

## REVIEWS

# Holism and the idea of general susceptibility to disease

Stephen J Kunitz

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In 1974 John Cassel, at the time Professor of Epidemiology at the University of North Carolina, published a brief article in which he proposed four principles which he thought should inform epidemiological studies of psychosocial factors in disease.<sup>1</sup> This was not the first time these ideas had been proposed, by Cassel or by others, but his paper summarizes conveniently the principles that have guided the work of many social epidemiologists for the decade or two preceding its publication, and for the several decades since. For this reason, their historical roots are worth understanding. The four principles were:

1. 'In human populations the circumstances in which increased susceptibility to disease would occur would be those in which there is some evidence of social disorganization.'
2. '[N]ot all members of a population are equally susceptible to the effects of these processes' (e.g. social disorganization). Dominant members of the population are less susceptible than subordinate members.
3. Both biological and social processes are protective. 'Chief among [the latter] are the nature and strength of the group supports provided to an individual.'
4. '[S]uch variations in group relations, rather than having a specific etiological role, would enhance susceptibility to disease in general.' The importance of these group factors would be diminished 'in preindustrial societies, living in small, tightly organized communities, [where] the exposure to highly potent disease agents may account for the major part of disease causation. Under these circumstances variations in susceptibility due to social processes may be of relatively little importance. With increasing culture contact, populations become increasingly protected from such disease agents but simultaneously exposed to the social processes discussed above. Variations in susceptibility now assume greater importance in the etiological picture and the concomitant changes in such factors as diet, physical activity, and cigarette smoking will facilitate the emergence of new manifestations of such susceptibility.'

In this paper I shall consider some of the sources of these ideas, and especially the idea of general susceptibility to disease. I should like to argue that the idea of general susceptibility has some of its sources in the ideas regarding adaptation and holism that pervaded late 19th and early 20th century thought, and some of its sources in developments specific to medicine and epidemiology. It is not my purpose to assess the validity of the theory of general susceptibility in its various incarnations. My intention is to describe some of its historical roots and the context in which it arose.

Different definitions of holism have been offered over the years, but the most inclusive was set down in 1890: 'the whole is greater than the sum of its parts',<sup>2</sup> whether the unit of concern is an individual human being, or a biological or social system. At the individual level, holism means that the mind and the body are one. At the societal level, it means that communities are not simply aggregates of individuals but are greater than the sum of the individuals who comprise them. The idea of holism emerged to prominence in the second half of the 19th century, but it became pervasive in Europe and North America between the two World Wars.<sup>2-12</sup> It implied, among other things, a concern with the adaptation of whole systems to change, whether environmental or social. It was in very large measure a response to the disruptions in the late 19th and early 20th centuries caused by industrialization; by the internal and international migration of millions of people to rapidly expanding cities from rural communities; and by World War I. All these were developments which had led to a pervasive sense of both personal and social fragmentation.

In response, many artists and writers sought a sense of wholeness among the traditional Indian cultures of the American Southwest.<sup>13,14</sup> Social reformers sought to recreate a sense of community in the rapidly expanding slums of industrializing cities.<sup>15</sup> Sociologists and anthropologists found the sources of social pathologies in the breakdown of traditional communities.<sup>16</sup> Industrial psychologists sought to create community in the workplace.<sup>17</sup>

The quest for community has a history that predates the 1920s, of course. Ideas about the destruction of community have a long history in Western thought. They have their origins in responses to the democratic revolution in France and the industrial revolution in England, as well as to the individualism that characterized the US during its period of rapid growth and

Department of Community and Preventive Medicine, Box 644, University of Rochester Medical Center, 601 Elmwood Avenue, Rochester, NY 14642, USA. E-mail: Stephen\_Kunitz@urmc.rochester.edu

expansion during the 19th century.<sup>18</sup> All these changes were thought to have shattered traditional bonds of community. The well-known paired concepts of *gemeinschaft* (community) and *gesellschaft* (society), traditional and legal-rational authority, the folk-urban continuum, and status and contract were all attempts to define this transformation from traditional to modern.<sup>19</sup> Modernity implied secularization, individualization, and—for many—alienation and anomie. Whether they believed these changes were for good or ill, virtually all observers knew that a monumental transformation was occurring.

