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Changing Ideas of Causality in Medicine

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MEDICINE is now undergoing a profound and fundamental change in direction. In this shift, the sick *person,* rather than the disease, is becoming both the subject and the object of medicine.

Since the phrase "treat the patient as a person" has been around for a long time, one may wonder what is meant by saying the *new* focus of medicine will be the person. The usage "treat the patient as a person" suggests that a doctor should treat the patient in the manner one would treat a person—*as if* a patient were a person. Or, put differently, a humane physician, while treating a cancer, must always remember that the cancer occurs in a person whose needs, fears, emotions, and so forth should be kept in mind. While that is a step on the way to where I believe medicine is going, it is still far short.

The evidence for today's gradual change from disease to person is largely indirect, reflecting dissatisfaction both within and outside the profession. There is increasing concern with ethical issues in medical research and practice. Humanities have been introduced into the curricula of a number of schools. There have been basic curricular changes toward this end at some of the newer or more adventuresome medical schools. The National Board of Medical Examiners, which wields considerable influence, has become concerned about finding ways to test the "interpersonal skills" of new physicians and has introduced behavioral-science material into their examinations. The "holistic medicine" movement on the fringe of the medical establishment has been embraced quite

widely by laypersons and even physicians. That such evidence, and more, exists should not be interpreted as pointing to immediate change. The shift I am describing is occurring very slowly, and it will take many decades before it is fully realized. The reason change takes place so slowly is that, whenever fundamental new concepts enter medicine, existing concepts must change and new tools for action must be formed because medicine is, ultimately, a profession of action.

This essay is concerned with two concepts which, together, provide the philosophical foundation for present-day medicine. The first is that there are such things as diseases; the second, that each disease has a cause (the concept of specific etiology). As the focus of medical practice shifts to the sick person, both of these concepts come into question. Later, I am going to explore the idea of the "story" as a more effective way of understanding illness.

Concepts of Disease

When someone is ill, in the Western world, a disease is sought as the explanation for the sickness. When the disease is found, its cause is always sought. These are two common premises of medicine, for both physicians and laypersons. As pervasive as these concepts are today, they were not always a part of medicine. Indeed, concepts of disease, *as we know them*, are only about one hundred and fifty years old.

The start of our modern era of medicine began in Paris in the 1820s and 1830s. For the first time ever, three things merged: first, the performance of autopsies and the rise of anatomical pathology; second, careful clinical observation providing both symptoms and the natural history of the illness; and, finally, the beginnings of physical diagnosis and consequent knowlege of what was present in the body before death.[1] From these, there emerged the basic picture of disease

[1] Stanley J. Reiser, *Medicine and the Reign of Technology* (Cambridge: Cambridge University Press, 1978).

as we know it—a pathological (abnormal) entity characterized by unique alterations in body structure, a set of typical symptoms, and distinctive findings on physical examination.

This new way of seeing diseases, and the methods of physical diagnosis that came with it, revolutionized medical practice, producing changes even more dramatic than have occurred in the present era of therapeutic effectiveness. All the advances of the remainder of the nineteenth and the beginning of the twentieth century merely served to expand and amplify this concept of disease, and to add physiology and biochemistry to the definitions. Ultimately, the picture of diseases that emerged was ontological—diseases as objects, "things" that enter the body and make the person sick, such as cancer of breast, tuberculosis, lupus erythematosis, or rheumatoid arthritis. When we are sick and ask what is the matter, it is in such terms that we have come to expect an answer. It cannot be too strongly stated that all of the great advances in medical knowlege that have occurred over the past century have their origin in the classification of diseases. Individual disease constructs have organized the activities of clinicians looking for the source of a patient's illness as well as the activities for the researcher in search of the mechanisms of disease.[2] But concepts of disease, like all other species concepts, are, ultimately, human abstractions, not objective entities. The thing called (for example) "rheumatoid arthritis" does not really exist independent and free-standing in nature, rather only in the minds of physicians. In these last few years, these human abstractions, the concepts of disease, have come under attack.[3]

[2] Knud Faber, *Nosography* (New York: Paul B. Horber, 1923), pp. 210–211.

