secreting specific digestive enzymes that can attack the organ itself, producing such signs and symptoms as abdominal pain, diarrhea, weight loss, jaundice, hyperglycemia, and steatorrhea. Our species and others are in fact highly uniform in structure and function; otherwise there would be no point to the extreme detail in textbooks of human physiology. This uniformity of functional organization I call the species design. To deny its existence on Darwinian grounds would be to miss the forest for the trees.

Polymorphic functional traits, no one form of which is yet fixed in the population, can actually be included in the species design disjunctively. Thus it is typical of human blood to be either *A* or *B* or *AB* or *O*, typical of human irises to be either blue, brown, or green, typical of human skin to have some amount of pigmentation from small to great. But there are other intraspecific differences which cannot be handled disjunctively, and they are striking enough to generate several distinct species designs. These differences are of sex and age. Only a poor observer would be satisfied with noting that human beings typically have either ovaries or testicles, either wombs or penises, either large or small breasts, etc. The female characters occur together and constitute a single coherent functional design, as do the male's. Hence a disjunctive treatment of sex is inadequate. Less obviously in our species, functional design varies with age ([38]). This phenomenon is unmistakable in species whose life stages are as dissimilar as caterpillars, pupas, and butterflies. But there are functions performed in the human infant and not in the adult, e.g. enlargement of the skeleton, and also the reverse, e.g. sperm production or ovulation. Thus species design seems to be relative both to sex and to age.

For these reasons, physiology should probably be viewed as making its statistical abstractions from reference classes smaller than species. In medical applications the operative class seems to be an age group of a sex of a species, e.g., human male neonates or, say, 7–9 year old girls. In other contexts, perhaps even in medicine itself, one would have to factor in race as well, since in some respects the different races have different functional designs. Despite this contraction of the reference class to a fraction of a species, the term "species design" is still convenient and seems unlikely to cause confusion.

4. *Normal functioning.* Our interest in species design is that we wish to analyze health as conformity to it. It will simplify the exposition to introduce first a notion of normal functioning, which will develop into our final analysis of health by two modifications. The two modifications are a shift from functioning to functional readiness (**III**.5) and a clause on environmental injuries (**IV**.2). But aside from details, the idea is that diseases are internal states that interfere with functions in the species design.

> *Normal functioning* in a member of the reference class is the performance by each internal part of all its statistically typical functions with at least statistically typical efficiency, i.e. at

efficiency levels within or above some chosen central region of their population distribution.[8]

Three comments are necessary on this definition. First, its final clause says "within or above" because superior functioning is consistent with health. The unusual cardiovascular ability of a long-distance runner is not a disease. Secondly, the definition tries to avoid confusion between different uses of 'function'. In one sense, sometimes used with clinical tests, a function is the concrete process that makes a physiological contribution, e.g. thyroid secretion. In this sense there can be too much thyroid function, i.e. hyperthyroidism. This is not our usage, since for us the function is the contribution to physiological goals, and too much thyroid secretion damages these goals as much as too little. To put it another way, the function of the thyroid is not merely to secrete hormones, but to secrete the right amount of them for current metabolic needs. For us there is no such thing as excessive function. But to keep the formulation unambiguous, I use the term 'efficiency'. What health always allows is unusual efficiency of a process in serving physiological goals, not unusually much of the process itself. The latter may be a disease. The population distribution to which the definition refers is the one for a function's efficiency. Abnormal functioning occurs when some function's efficiency falls more than a certain distance below the population mean. My third comment is that this distance can only be conventionally chosen, as in any application of statistical normality to a continuous distribution. The precise line between health and disease is usually academic, since most diseases involve functional deficits that are unusual by any reasonable standard.

I must now defend this claim that diseases involve interferences with normal functioning in the sense of the definition. It seems clearly true of any disease process serious enough to cause manifest illness. In such cases there are gross disturbances far enough up in the functional hierarchy that the patient feels their effect. Tuberculosis or emphysema, when actual illnesses, make respiration unusually ineffective. Cardiovascular diseases interfere with blood circulation and thereby greatly depress muscular function during physical activity. Common symptoms of acute illness such as fever, vomiting, and loss of appetite imply failures of such functions as temperature maintenance and digestion. And so on. The connection between overt

[8] Compare Ryle: "the coordinated activity of component parts each functioning within its normal range" ([31], p. 5).

illness and abnormal functioning, like the connection between overt illness and virtually every account of health ever proposed, is fairly clear without argument.