These were the conceptions with which the first generations of American sociologists confronted the changes they saw in the expanding industrial cities of the Northeast and Midwest in the early decades of the 20th century. Most of them were White Protestants from small towns and farms. They combined a liberal faith in individualism and progress with a belief in the importance of ‘group cohesion, status and consensus’.<sup>20</sup> Their concern was with the many different social problems of the growing cities (divorce, gangs, hobos) to which they had moved. They valued social equilibrium and believed that rapid change caused social disorganization, maladaptation and maladjustment, and personal and social pathology, but for the most part they did not give much attention to the political and economic context of these transformations.<sup>16</sup> Social disorganization was measured as a deviation from norms, which implicitly were the norms of small town America.

The arts and social sciences were not the only domains of intellectual life affected by the post World War I quest for wholeness and community. In epidemiology and medicine similar concerns arose, as a reaction both to broad social changes as well as to changes within these fields themselves. It is to some of those developments that I now turn, focussing largely on the US.

## Holism in epidemiology and medicine

The dramatic discoveries of infectious agents of disease beginning in the 1880s, the successful preventive treatment of rabies and diphtheria, and the improved understanding of deficiency diseases led many scientists, clinicians, and epidemiologists at the end of the 19th and beginning of the 20th centuries to an enthusiastic belief in necessary causes of disease and in disease specificity.<sup>10</sup> A necessary cause is one without which a disease could not occur. Without the tubercle bacillus, there could be no tuberculosis. Specificity meant that diseases were different from one another, had unique causes, and did not blend one into another.

This was a true epistemological revolution, for as Charles Rosenberg has observed, ‘The model of the body and of health and disease’ until then ‘... was all inclusive ... capable of incorporating every aspect of man’s life in explaining his physical condition. Just as man’s body interacted continuously with his environment, so did his mind with his body, his morals with his health. The realm of causation in medicine was not distinguishable from the realm of meaning in society generally.’ Moreover, it was widely believed that diseases could change from one to another and that the distinctions between different ones were not fixed. ‘The idea of specific disease entities played a relatively small role in such a system.’<sup>21</sup>

These ideas were now overthrown as enthusiasm for new ways of understanding diseases became dominant. Inevitably,

however, there was resistance and reaction to such enthusiasms.<sup>22–25</sup> John Gordon, Professor of Epidemiology at Harvard, writing the history of his field, observed of the period following World War I:

In the minds of many, realization took form that disease was no longer being studied, but rather the parts of disease; that too frequently the parts were considered the principal phenomenon; and that in pursuit of knowledge about infectious agents, the main objective was being lost.<sup>26</sup>

According to Gordon, these ideas crystallized in the years immediately following World War I as a result of the failure to explain and control the 1918 pandemic of influenza and outbreaks of polio, meningococcal meningitis, and encephalitis. Moreover, he wrote, the ‘changing social order’ brought an increasing awareness that ‘cultural, economic, and social factors are important determinants of health and disease in groups of people’. He continued:

This movement did not originate precisely in 1920, nor in the years immediately following. Matters simply came to a head then. The return to a holistic interpretation of community diseases, its consideration as a unified and total process, had been under way for a number of years. Opinions solidified, to give general appreciation that there is no single cause of mass disease, that causation involves more than the agent directly giving rise to the process, that cause lies also in the characteristics of the population attacked and in the features of the environment in which both host population and agent find themselves. The result is the modern concept of epidemiology as medical ecology and of disease as an ecologic process.<sup>26</sup>

The studies of pellagra by Joseph Goldberger and his colleagues in the 1920s are a classic example of this ecological view. Pellagra was caused not simply by a nutritional deficiency, they argued, but by a change in agricultural patterns, by the migration of farmers to cotton mill villages, and by the ecological setting of those villages. Villages in countryside where mono-cropping of cotton predominated were home to people at high risk of developing the disease. People in equally poor villages in countryside where truck farming remained common were not at high risk because they were able to purchase meat and eggs from the truck farmers who came to town to sell their goods.<sup>27</sup>