[3] Eric J. Cassell, "The Conflict between the Desire to Know and the Need to Care for the Patient," in Stuart F. Spicker, ed., *Organism, Medicine, and Metaphysics: Essays in Honor of Hans Jonas on His 75th Birthday* (Boston: D. Reidel, 1978); George Engel, "The Need for a New Medical Model: A Challenge for Biomedicine," *Science* 196 (April 1977): 129–136; H. Tristram Engelhardt, Jr., "Explanatory Models in Medicine: Facts, Theories, and Values," *Texas Reports in Biology and Medicine* 32 (Spring 1974): 225–339; H. Tristram Engelhardt, Jr., "The Disease of Masturbation—Values and the Concept of Disease," *Bulletin of the History of Medicine*

As they once provided guidance for research, diagnosis, and treatment, they are now seen, correctly in my view, as being unduly restrictive. The unifying theme of the increasing literature on this subject is that disease categories focus physicians and their technology on the diseased organs and exclude other things vitally important to the care of the sick person.

There has been less discussion of the second philosophical underpinning of modern medicine—the concept of specific cause. In fact, the two ideas gained strength at the same time. Resistance to ontological beliefs about disease—that diseases were specific objects, entities that invaded the person to produce illness—faded away as bacteria were discovered to be a cause of human disease. Here were the representatives of the ideal—typhoid fever, tuberculosis, pneumococcal pneumonia, distinct diseases with specific causes. Faber writes: "Only when we have penetrated to the underlying causes, and described the etiologic entities of disease will the goals of nosography [the classification of disease] have been reached."[4] Common parlance reflects this when people say they do not want to treat the symptoms, they want to get at the causes.

Medicine through the centuries has occupied itself with the philosophical problem posed by the question of causality.[5] From Aristotle's four causes (essential, formal, exciting, and final), physicians have gone on to: intrinsic and extrinsic causes; antecedent, conjoint, procataractic, proegumenical

48 (Summer 1974): 234–248; H. Tristram Engelhardt, Jr., "The Concepts of Health and Disease," in H. Tristram Engelhardt, Jr. and Stuart S. Spicker, eds. *Evaluation and Explanation in the Biomedical Sciences* (Dordrecht: D. Reidel, 1975), pp. 125–141; Horatio Fabriga, Jr., "Concepts of Disease: Logical Features and Social Implications," *Perspectives in Biology and Medicine* 15 (1974): 583–616; Robert P. Hudson, "The Concept of Disease," *Annals of Internal Medicine* 65 (September 1966): 598; Lester S. King, Jr., "What Is Disease?," *Philosophy of Science* 21 (July 1954): 197; Walter Tagel and Marianne Winder, "Harvey and the 'Modern' Concepts of Disease," *Bulletin of the History of Medicine* 42 (1968): 496–509; Owsei Temkin, "The Scientific Approach to Disease: Specific Entity and Individual Sickness," in A. C. Crombie, ed., *Scientific Change* (London: Heinemann, 1961), pp. 629–647.

[4] Faber, *Nosography*.

[5] Lester S. King, Jr., *The Philosophy of Medicine: The Early Eighteenth Century* (Cambridge: Harvard University Press, 1978), pp. 209–232.

causes; necessary, predisposing, and defining causes, and so on—a list that should give pause to anyone who wants to add another term. What was different about the nineteenth-century concept was that these were *specific* causes for specific diseases. Thus the modern textbook states, "Typhoid fever is an acute, often severe illness, caused by salmonella typhi. . . ."[6] This direct and unambiguous usage contrasts with that of even the turn of the century, when less direct and more circumspect terms such as "constant association" would be more likely.[7]

The Story of an Old Man

The idea of specific cause was originally useful in stimulating research about diseases and their cure. But in recent years, in company with the ontological idea of disease, specific etiology has been a limiting concept, holding back progress in medicine and medical care. Since that may seem an odd statement, let me illustrate with an actual case.

An elderly man was found unconscious in his fifth-floor walk-up apartment and brought to a New York City teaching hospital. He was found to have pneumococcal pneumonia. In addition, his right knee was greatly swollen; his physicians believed that he had a Charcot joint, a rare manifestation of late syphilis. I learned about the patient because of the knee. The medical student on the case had previously worked with me and she called to tell me about it as a matter of interesting conversation.

The patient's diagnosis, in classical terms, was pneumococcal pneumonia and, perhaps, tertiary syphilis. The treatment in this case seems to get at the cause. Antibiotics will eliminate the pneumococcus and cure his pneumonia. If he has syphilis,

[6] Abram S. Benenson, "Typhoid Fever," in Paul B. Beeson and Walsh McDermott, eds., *Testbook of Medicine*, 14th ed. (Philadelphia: Saunders, 1975), p. 360.