More significantly, latent or asymptomatic disease also seems to involve atypical functioning at lower levels of the functional hierarchy. Diabetes, whether or not it is evident to its bearer, consists of an unusual deficiency in insulin secretion and therefore in sugar metabolism. Hepatic cirrhosis, nephritis, pancreatic cancer, and countless other pieces of local pathology can progress for a long time without depressing gross functions enough to be detected. They do, however, make standard tissue functions decline and fail in the affected part of the organ. Such localized dysfunction is also characteristic of the various minor skin diseases. To the biologist or physician, the skin is a highly versatile organ, with a complex structure designed for such functions as sensation, excretion, temperature regulation, and protection from environmental agents. In general, there is clearly some plausibility in the claim that the history of medical theory is nothing but a record of progressive investigation of normal functioning on the organismic, organic, histologic, cellular, and biochemical levels of organization, and of the increasingly subtle kinds of pathology this investigation reveals.

Instead of listing examples of diseases with atypical functioning, it may be more convincing to examine four that Engelhardt cites ([12]) to show the heterogeneity of disease. He writes:

> What counts as health and disease for humans depends upon very complex judgments concerning suffering, the goals proper to humans, and, for that matter, the form or appearance proper to humans. In standard textbooks of medicine such as Cecil-Loeb's . . ., one sees that all sorts of phenomena are listed as diseases, and for apparently quite different reasons. Rabies is listed probably because it is both unpleasant and fatal, herpes zoster primarily because of its pain and perhaps in part because it is somewhat unsightly. Other conditions such as phenylketonuria are likely to count as diseases because of their disteleology, their compromise of the functions of human intelligence. Other states are classified "pathological," simply because they present symptoms that are somewhat ugly, or are at best not considered to be part of a proper human form. Vitiligo, the simple loss of pigment on patches of skin is an example of this.

The variety in these explanations is unnecessary. Engelhardt's category of "disteleology" would suffice for all four diseases, provided it is interpreted as our abnormal functioning. Rabies moves within three

days from partial dysfunctions, hydrophobia and convulsion, to the complete dysfunction of death. Phenylketonuria, the next most serious disease, is an inborn deficiency in one of the enzymes of a standard metabolic pathway, phenylalanine hydroxylase. The deficiency is itself a dysfunction on the biochemical level, and it leads, as Engelhardt says, to the gross dysfunction of mental retardation. Herpes zoster, a viral infection of posterior nerve ganglia, produces a vesicular skin rash above the affected nerves and also neuralgic pain, often chronic and severe. Leaving the pain aside, zoster involves two kinds of local dysfunction, neural and dermal. The skin rash alone violates the definition of normal functioning. Viewing the skin as an organ, there is no difference between failure of skin functions in a set of vesicles and failure of liver or kidney functions in local areas of those organs. Our definition counts every such skin rash as a disease, and medicine seems to agree with this prediction. Finally, vitiligo is a case of the same kind, since the pigment melanin has the biological function of absorbing ultraviolet light.

All of Engelhardt's examples involve failure of parts of the body to perform biological functions which it is statistically normal for them to perform. His four test cases must serve here in lieu of a mass of supporting instances that can be found by comparing any textbooks of medicine and biology. But it may be wise to comment on the consistency of our analysis with biological functions like melanin's and diseases of their disturbance. To say that physiological functions are contributions to individual survival and reproduction is not to say that their failure will be fatal in any particular case. Skins, noses, and ears certainly play a causal role in the organized hierarchy of activities by which members of our species live and bear offspring. Otherwise they could never have been established in the species, at least by direct selection. But the required contribution of a trait need only make its bearers more likely to survive than nonbearers. Nothing follows about the survival of any individual nonbearer. So diseases involving melanin deficiency, deafness, or diminished sense of smell do not have to be life-threatening for our analysis to be correct. The most it could imply would be that diseases make people marginally less likely to leave descendants. I doubt it implies this much in view of its requirement that functions be performed at every usual body location, a requirement intended to reflect the medical attitude to local pathology. Once a function is recognized by biology, a failure of it, even a local one, seems to count in medicine as a disease.