In physiological research and in clinical medicine as well, an important body of thought emerged which was focussed on the whole organism and the whole person, respectively. According to LJ Henderson, Professor of Biological Chemistry at Harvard, writing in 1927, ‘To-day, looking backward, we see how it was that bacteriological researchers for a long time took the first place which Claude Bernard believed to be already assured to those of his own science ... In our time bacteriology grew into a fully developed science, perfected its methods, exploited its domain, and then, the most pressing work well done, resigned its leadership of the medical sciences’. According to Henderson, bacteriology was merely technical; physiology required a deep knowledge of biology and medicine. Pasteur, he wrote, ‘always retained the chemist’s outlook’ whereas Bernard was as much a

philosopher as a biologist, with an understanding of ‘the theory of organism’ and of ‘the deeper problems of medicine’.<sup>28</sup>

Henderson was himself an important physiologist who shared with his colleague, Walter B Cannon (who coined the term ‘homeostasis’),<sup>29</sup> a belief that the entire organism was an open system that could only persist if it were able to adapt to changing conditions by maintaining a stable internal environment. According to John Parascandola,<sup>8</sup> Henderson, whose early work was on the acid-base buffering mechanism of the blood, ‘believed that the concept of organization taught the biologist to recognize the wholeness of the organism and the interdependence of its parts and processes’. The important point is this. Both investigators took a holistic view and understood living organisms to be open systems that had developed mechanisms to maintain the stability of their internal environments in the face of environmental change (what subsequently came to be called stress). These mechanisms were interactive and implicated in many different bodily functions. Failure of adaptation resulted in disease.

Both Cannon and Henderson also discussed the relevance of their work to the practice of medicine and to society more generally. Indeed, physiology gave each of them conceptual tools with which to address the economic and social crisis of the 1930s as well as the crisis they each perceived within medicine.<sup>30</sup> Henderson was by far the more influential in this regard. He moved on from physiology to the study of social systems and for a number of years in the 1930s taught an influential seminar on the sociology of Vilfredo Pareto and in the mid-1930s published a book on Pareto’s sociology.<sup>6,31,32</sup> More important for present purposes, he also wrote about the doctor-patient relationship as a social system in several papers that influenced the sociologist Talcott Parsons, and through him many later medical sociologists. He urged physicians to return to a Hippocratic view of the patient as a human being living in a social as well as a physical environment ... and to study the ‘whole man’.<sup>8,33,34</sup>

Cannon, too, invoked Hippocratic ideas and the healing power of nature (the *vis medicatrix naturae*). He wrote that all he had done in his description of the ‘various protective and stabilizing devices of the body’ was to present a modern interpretation of the natural *vis medicatrix*.<sup>29</sup> It was this view that informed his position with regard to the doctor’s role. Some years earlier, in a speech to the Massachusetts Medical Society, he had urged physicians to take an interest in the emotional lives of their patients because emotions had such profound physiological effects and because if physicians did not concern themselves with these aspects of care, patients would seek the ministrations of ‘cults, mental healers and the clergy. The doctor is properly concerned with the workings of the body and their disturbances, and he should have, therefore, a natural interest in the effects of emotional stress and in the modes of relieving it.’<sup>35</sup>

The importance that Henderson and Cannon both attributed to the doctor-patient relationship and to the treatment of the whole man bears more than a nodding acquaintance with, indeed may have been influenced by, the work of those physicians Theodore Brown<sup>36</sup> has called ‘the holistic elite’. These were men like Lewellys Barker, Francis Weld Peabody, G Canby Robinson, and many others who believed that over-emphasis on disease mechanisms was drawing attention away

from concern for the patient as a person—the title of an influential book by Robinson.<sup>37</sup> Their shared concern was that the general clinical and interpersonal skills that were so much a part of the physician’s art were being devalued, although they themselves were specialists and accomplished clinical and laboratory investigators. In a seminal address to medical students in 1927, Peabody said, ‘the most common criticism made at present by older practitioners is that young graduates have been taught a great deal about mechanisms of disease, but very little about the practice of medicine—or, to put it more bluntly, they are too “scientific” and do not know how to take care of patients’. He estimated that, excluding patients with acute infections, half the remaining patients seen by physicians ‘complained of symptoms for which an adequate organic cause could not be discovered: Here ... is a great group of patients in which it is not the disease but the man or woman who needs to be treated’. He concluded that, ‘One of the essential qualities of the clinician is interest in humanity, for the secret of the care of the patient is in caring for the patient’.<sup>38</sup>

The fact that Peabody set aside acute infections in a separate category is noteworthy, for it reflected a widely shared perception in the interwar years that infectious diseases were declining and that the new diseases confronting patients and their physicians would increasingly be the chronic diseases that would require the interpersonal and clinical skills of the experienced general physician.<sup>10,39,40</sup> This theme continued to run through later writings on the topic, as the fourth principle quoted from Cassel<sup>1</sup> above suggests.