[7] King, *The Philosophy of Medicine*.

the same antibiotics will eliminate the treponema but, unfortunately, will not make his knee better (because structural damage to the joint would already have occurred).

Will this patient get better? His pneumonia almost surely will. The cause of his disease is the pneumococcus, and antibiotics effectively kill the organism. But, sadly, that is not the end of the case. What is the object of treatment? Is it to make a disease better or to make a person better? It is not new to this decade to realize that making the disease better is not sufficient. The understanding is increasingly widespread that just because the disease has been cured does not mean that the physician's responsibility has ended. And, further, that although we live in an age of cure, the diseases that afflict us—heart disease, cancer, stroke, diabetes, arthritis, and so on—are often not curable. Most of those diseases (with the possible exception of cancer) do not even fit the classicial definitions of disease as specific objects.

What else do we know of this patient? He is seventy-four years old and his wife died about a year ago; the remainder of his family lives out of New York; he has no friends. The bad knee turns out to be not syphilis but "merely" osteoarthritis—degenerative disease of the joints.

Any attempt to use the modern medical language of cause would face difficulties in describing this man's case. But, avoiding the words and difficulties of concepts of cause, there is another way in which his case can be presented. We are able to tell the *story* of his illness.

With his wife recently dead and no close friends, this man withdrew from social contact, a common happening in the lonely aged. Often, such people will stop making real meals, instead picking at food or eating what little is required to still their hunger. Any attempt this man might have made to re-establish social connections or to improve his diet, of his own desire or at the urging of his family and acquaintances, was hampered by his disabled right knee. Walking up and down his five flights of stairs was extremely painful, and he

avoided it as much as possible. A previous physician, and the patient himself, had dismissed the knee problem as "old age arthritis for which nothing could be done." The combination of malnutrition and social isolation increased his susceptibility to infection. In all probability, the pneumococcus responsible for his pneumonia had been an inhabitant of his throat for a long time before the host-parasite relationship was tilted in its favor. He was found only because a neighbor had not seen him or heard him in his apartment for more than a day.

The idea of "story" is used here in its ordinary sense: the retelling of a series of related events about a person that occur in specific places and times and take place in a defined sequence. Stories such as the one I have told occur with increasing frequency in the big cities and, perhaps, rural areas. This man had arthritis, another person might have had weakness from an old stroke, another difficulty breathing, but, for most of them, infection is the final blow (Pasteur said, "The microbes will have the last word"). The language of disease (pneumonia, arthritis) and the language of cause ("the pneumococcus causing the pneumonia") are both useful and necessary in telling this story, but they are not nearly as useful in solving this person's problem. The reason the languages of disease and of cause are useful in recounting the story is that we have become accustomed to them. The words define our understanding but, equally, the words limit our understanding. At a recent presentation on this subject, a physician said, "I do not see why we have to change our thinking [about the concept of cause]. Why not just eliminate the word 'cause' from our vocabulary?" I was pleased to agree. It would be almost impossible to eliminate the word "cause" from one's daily usage without a consequent change in thinking.

Treating the pneumonia will solve only part of the problem. Experience suggests that the man will soon be ill again unless other problems are solved. For decades, we have called these other problems the "psychosocial aspects" of the case. But clearly, the man's crippled knee is not a "psychosocial aspect."

Further, we do not call the lung an aspect of pneumonia—you cannot have pneumonia without it.

These things—age, widowhood, loneliness, fifth-floor walk-up, osteoarthritis, malnutrition—are not "aspects" of the case; they are *necessary parts of this story, without which the story would be different*. Furthermore, if the story were different, the disease would be different. For example, this man might have consumed aspirin because of his painful knee—and developed gastrointestinal bleeding from erosive gastritis but, because eating diminished the pain coming from his stomach, maintained his nutrition. Or, in sorrow, he might have started drinking, become intoxicated, vomited, and then aspirated the vomitus into his lungs, producing a lung abcess or aspiration pneumonia. In each instance, a different disease with a different treatment results when a feature of the story is changed. The list of possible diseases brought about by changes in the story would be quite long.

And if the person in this story were different so too would be the disease. Alter some characteristic, make him ruggedly independent, for example. Or provide a life of exercise so that the knee would be less disabling. Or a previous life of sports and exercise with the same knee so that the disability would be more profoundly depressing. Change any of those features of the person and the story is changed. Everyone knows that if the protagonist is changed, a story is changed. And here it appears that if the story is changed, the disease in the story also changes.