5. *Functional readiness.* With a small modification, normal functioning

now becomes the analysis of health from the beginning of this section. The modification is required because biological functions are usually performed on appropriate occasions, not continuously. What occasions are appropriate is an empirical fact about the reference class. Thus vision occurs when the eyes are open, digestion when food is in the alimentary canal, adrenalin secretion under stress, sweating when temperature is rising, blood-clotting after a wound, and so on.

At any one time an organism might be functioning normally with respect to its current situation, yet be incapacitated from doing so on occasions yet to arise. It is then less than a perfect specimen of its species and so, by our original idea, not in perfect health. Medicine again seems to conform to this view. An inability to perform a function remains a disease even if the occasion to perform it never arises. Hemophiliacs who are protected from all injury, or diabetics who take daily insulin, are still diseased. One could, of course, say that what maintains functional readiness for the future, e.g. clotting factor in the blood, is itself a function in the present. But it seems clearer to replace the idea of normal functioning with normal functional ability or readiness. The change preserves all previous argument, since failure of function entails failure of functional readiness. The only effect of the revision is to count new conditions as diseases. So the result of the section is to support the following proposal.

1. The *reference class* is a natural class of organisms of uniform functional design; specifically, an age group of a sex of a species.

2. A *normal function* of a part or process within members of the reference class is a statistically typical contribution by it to their individual survival and reproduction.

3. *Health* in a member of the reference class is *normal functional ability*: the readiness of each internal part to perform all its normal functions on typical occasions with at least typical efficiency.

4. A *disease* is a type of internal state which impairs health, i.e., reduces one or more functional abilities below typical efficiency.

6. *Limits of the proposal.* Our guiding principle has been the species-relativity of health. We have supposed that the basic notion is 'X is a healthy Y'—that it is by comparing X with its reference class Y that one distinguishes the way X does function from the way it ought to. This comparison presupposes enough uniformity in the species to generate a statistically typical species design. When the uniformity breaks down— as with polymorphic or continuously distributed traits like eye color, blood type, height, metabolism, body

build—no one version of the trait can be required for health. Correspondingly, no version is a disease unless it depresses some function far below the group mean. As long as the efficiency of all functions exceeds a minimum, any value of these traits is as healthy as any other. In this way our definition allows variation within the normal, recognizing a wide range of individual differences of equal intrinsic health.

Thus our account abstracts from the intraspecific variability which is the raw material of evolutionary change. Judgments about what promotes species members' success in different environments are not, for us, judgments of intrinsic health. This seems inevitable in a definition of health as absence of disease, since medicine does not regard failure to be in the evolutionary vanguard as a disease. Diseases are, so to speak, failures to get as far as the rest of the species has been for millennia. On the other hand, some judgments about differential adaptation are judgments of instrumental health. Individual differences may be irrelevant to health in that none is a disease, but relevant in that they make a person more likely to get a disease under certain conditions. There is some evidence that even blood types carry different risks of various diseases, e.g. stomach cancer and diabetes ([32], p. 245). There is no doubt that individual variations of body build affect the probability of cardiovascular disease or complications in childbirth. But not all differential adaptation is differential instrumental health. There is a residuum of variation, such as unusual beauty that enhances mating success, which can only increase health according to some positive conception.

IV. Successes and Failures of the Account. The last section proposed an empirical notion of the nature of a species, e.g. human nature, to explicate medical normality. In this section we will try to generalize about how well the explication works. The thesis that health is normal functioning is essentially a medical truism, some such formula appearing in many dictionaries. We merely specified the notion of function as biological and the notion of normality as statistical. As compared with other views, our proposal has at least the following advantages in fidelity to standard disease classifications.

1. *Successes.* First, it explains the divergence between judgments of disease and those of desirability or treatability. As we noted, some undesirable conditions but not others are diseases. Hemophilia is, while an inability to regenerate severed limbs or damaged brain tissue is not. The reason seems clear: blood-clotting in wounds is a typical human function, limb and brain regeneration are not. If we were

one of the species that regenerate their limbs, a person lacking this ability would undoubtedly count as diseased. Similarly, health requires a person to manufacture insulin but not vitamin C, since our species does make one and not the other ([7], p. 43). Controlled diabetes remains a disease; to control scurvy is to eliminate it. Partial color blindness is probably fatal to fewer people each year than smell blindness to carbon monoxide, but the former is still a disease and the latter is not. It is hard to imagine explaining these judgments without appeal to what is typical of the human species. Our account further explains why a condition once a disease is always so, regardless of its harmful, neutral, or beneficial effects in an individual case. Cowpox, myopia, and hemophilia are diseases because they involve functioning below the species norm, but the effect of a deficit varies with a person's situation.