The shared concerns of this elite group influenced their teaching of medical students and house staff,<sup>41</sup> their views of the way medical services ought to be organized in an age of specialization, and the research they undertook. Barker, for instance, was a member of the Committee on the Costs of Medical Care and part of the majority that wrote an influential report recommending, among other things, that generalists be the ones to organize the care of patients, with specialists being called upon only as needed. ‘Under present conditions, the old-time relation with a family physician is often disturbed’, they wrote. ‘The family physician should be restored to his place of responsibility and trust and his potentialities extended by substituting coordinated for uncoordinated relations with specialists and the other agencies which permit him to do his work effectively.’<sup>42</sup>

Barker was as well one of many investigators who explored the constitutional bases of disease. He commented in 1922 that, ‘During the past fifty years ... under the spell of bacterial and protozoan etiology, medical men have been so absorbed by studies of influences arising in the environment that they have, too often, forgotten to continue their investigation of influences of endogenous origin ... Recently, however, there has been a welcome revival of studies of constitution’.<sup>40</sup> For constitution-alists of the 1920s and 1930s like Barker, patients were ‘inter-connected wholes, psychologically and physically’, environment and heredity were viewed as equally important, and ‘[D]isease ... was the individual’s adaptive struggle with his or her social and/or physical environment’.<sup>40</sup> That is to say, for constitution-alists as for holists more generally, healthy individuals were those who had adapted successfully to their environment, and their ability to adapt was a result of the characteristics of both their own constitution and of their social and physical environment.

In an important sense, however, holism led in two different directions: toward disease specificity and towards general susceptibility. The constitutionalists tended to accept the notion of specificity, for they believed that people with different constitutions were susceptible to different clusters of diseases. For example, Franz Alexander, the well-known psychoanalyst and psychosomaticist, believed that certain diseases were influenced by the sympathetic nervous system and others by the parasympathetic system.<sup>43,44</sup>

On the other hand, the research of the endocrinologist Hans Selye from the 1930s to the 1970s has been an especially important source of ideas about general susceptibility. Like Alexander, he too acknowledged a major debt to Walter Cannon, dedicating an important publication 'to the memory of that great student of homeostasis, whose life and work have been the author's greatest inspiration',<sup>45</sup> although he could never convince Cannon of the correctness of his theory.<sup>46</sup> It was he who coined the term *general adaptation syndrome* to describe the non-specific responses of the body to a wide variety of stressors. The response, mediated by the pituitary-adrenal axis, could include both inflammatory and anti-inflammatory features. While specific stressors, for instance micro-organisms or chemical toxins, can produce specific responses, there are general responses which, Selye argued, characterized all stressors. Moreover, there are diseases of adaptation; that is to say, diseases caused by 'derangements of our adaptive mechanisms'.<sup>46</sup> For example, infectious organisms surround us and infest us all the time, but they do not always cause disease until we are stressed in some way.

If a microbe is in or around us all the time and yet causes no disease until we are exposed to stress, what is the 'cause' of our illness, the microbe or the stress? I think both are—and equally so. In most instances '*disease is due neither to the germ as such, nor to our adaptive reactions as such, but to the inadequacy of our reactions against the germ*' (emphasis in original).<sup>46</sup>

He suggested further that a variety of other conditions, such as rheumatoid arthritis and mental illness, might also result from deranged responses of adaptive mechanisms to a variety of stressors. A similar position was elaborated a decade later in a widely cited volume by Rene Dubos, who put the evolution of infectious diseases into the same historical context as had writers in the interwar years. He wrote:

The sciences concerned with microbial diseases have developed almost exclusively from the study of acute or semi-acute infectious processes caused by virulent micro-organisms acquired through exposure to an exogenous source of infection. In contrast, the microbial diseases most common in our communities today arise from the activities of micro-organisms that are ubiquitous in the environment, persist in the body without causing any obvious harm under ordinary circumstances, and exert pathological effects only when the infected person is under conditions of physiological stress.<sup>47</sup>