In fact, in stories of illness, there are always two protagonists—the body and the person. There are the events that take place in the body (such as the effect of malnutrition, the alterations in the knee, or the alterations that take place as part of pneumonia). And there are those events that happen to the person either before the body events (widowhood, social isolation), in mixed sequence (the malnutrition), or as a result of the direct effect of the body events or their meaning (inability to walk stairs, the connotation of helpless aging from

the knee, the hospitalization, and many others). To see the story in only body terms is as inadequate as viewing it in only "psychological" or "social" terms.

In the story of the old man, *cause*, certainly as it is currently used in medicine, is an almost empty concept. What is the cause of the old man's pneumonia? His age, the fifth-floor walk-up, malnutrition, the knee, the pneumococcus? Despite what modern textbooks of medicine say, *the* cause of tuberculosis is not mycobacteria tuberculosis, as René Dubos makes abundantly clear in *The Mirage of Health*.[8] What is true for the infectious diseases is even more applicable to diabetes, hypertension, and the other disease problems of our time. Modifiers to the word "cause," such as contributing, necessary, sufficient, multifactorial, and so forth, are simply attempts to hold onto the concept of specific etiology as it evolved in the late nineteenth and early twentieth century. We are attached to the concept for historical reasons, not because that is the only or even best or most effective way of seeing things. In the case of the old man, the concept of specific etiology must be given up because it does not point to the most definitive way to make and keep him better. Physicians become so upset at the idea of giving up the concept of cause that one suspects it to be a fundamental part of their thinking—and not merely in the sense that all persons want to know "why" about everything. If, in recounting a story such as the old man's, one says, "This happened and then that happened and then that happened," etc., physicians would seem to prefer "This happened which caused that which caused that," etc.

It is difficult to surrender one language of causality without acquiring another. For this purpose, perhaps, the vocabulary suggested by Stephen Toulmin will be useful.[9] Words such as "forces," "pressures," "actions and reactions," "loci," "occa-

[8] René Dubos, *The Mirage of Health* (New York: Harper & Row, 1959).

[9] Stephen Toulmin, "Concepts of Function and Mechanism in Medicine and Medical Science (Homage à Claude Bernard)," in Engelhardt and Spicker, *Evaluation and Explanation in the Biomedical Sciences*.

sions," and "outcomes" better suggest how elements combine to create the story leading into (and then back out of) an individual illness. The hunt for a new language of cause and effect is really the search for better ways to understand cases such as that of this old man. Or to understand tuberculosis, alcoholism, smallpox, diabetes, auto accidents, rheumatoid arthritis and so forth.

Suggesting that the idea of specific etiology has outlived its utility cannot, however, change the fact that there is a disease called pneumococcal pneumonia. That label signifies a collection of phenomena which are very specific and which do not occur in the absence of the pneumococcus. Unique, too, are some of the phenomena under the labels "hypertension," "smallpox," and "osteogenic sarcoma." As medicine changes its focus to sick persons in order to protect or help restore their autonomy, what will become of diseases? Without those concepts, medicine would not have gotten to where it is now.

Mechanisms and Causes

But where is it now? What has been the nature of medicine's progress? First, physicians have acquired tremendous therapeutic effectiveness. It is a rare instance when a doctor can do nothing. From allergy to Zollinger-Ellison Syndrome, and from superior mesenteric artery obstruction to nutrient failure, physicians can intervene effectively to make people better. Whatever doubts form in the reader's mind may have to do with the appropriateness of actions or the uses of power, but that the power to act exists cannot be denied. However, *the power to act rarely comes from knowing the specific cause* of a disease. Allopurinol effectively prevents the progression of gout but it does not act against *the cause* of gout. Tricyclic antidepressants are often very useful in treating depression but do not act against the cause of depression. Neither do the cortisone derivatives act against the cause of asthma nor

cimetadine against the cause of duodenal ulcers. All of these examples and the multitude of other therapies that might be cited are successful because they intervene in the mechanisms of disease. What has been learned in these past decades, and what is being learned increasingly, is *how things work* in the body—in sickness and in health. Disease concepts may be merely human abstractions, but the body mechanisms that are learned are far more "real."[10]

Having discovered so much about how the body works, physicians have acquired the knowledge and the tools to intervene in the body mechanisms that are involved in disease (and health). A glance at a major medical journal will show that most of the papers are not about diseases but about fundamental body mechanisms, where the opportunity to study the mechanism was provided by disease. Medical students often complain bitterly in their first year about the presumed lack of relevance of, say, biochemistry to the care of patients. They are unaware that they are learning to "think mechanisms"—translating taught information about body processes into understanding of human function.