Second, our account seems to capture the medical view of traits with a continuous distribution in the population. It provides a unified treatment of *extremal diseases*, i.e. those associated with the tails of a statistical distribution. Its appeal to function explains why the spectrum of some traits contains two extremal diseases (hyperemia and anemia, hyperthyroidism and hypothyroidism, galactorrhea and agalactia) and that of others only one (night blindness, mental deficiency). At the same time, its appeal to statistics yields a reasonable level of minimal normal function. Night blindness is an unusual inferiority to the species norm for night vision; we do not all suffer from it by virtue of failing to meet the standard set by cats. At bottom, according to our account, all diseases are extremal diseases. Above the minimal level of normal functions, our view also matches medicine by making individual differences consistent with present health, and at the same time differentially relevant to future health in a given environment.

Third, our view makes health judgments independent of the gross output of the organism. It recognizes latent asymptomatic diseases like intestinal polyps, and other minor diseases like eczema which may have no effect on a person's overall ability to function. It also recognizes that the same effect on gross output may or may not be produced by a disease. Thus a man unable to lift a heavy weight may be either a normal individual or a strong man with Addison's disease. If the disease were a stable condition, the two states, normal musculature and underlying disease, could be equally undesirable, equally disabling, equally maladaptive, and so on through most accounts of the nature of health. Our account explains the difference by pointing to the abnormality of a microfunction, adrenocortical secretion, in Addison's disease. The distinction between normal

variation and underlying disease is one of the most important features of medical theory, though in practice it is often hard to draw because so much clinical evidence is gross output.

Fourth, our view explains how biologists can apply the notion of disease so readily to animals and plants, and why its application by veterinarians to commercial animals does not simply reflect commercial interests. What a healthy hen or cow is like is a biological fact; it is not an economic one.

Finally, for reasons sketched at the end of **I**, our account explains the partial successes of others. Organisms being what they are, important breakdowns of internal functions, homeostatic or otherwise, tend to be signaled by discomfort, to disturb the abilities on which the organism's adaptation to its environment rests and hence, in our case, to be judged bad. But these ideas seem too broad-gauged to follow medical judgments of disease into the fine structure of human physiology. To penetrate that structure, the notion of normal functioning on every level of organization is ideal. We have also given this notion enough content that its success cannot be ascribed to its vacuity. On the contrary, our account excludes at least two classes of recognized diseases.

2. *First anomaly: structural diseases.* The first class of diseases our account excludes are the entries in the *Nomenclature* that seem to be purely structural disorders. Some cases of this sort may have dysfunctional varieties or be included on the assumption that the affected part has an unknown function. Examples are congenital absence of the appendix, perhaps dextrocardia, and calcification of the pineal gland. But the *Nomenclature* also lists minor deformities, especially of the nose, the ear, and, mysteriously, the hymen. Many of these deformities disturb no normal function, and there may also be some internal tumors of which the same is true.

One might wonder why these structural disorders cannot be handled by making the whole disease concept structural rather than functional. Certainly physicians have a working assumption that structural abnormalities underlie functional ones, i.e. that pathology underlies disease. An empirical notion of normal structure could be derived from the reference class in the same way as our normal functioning. Unfortunately such an account would count superior as well as inferior functioning as disease, since structural abnormality occurs in one as much as the other. Thus it seems that no correct account can make structural deviation a sufficient condition of disease. As a necessary condition it is redundant and would not help with the problem of deformity. Despite the few structural disorders in the *Nomenclature*,

therefore—and the tendency of reference works to define health by formulas like "the structural and functional integrity of the human body" ([35], p. 114)—it is hard to see how structure plays any direct role in the concept of disease. The contrary evidence may illustrate the power of the species-design idea over the medical mind, even where species-typical structure loses all connection with function. Major deformities and tumors involve deviations from the functional design as well as the structural one. Some of the minor ones, e.g. macacus ear or absence of the earlobe, may appear in the *Nomenclature* for convenience in record-keeping. Any structural disorders that do not fit these two categories remain as anomalies in an otherwise intelligible scheme of classification.