This was not idle speculation, for by the 1950s research had shown that stressful life events in families were associated with an increased risk of streptococcal infections.<sup>48,49</sup>

The quotation from Dubos illustrates two related points. First, there had been a major transformation in the prevailing epidemiological regime. Second, the ever-changing epidemiological regime was best understood in evolutionary terms, and disease was best understood as a failure to adapt to evolutionary change. This was a widely shared view, particularly in psychosomatic medicine. For example, John Romano and George Engel defined health and disease as "phases of life, dependent at any time on the balance maintained by devices, genically and experimentally determined, intent on fulfilling needs and on adapting to and mastering stresses as they may arise from within the organism or from without," where health represents a successful adjustment and disease a failure'.<sup>50,51</sup> In an evolutionary context this meant 'that biological and psychological devices are to a considerable degree mutually interchangeable, a phenomenon which is phylogenetically and ontogenetically determined. The mental apparatus uses for expression and defences somatic systems which had been so used in the phylogenetic or ontogenetic past of the individual. The behavior of the organ or system so used is limited by its structure and function. Thus, the stomach may respond in the same way to a poison, foreign body or carcinoma as to a distasteful idea; it may manifest the same physiological response to a need for love as for a need for food ... It is probable that every system of the body participates in such reactions'.<sup>50,52</sup> Like Selye's conception of the general adaptation syndrome, Engel's formulation is a way to describe general susceptibility to disease. It is the opposite of disease specificity, for it means that many different causes may have the same effect. Moreover, this evolutionary understanding of human development and disease is implicitly holistic, for it is understood as the way to integrate the psychological and the biological, the mind and the body.

Harold G Wolff, another well-known psychosomaticist, argued similarly that disease was evidence of maladaptation to stress. Unlike Engel, however, he also argued that not only could different stresses cause the same response, but the same stress could provoke different responses, even in the same individual under different circumstances.<sup>53</sup> For example, in population studies he and his colleagues had observed that ill health was not spread evenly but that a relatively small proportion of the people accounted for most of the illness, and the illnesses were of various sorts. 'Indeed, it was rare to find an individual with much illness who had disease confined to one category'.<sup>54,55</sup>

Many of these ideas found their way into epidemiology through the work of John Cassel, who I quoted in the Introduction. In an early paper, he and his colleagues outlined a programme of research which drew upon conceptions already common in the social sciences and psychiatry.<sup>56</sup> They were critical of epidemiology for being too descriptive and insufficiently analytical. '[T]oo many current epidemiological studies content themselves with describing incidence and prevalence data by selected demographic variables and drawing few if any inferences.' This raised for them 'a more fundamental issue. What is the nature of the inferences that can be derived through epidemiological investigation? Specifically, has epidemiological analysis a contribution to make in identifying etiological factors, or is this the prerogative of clinical and laboratory investigation?' 'The answer to this question', they wrote, 'is dependent upon the nature of the model of health subscribed to and the nature of the phenomena included in the concept of etiology. Dating from

the discovery of bacteria, medical thinking has until recently favoured a closed-system mechanistic model of illness and health. This model ascribes a single specific cause to each disease which, if present, would ideally always cause the disease. Conversely any disease would always be due to a specific cause.' They went on to point out that even when ideas of multiple causation developed, the closed-system model of disease meant that multiple causes 'are regarded as causes under all circumstances'. This might have been appropriate for infectious disease, but it was not appropriate for 'the diseases of contemporary industrialized society', for which 'a more useful model would appear to be the open-system model ... suggested by von Bertalanffy'. 'One of the cardinal features of such a model is that any specific stimulus may lead to a variety of reactions, depending upon the circumstances. Conversely any specific reaction may have as its antecedents a variety of stimuli', just as the work of Engel, Wolff and others had suggested. They also drew on work by Engel, Romano and Selye to suggest that the 'adaptive capacity of the individual to resist noxious stimuli' shaped the disease experience, and that 'pathological end states, other than those included under specific categories ... could be regarded as appropriate indices' of ill health in epidemiological studies.