A body mechanism is a smaller scale series of events than a story, biochemical or physiological transformations taking place in some organ or other locus contributing to the function of the part. An example of Toulmin's makes the point of hierarchies of mechanisms and functions:

> . . . the biochemical transformations going on in the liver are the "mechanisms" called into play in the "function" of bile-secretion; but bile-secretion itself—particularly, the variation of bile-secretion with changing stimuli and occasions—can itself be viewed as a "mechanism," when it is considered as contributing to the "functional" operation of the entire intestinal tract; and this latter operation in turn becomes a "mechanism," as seen from the standpoint of the overall "vital function" of digestion.[11]

[10] Cassell, "The Conflict between the Desire to Know and the Need to Care for the Patient."

[11] Toulmin, "Concepts of Function and Mechanism in Medicine and Medical Science."

In disease, a mechanism may be interfered with or freed from higher control, thus interfering with the function of an organ. For example, in the disease cholera, when the bacterium is in the intestines it produces a substance (we would ordinarily call the substance a toxin, but that is a value term that interferes with understanding this point) which acts on the intestinal walls to stimulate the enzyme adenylcyclase. That enzyme leads to an increase in cyclic AMP, which is involved in moving fluid across cell membranes. Because of the increase in cyclic AMP, a huge amount of fluid enters the gut, leading to the voluminous watery diarrhea so characteristic of the disease. This fluid loss depletes the body fluids, leading to shock and so on. Effective treatment consists of finding a method of intervening in the chain of events involved in order to stop the abnormal function. In cholera, that means simply replacing what is lost in the diarrhea. The nineteenth-century treatments for cholera, on the other hand, were directed at what were believed to be its causes—the suspected toxins. Toward that end, vomiting and/or further diarrhea were induced that had (at least, in retrospect) a less than salutary effect. Incidentally, antibiotics that effectively kill the cholera organisms are not effective in the treatment of cholera.

In fact, people would prefer to write or speak about mechanisms in causal terms, also. One begins to suspect that giving up the language of cause is resisted in the same manner as giving up other aspects of reductionist thinking. Mechanisms in the body (or in society, for that matter) do not really take place in little sequential steps. That is how we take them apart conceptually, study them, and even draw diagrams of them. But in nature the process cascades through time, a variable amount of time depending on the process. An instant for this, longer for that, with feedbacks and replications utterly obscuring the steps. The language of cause is part of the human process of investigation—an artifice of thought, not a property of natural systems.

Disease after disease has given way to intervention in their

mechanisms. Doctors may talk a language of cause, but what I have described is how, in fact, they do things. So why do they not see the story of the old man with pneumonia in a similarly effective manner? Simply because medicine has confined its hunt for mechanism to the body, in keeping with its perceived mission to treat diseases. But when the doctor's job is seen as making people better in the larger sense, then it is obvious that the mechanism of disease in the body is not at all the whole story. It has become popular (but not the less necessary) to point out that mind-body distinctions artificially separate those aspects of illness that arise in the person apart from his or her body. (Actually, the word "person" is not commonly used in this context.)

It is also increasingly common to see stated the truth that disease has to be seen in its entire "biopsychosocial" dimension to be understood.[12] Indeed, decades have been spent in exploring the contribution of social and psychological facts in human illness. As long as they have been seen as "factors" rather than as part of the mechanism of illness or as absolutely essential parts of the story of an illness, they have not received the same attention as the body aspects.

Unfortunately, when attention has been paid to the non-body parts of the course of illness, the same scientific tools were used that have worked so well for elucidating the enzyme systems, and those methods simply do not work as well away from the body. I have discussed in these pages and elsewhere[13] problems created in the care of the dying, and elsewhere in medicine, by the attention and honor paid to the analytic reductionist mode of thought used in science and the neglect and disdain (I do not think those words are too strong) for the synthetic, integrative thought necessary for under-

[12] Engel, "The Need for a New Medical Model."