3. *Second anomaly: universal diseases.* Another way in which our definition diverges from medical usage is by excluding some universal diseases. Dental caries, lung irritation, atherosclerosis, and benign hypertrophy of the prostate in old men are diseases typical of the whole population or a sex or age group. It is clear that medicine is prepared to view the entire reference class as functioning abnormally. On the other hand, such cases are so few that it is hard to decide among various explanations. To begin with, our definition already covers some universal diseases. For normal functioning it required every body part to function in its typical way. Because of this requirement, which was introduced to handle local pathology with no systemic effects, the only problem arises when everyone has the same disease in the same location. Dental caries are vitiligo of the teeth, conceptually speaking, and atheromas may be vitiligo of the arteries. Unless there are specific body locations which are typically carious or atheromatous, these conditions are diseases on our account. The universal diseases which violate the definition seem to be those which are evenly distributed, e.g. lung irritation due to environmental pollution or arterial thickening after a certain age.

These remaining cases seem to show that the above explanation is, if not sophistical, inadequate to understanding the medical acceptance of universal disease. The case of lung irritation suggests that we might revise our definition of health to count all environmental injuries diseases. I favor this modification because it is an obvious extension of the principle that normality lies in the nature of a species. If one is after a species design, one would wish to subtract limitations on functional ability directly caused by environmental agents, leaving only the inherent defects of the organism itself. It is common in biology to draw such a distinction of degree between external and internal causation; this is done, for example, whenever a trait is said

to be under genetic control. Perhaps the change might be made as follows:

> 3. A *disease* is a type of internal state which is either an impairment of normal functional ability, i.e. a reduction of one or more functional abilities below typical efficiency, [illegible] limitation on functional ability caused by environmental agent[illegible].
>
> 4. *Health* is the absence of disease.[9]

The revised definition covers conditions like lung irritation and provides an alternate explanation of tooth decay. What there cannot be, on this view, is a universal genetic disease.

Exactly that, however, may be implied whenever medical authors list progressive dysfunctions of normal aging as diseases. When senile decline of function is caused from within, our account will not allow it to be a disease. That is because of the age-relativity which we built into the account to reflect differences between child and adult. Apart from childhood, one might be tempted to take the adult as the species type and old age as its disintegration. Yet the same functional limitations viewed as diseases in old age may count as normal in childhood. Much of senility is only regression to earlier stages of development. The puzzle is why old age is not always seen as a stage with its own statistical norms of healthy functioning. Lacking a solution to this puzzle, our account ends up differing from some medical sources over whether minor deformities and normal aging constitute disease.

It would be a mistake, I think, to take such differences to invalidate our general approach to defining health. Instead they should be viewed as anomalies deserving continued analysis. At present, the major alternative to our functional account is the position expressed earlier in the Engelhardt quotation: that the concept of disease has no exact content because it is a vehicle for changing human goals and expectations. But to say that

> What counts as health and disease for humans depends upon very complex judgments concerning suffering, the goals proper to humans, and . . . the form or appearance proper to humans

is to do little to explain the actual medical inventory of disease. Such accounts cannot explain this inventory because they cannot predict it. They are so tolerant that they include whatever physicians may come to count as diseases, but do not exclude what they do not. The best course, I think, is to continue trying to accommodate

[9] A less exact summary of our final view appears in [4], pp. 62–63.

the anomalies within our view or to find another view of comparable explanatory power. If both efforts fail, a reasonable conclusion is that minor deformities and aging do not fit the traditional medical conception of disease.

V. Positive Health.[10] We have proposed an analysis of disease and of health as its absence. The idea that health should be more than the absence of disease, something positive, has grown increasingly popular in recent years. One source of such interest is the trend toward preventive and community-oriented medicine, which rejects the traditional medical focus on persons already ill. A shift from cure to prevention, from crisis intervention to health maintenance, might greatly alter medical institutions. But it does not change the underlying concept of health as long as what is prevented is still disease. What is positive is the actions of preventive physicians; the kind of health they seek to promote remains the same. This point can be obscured by the tendency to take the traditional medical concept of health to be a practical notion, the absence of overt illness. The equally traditional theoretical notion, absence of disease, suits cure or prevention alike. The shift of focus in preventive medicine is only from the intrinsic to the instrumental variant of this notion.