With this background, Cassel and his colleagues went on to point out that the relevant unit of analysis for epidemiology was the health status of groups. 'Pathology is concerned at the cellular, tissue, organ, organ system, and organismic level, and epidemiology at the organismic, familial, societal, and cultural level.' They drew upon a number of concepts prevalent in the social sciences to derive hypotheses regarding their proposed study of health and culture change among southern mountain folk moving to industrial towns. They used, among other concepts from the social sciences, anthropologist Robert Redfield's notion of the folk-urban continuum to describe the changes they expected to see. 'The rural folk culture is found in small, relatively isolated, and relatively homogeneous communities. Under these circumstances every adult could know every other adult on the basis of long-continued personal interaction. This local community tends to be a self-contained, self-supporting universe, relatively separate from others. Traditions tend to be stable, and the pace of change slow.' Such a culture might not be well suited to life in industrial cities, and adherence to it might be maladaptive. Cities are 'organized on different principles. The urbanite is not cut loose from all group controls over his behavior, but tends to be a member of many groups rather than one all-encompassing group ... Thus we feel that the health-relevant processes will not be found by analyzing cultural disorganization and secularization apart from the relevance of the culture brought to industrial society by migrating groups ... In essence our analysis of social and cultural processes relevant to health revolves about the question: How effectively has the past experience of this group equipped it to cope with its present life situation?'

They hypothesized that people who had been in the city for two or more generations would have adapted to urban life and would be less likely to experience ill health than newcomers whose culture had not prepared them for their new environment. Similarly, with regard to family organization, they hypothesized that extended families might be a temporary buffer against stress but maladaptive among urban migrants in the long term.

These are interesting hypotheses based upon a thoughtful attempt to synthesize research from several disciplines. They clearly drew upon ideas of community and social disorganization that had pervaded social thought for the preceding century or more, as well as on the more recent literature on adaptation and stress. Similar more-or-less persuasive efforts have guided subsequent attempts to integrate ideas of general susceptibility to disease with social processes such as psychosocial stress, social support, social stratification, social capital and income inequality.<sup>57-64</sup>

Not surprisingly, ideas regarding general susceptibility have undergone major challenges and changes in recent years.<sup>65-68</sup> For example, numerous different pathways from stressful experiences to adaptive and maladaptive responses have been identified,<sup>69-71</sup> and current thinking suggests that the response to stressful experiences is not general, as Selye believed, but highly specific and highly variable, thus explaining 'the low correlations obtained between stressful experience and disease'.<sup>65,72</sup> To take just a few examples: (1) Some cancers do not follow the socioeconomic gradient that would be expected if dominant members of a group invariably had lower levels of morbidity and mortality than subordinate members.<sup>73</sup> (2) Likewise, heart disease mortality is higher among high than low social strata in southern Europe, just the reverse of the northern European pattern and of what would be expected.<sup>74</sup> (3) The same or similar measures of social support which predicted reduced mortality in several studies failed to do so in a study of Japanese Americans in Hawaii<sup>75</sup> and among rural African Americans.<sup>76</sup> (4) Psychoneuroimmunological research to date has produced inconsistent results with regard to the impact of stress on the onset and progression of AIDS and cancer although the association of stress with regard to minor infections is consistent and convincing.<sup>63</sup>

Nonetheless, the different pathways through which stress is mediated represent an integrated response of the entire organism to psychological as well as physical stressors.<sup>65,71</sup> That is why contemporary observers<sup>69</sup> continue to argue, as Harold Wolff and his colleagues did more than 40 years ago,<sup>55</sup> that many different responses to stress tend to cluster among the most vulnerable in any population. Thus modern conceptualizations of the response to stress are still organismic and continuous with the tradition of holism that has been such an important theme in medical and epidemiological thinking since the 1920s.

## Conclusion

Virtually all who have written on and advocated the concept of holism have described themselves as responding to three interrelated transformations, one epistemological, another epidemiological, and the third sociological. The epistemological transformation was wrought by the germ theory of disease. As I noted at the outset, the germ theory introduced for the first time the idea of causal necessity in medicine, as well as the idea of disease specificity. These ideas replaced older ideas of causal sufficiency. If a necessary cause is one without which a condition cannot occur, then a sufficient cause is one that is followed by a particular condition. In 19th century American medicine, causal sufficiency meant multiple weakly sufficient causes. A variety of conditions could result in tuberculosis, for example: crowding,

absence of love, inadequate nutrition, and so on. As the comments of John Gordon<sup>26</sup> quoted previously suggest, many investigators since the early 20th century have rejected the idea of causal necessity and disease specificity, and indeed under the rubric of 'risk factors' have re-introduced the idea of multiple weakly sufficient causes into contemporary medicine and epidemiology,<sup>10</sup> an important development that itself has not been without difficulties.<sup>77</sup>