[13] Eric J. Cassell, "Being and Becoming Dead," *Social Research* 39 (Autumn 1972): 528–542.

standing human values and the moral problems of medicine.[14] The difficulties produced for understanding the notion of person (and thus for medical care) by trying to apply methodologies and modes of thought to aspects of person that were developed for, say, biochemistry are considerable. Although crucial, methods are not my concern here. When fundamental attention is paid to the nonbody (social and personal) parts of the story of an illness as essential to making a sick person better, then improved research methods will follow. Unfortunately, the social sciences seem as devoted to old-fashioned concepts of cause as does medicine. How could it be otherwise? They grew up together. I believe people are still seeking the causes of poverty as diligently as physicians seek the causes of disease. Thus far, the treatments for poverty have been about as effective as were the purges and emetics in the attempt to eliminate the toxins of cholera. It seems not to have occurred to most that it is not that the causes of poverty are so resistant but that the concept of cause itself is deficient.

The basic point, however, is that physicians are already used to the idea of intervening in the mechanisms of disease rather than merely trying to treat the cause. What is needed, then, is not a radical reorientation in the way of thinking but in the scope of that thought—intervention not only in any part of the body mechanisms or disease that will stop its progress, but (equally honored) in any part of the story of an illness that would return the sick person to function.

To return to the old man with pneumonia, he has been treated with penicillin and his pneumonia has been cured. The malnutrition was reversed by a standard hospital diet. In good American hospitals, a social worker would be called by

[14] Eric J. Cassell, "Moral Thought in Clinical Practice: Applying the Abstract to the Usual," in H. Tristram Engelhardt, Jr. and Daniel Callahan, eds., *Science, Ethics and Medicine*, vol. 1 (Hastings-on-Hudson, N.Y.: Institute of Society, Ethics and the Life Sciences, 1976), pp. 147–160.

the physicians (or the nurses) to deal with the "nonmedical" problems of which everybody would be aware nowadays. But despite the best efforts of social service and the social agencies contacted, the man would still be widowed and alone. (Although the attention paid to him during the hospitalization, and afterward by the visiting nurse and social agencies, might serve to reconnect him to the social world. That might be an invisible, latent benefit of the various professional activities on his behalf. Thus reconnected, he might overcome the other problems himself.) In the usual instance, within a number of months, he would again be eating poorly because of the pain and effort imposed by his arthritic knee and he would again be withdrawn. Again, in the usual instance, an illness would follow.

Looked at as a story, what could be done? The usual pessimism of the hospital staff in cases like this is warranted; little could be changed in the basic social situations. Attempts to improve things would probably always founder because of the knee. Therefore, *the first key to the case is probably the knee*. It is true that osteoarthritis cannot be cured. However, with physical therapy and medication, most such joints can be made considerably more functional and less painful. All these activities can change the meaning of the arthritic knee; changing meaning is itself a potent (but neglected) force. The painful joint need not be a symbol of inexorable aging that diminishes physical activity like the very sands of time. It can be a painful knee that needs treatment if this man is to get on with his life—nothing more, nothing less. Knee replacement is available and effective if the simpler treatments fail. The second key to the case is probably nutrition. Improving the knee will take time, and unless attention is paid to this man's nutrition in terms appropriate to his realities malnutrition will return and complicate everything.

The point of abandoning outmoded concepts of cause and seeing illness in terms of events unfolding over time is to

realize that proper treatment is that which most simply and effectively changes the story. Of course, this man is subject to forces—social, psychological, and biological—over which neither he nor we have any control. Grief is enormously potent, and so too are changes in the social fabric caused by modern geographic mobility of which his family is a part. So too are the erosive effects of poverty and aging in a society unprepared for increased longevity or the negative biological effect of aging. But why should we feel helpless in the face of those things, no matter how potent they are? Throughout the vast majority of its history, medicine has been a David in the face of Goliath, looking for the place where its weapons would be most effective. And throughout its history, it has been helped by equally potent biological, psychological, and social forces which are also present in this man's story—the tendency of the body to heal itself, the inexplicable resurgence of hope,[15] the drive in all of us to remain connected to the group, and, ultimately, the sense of responsibility the larger society has for a sick person.

The other reason for abandoning outmoded ideas of causality is that the story of this man's illness is part of something much larger—how people live their lives in a social world. And that we are all part of.

[15] Alisdair MacIntyre, "Seven Traits for the Future—Designing Our Descendants," *The Hastings Center Report* 9 (February 1979): 5–7.