A second kind of interest in positive health does involve a true positive conception. This is the view, variously expressed, that physicians and mental-health workers should actively aid individuals, or communities, in maximizing their quality of life and developing their full human potential. Ideals of self-actualization and personal development are common in the mental-health area. Their popularity rests partly on widespread skepticism about the concept of mental disease, and partly on the idea that genuine mental diseases are too severe to be relevant to most psychotherapy patients. In any case, failure to develop one's capacities fully is not in general a disease, and therefore self-actualization is a positive conception. Self-actualizing people are, of course, assumed not to be maximizing their potential for evil, or for illness. Some constraint must be put on the notion of realizing a potential in order to distinguish it from mere change. One way to do this would be to use the notion of a function, and if this is done positive health falls within the framework of our discussion.

It is useful to distinguish three possible conceptions of positive health as functional excellence, each of which has some expression

[10] In this section I am indebted to Drs. John and Sidney Cobb, Richard Burke, and Fleeming Jenkin.

in the literature. I will call them the individual-potential, the species-potential, and the unlimited views, roughly in order of increasing scope. According to the *individual-potential view*, I achieve ideal health by developing my own individual functional capacities to the fullest. To use athletic abilities as a convenient model, I become healthier by increasing my strength, endurance, and coordination in a fitness program. Ideal health does not require that I reach Olympic levels, only the highest my natural gifts allow. According to the *species-potential view*, every difference in a species-typical functional ability is a difference of health. On this view Olympic athletes are our best model of physical health, not because they have maximized their natural gifts but because their performance reaches the highest absolute levels. In either case, the positive view is not that athletic training increases health by allowing greater freedom from disease. Superior ability must be healthier in and of itself. On the *unlimited view*, every increase in functional ability increases health, even the acquisition of new functions not typical of the species. This view seems to make the Bionic Woman healthier than normal people by virtue of the novel functions on which her strength and hearing depend.

Any of these three positive views looks like a natural extension of our negative account, since those functional limitations which are diseases diminish health on each view. But the individual-potential view is not a simple extension of health as the absence of disease. An individual's capacities may be limited by an inborn disease, e.g. blindness or retardation, in which case full development of individual capacity is less than the absence of disease. Thus this view cannot serve as a general conception of health. Its main attractions seem to be that it allows ideal health to be consistent with individuality, and that it allows the aim of treatment to vary with the individual case ([15]). The second reason, however, confuses theoretical health with the idea of appropriate therapeutic goals. Some readers may be attracted to either the individual-potential or the unlimited views because they discard the notion of a species design.[11] In any case, I close with some criticisms of these notions that apply about equally to all of them.

There are at least three disanalogies between these ideas of positive health and the familiar negative conception. The first disanalogy is

[11] The unlimited view, besides accommodating futuristic medical technology, might be thought to have the virtue of allowing interspecific health comparisons. On our negative view, one species can be healthier than another only in the sense of getting fewer diseases or getting them less frequently. But I doubt that more exciting kinds of interspecific health comparison make sense. At any rate, one should not want to ask whether, say, elephants are healthier than plankton.

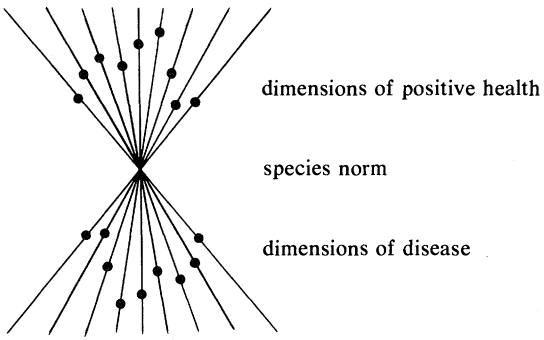
that taking health to be functional excellence changes it from a limited to an unlimited ideal. It is not clear what limitation there is in principle on functions like strength or intelligence, still less on what new functions could be added to our biological design. The point is not that positive health is practically unattainable; complete absence of pathology is equally "utopian" ([30]). The point is that the notion of perfect health no longer seems to make sense. This disanalogy is the least important, and may not apply to the individual-potential view at all.