The second great transformation was of the prevailing epidemiological regime: the decline of infectious and rise of chronic non-infectious diseases. Many were impressed that the idea of causal necessity that had made possible specific preventive and therapeutic interventions in infectious diseases was less salient when it came to the newly important non-infectious diseases, for which multiple weakly sufficient causes appeared to provide more adequate explanations.<sup>78</sup> The recession of epidemic infectious diseases also meant that the newly important diseases were thought to be caused by factors of a psychosocial nature and were a manifestation of the breakdown of adaptive capacity.

The third transformation is the one that I described at the outset as the change from 'traditional' communities to 'modern' societies. It was the perception of that transformation that created the context in which the quest for wholeness occurred; for it was understood to mean that a sense of community had been lost and that isolated individuals were more likely to suffer psychological and physical distress.<sup>79,80</sup> Moreover, it was this transformation that required individuals and communities to adapt to situations unlike any they had ever before encountered and that made adaptation and adaptability such pervasive preoccupations in social and medical thought throughout much of the 20th century.

It was, I believe, the perception of these transformations that shaped the principles enunciated by Cassel<sup>1</sup> and comprised a paradigm that has guided a considerable body of research over the past several decades. Its intellectual coherence; its integration of many widely shared assumptions about the nature of social organization and disorganization, the nature of community,

and the consequences of social change; the alternative it provides to reductionist modes of explanation; and—not least—its explanatory power in many different studies, have made the paradigm attractive to people searching for a unifying explanation of seemingly diverse conditions. Further, it represents an important continuing epistemological tradition in medicine, one that stands in opposition to the dominant paradigm of the past 100 years.

It is primarily in psychology, psycho-social epidemiology,<sup>44</sup> and family medicine in the US<sup>81</sup> that these ideas have persisted. Common to them all is a commitment to understanding how the health and disease of individuals is shaped by their social contexts. Hence the interest in open systems, in perceptions and experiences of stress, in the functioning of family and social networks, in the patient as a whole person, and in disease as all manner of distress. Hence, too, the frequent and misplaced ritual bashing of Descartes for the mind/body split he is said to have created in Western thought.<sup>82</sup> For both Descartes and the Western intellectual and scientific tradition are far too complex to be summarized in such a formulaic fashion.

It is more nearly true that the Western medical tradition has uneasily embraced at least two ways of thinking about diseases, patients, and populations: one emphasizing the importance of specific disease entities and their natural histories that are the same from one patient and population to another; the other emphasizing the importance of knowing all that is wrong with a patient and less concerned with specific diseases and their specific causes.<sup>83,84</sup> Thus ideas about holism and general susceptibility are both a response to contemporary social and scientific conditions, and part of a long debate about how best to understand diseases and the people, and peoples, they afflict.

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### KEY MESSAGES

- The idea of general susceptibility to disease has been an important idea in social epidemiology for more than half a century.
- It has important roots in three important transformations: sociological, epidemiological, and epistemological.
- The sociological transformation was perhaps the most fundamental. It was from 'traditional' to 'modern' societies, and for many it implied social and individual alienation and fragmentation, the answer to which in the years between the world wars was holism in a variety of forms.
- The epidemiological transformation was from a regime dominated by infectious diseases to one dominated by non-infectious diseases, for which different modes of causal attribution were thought appropriate.
- The epistemological transformation was precipitated by the microbiological revolution of the late 19th century, which introduced the idea of necessary cause into medicine and epidemiology. The reaction to this 'reductionist' mode of thinking on the part of many investigators was to emphasize the importance of multiple weakly sufficient causes, or risk factors.
- Western medicine has embraced two different ways of understanding diseases and the people who have them, one emphasizing the natural history of disease, the other emphasizing the experience of the patient. Ideas of holism and general susceptibility may be seen as a continuation of the latter tradition, in opposition to what has been the dominant tradition for the century just past.

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