More important is the second disanalogy: not only is there no fixed goal of perfect health to advance towards, but there is also no unique direction of advance. This point reflects the familiar fact that realizing one potential is often inconsistent with realizing others. To enhance one function to the fullest, e.g. strength, may inhibit others, e.g. speed. One cannot simultaneously become the best sprinter and the best weightlifter one's inheritance permits, or the best boxer and the best pianist. The diversity of body types among Olympic athletes shows that no single physical ideal suits all possible activities. Anthony Smith, who gives figures on this diversity, puts the point nicely:

> The magnificient physiques, with muscles arching and flowing over a broad frame, do not win the longest races. Marathon men are short and thin. Weight lifters have short legs and short arms. World record-holders of track events often have awkward, gangling, and even misshapen bodies. Michelangelo's broad-shouldered, long-legged, and well-muscled David would not have had a hope in any race longer than a medium sprint. ([32], p. 276)

Along any one functional dimension, comparative judgments of positive health can easily be made. What one cannot say is whether an advance along one dimension is healthier than an advance along another.

This fundamental problem survives a comparison one might make between positive health and the severity of disease. If diseases can be graded according to severity, why cannot one also grade states of positive health? With lines representing functional dimensions, the symmetry of the two problems might be pictured as follows:



Any person's condition would include points on each of the dimensions. The suggestion is that both kinds of judgment can use a common notion of total distance from the species norm. But this suggestion cannot remove the problem of incompatible types of functional excellence. It is true that both domains allow many conditions at any one distance from the species norm. The asymmetry is that medicine seeks to move upwards in the diagram, and the lines diverge above the center. If medicine sought to produce disease, the problem would be how to choose among diseases of equal severity. As it is, in negative health all therapeutic programs converge on one goal; in positive health they diverge farther the greater the net improvement. Hence in practice positive health is not one ideal, but a kind from which various ideals may be selected and pursued.

The third disanalogy is a further practical effect of the second. If the pursuit of positive health forces a choice between incompatible excellences, it requires an evaluative decision—by client, physician, or society—about what life goals are worthy of pursuit. What it would be for a person to become healthier is no longer fixed by the concept of health until someone's values are added on. This value-ladenness is the most striking difference between positive health and the traditional negative variety. Our conception of disease required no value judgment about what forms of human life are admirable or desirable. Diseases were interferences with an empirically discoverable species design. Thus what it is to eliminate disease is uniquely describable in advance of normative decisions.[12] Health does not depend on values when it is freedom from disease, only how far

[12] It has been suggested that how much abnormality counts as disease varies from function to function for reasons of value. If such variation can be shown, perhaps even negative health is value-laden in this minimal way. But one could also retain the value-free disease concept and say that physicians treat some normal conditions for evaluative reasons. We saw that this is true in any case.

one ought to pursue it. By contrast, ideals of positive health are not discoverable, but only advocable. Their advocacy raises familiar ethical dilemmas about the good life for man, yet no medical procedure can possibly resolve them. A major attraction of positive mental health is precisely the vain hope of giving personal or social values the objectivity of traditional medicine.

Because of these disanalogies, I am inclined to end with a terminological suggestion. Perhaps "positive health" should be limited to improvements of function that do not sacrifice any possible improvements of others. This category is not necessarily vacuous, as fitness enthusiasts will testify. Perhaps for most people, an exercise program enhances all functions about equally, without affecting any options for future development. It seems easy to see neutral enhancements as a kind of health. But to call anything more positive health is likely to activate assumptions about negative health in areas where they no longer apply. We saw that positive health is unnecessary to a practical shift from cure to prevention. It is also unnecessary to advocating specific ideals of functional excellence. Whatever they are, they can be advocated under their own descriptions rather than the tendentious label of positive health. In any vocabulary, we must avoid confusing empirical questions with deep normative issues about the goals of human life and the role of health professionals in achieving them. The trouble with calling physical or mental or moral excellence health is that it tends to unite under one term a value-neutral notion, freedom from disease, with the most controversial of all prescriptions—the recipe for an ideal human being.

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