



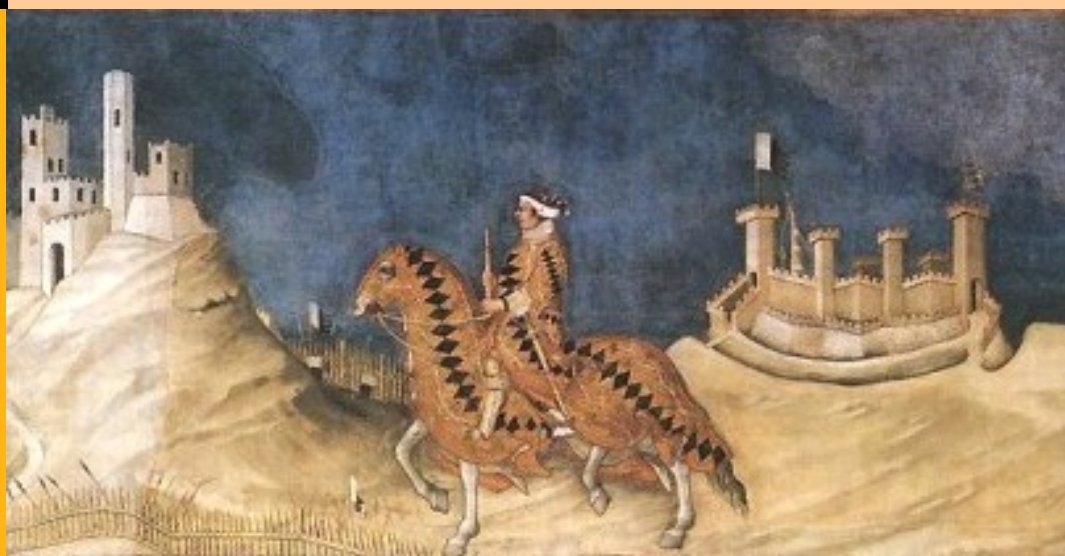
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A Selective Migration Review:
from public policy to public health

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Abstract:

The contribution of Steinbeck in the late-1930's concerning motives and decision-making for environmental migrations did much to influence research in social science. The Tiebout's hypothesis and theoretical model of migration, published in 1956, permitted evaluation of urban public policy implications. The impact of these two pioneers in migration theory set the stage for new models and new methods in migration research having advantage of much more data from many more environmental, economic and social sectors applied to many more accumulating, often tragic, examples. This paper looks at the state of the science as these two influential authors left it and how the public health part of the 1930's Dust Bowl migration to California contributes to our understanding of this complex human, decision-making system. Finally, Garfield's scientometric propagation of scientific thinking was utilized for migration theories.

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A SELECTIVE MIGRATION REVIEW: from public policy to public health

“The land is so much more than its analysis,” John Steinbeck

John Steinbeck’s magnum opus “The grapes of wrath” (1939) was based on the historical forced environmental migration from Oklahoma to California in the 1930s during the Great Depression. Oklahoma and some neighboring states experienced the “Dust Bowl” that has been analyzed by atmospheric scientists, agronomists and geologists with respect to storms, precipitation, crops and soil erosion. The economic consequences of the Dust Bowl were enormous and bitter, particularly for the landowners and workers in agriculture.

President Franklin D. Roosevelt described the situation of the farmers and stockmen in his speech (1936):

“No cracked earth, no blistering sun, no burning wind, no grasshoppers are a permanent match for the indomitable American farmers and stockmen, and their wives and children who have carried on through desperate days and inspire us with their self- reliance, their tenacity, and their courage.”

Migration west was the only solution for the population of the Dust Bowl. In early American history, the West had a lower population density and higher income per capita than any other US area. Harold Hotelling’s (1921) population growth and migration model was based on these two historical observations and used the mathematics of pressure/gradients to represent this idea of flow. More than a half million workers migrated to California with an eye on the fertile San Joaquin Valley.

Steinbeck’s protagonists moved to the Bakersfield area in the San Joaquin Valley. After the initial shock of hard economic and social dislocation the migrants eventually obtained work in agriculture and were assimilated into the Californian society.

The migration was not a “happy ending” for many Dust Bowl migrants. Many were infected by a variety of diseases, including tuberculosis, scarlet fever and whooping cough, made worse by their poverty and cramped living during the move and after their arrival. A complicating factor was a relatively unknown illness called Valley Fever or Coccidioidomycosis, from which a number of migrants died in the years following the mass migration. Public Health scientists in endemic regions tried to help the infected migrants during the Great Depression and World War II periods. See, for instance, the Kern County Public Health Services Department’s comprehensive webpage for the illness: “kerncountyvalleyfever.com”. To understand the Dust Bowl migration requires the attributes of multidisciplinary network analysis to appreciate the complexity of the environmental and social disaster: atmospheric science, geology, agronomy, public policy, public health, social sciences and finally humanities, all of which provide insight into this population transformation (Steinbeck, 1939; Hirschmann, 2007; Potter, 2013; Galgiani, 2008; Pappagianis and Einstein, 1978; Davis, 1998; and Sprigg, et al., 2014).

At an even wider scale of linkages between environmental change and social consequence, we have the example of the pre-historic migration of human beings. In order to analyze this pre-historic migration, DNA-research has been applied widely as a tool for tracing the movement. By mapping the genetic record of *Homo sapiens*, we now understand the pattern of this migration from Africa to Europe, Asia, and to Australia and the Americas 60,000 years ago. If we consider the genealogical past of American Indians, DNA information reveals an ancestry of people that migrated from Asia some 50,000 years ago. DNA patterns are at least partly verified by paleontological records. See, for example, the work of Danish evolutionary biologist Eske Willerslev, reported by Dalton (2010).

Strong ongoing DNA-research traces this global migration. See, for example, the Genographic Project (2005), a research partnership of IBM and the National Geographic (genographic.nationalgeographic.com or ibm.com). Such work was further bolstered when the Nobel Prize in Chemistry was awarded in recognition of the credibility and power of DNA analyses.

It is clear that migration at the micro, meso and macro level deserves careful evaluation but it is also clear that its appreciation is not limited to the social sciences.

The study of migration is multi-disciplinary, with scientific and humanitarian concerns. Yet, poor communication both between and within disciplines is a recognized condition today. Molho (2013) wrote: “A longstanding and deeply rooted problem in assimilating and evaluating research on migration theory lies in the diverse and fragmented nature of the field. As a result, reliance on any one single approach will likely lead to a highly specific and incomplete view of the complex process behind individuals’ locational decisions in the space economy”.

The use of any one-discipline and fragmented approaches for understanding complex processes like migration leads to incomplete and in some cases incorrect conclusions. Koopmans (1979) advocated that the gradual breakdown of barriers between disciplines will advance science, and the science of migration is an example where that comment seems particularly cogent.

Due to fragmentation, Tiebout’s theory of migration (Tiebout, 1956) appears to be the missing element. Tiebout’s controversial ‘pure theory’ may be considered one of the most cited articles in public and regional policy, but it is almost forgotten in migration surveys.

“The act of moving or failing to move is crucial. Moving or failing to move replaces the usual market test of willingness to buy a good and reveals the consumer-voter’s demand for public goods” (Tiebout, 1956).

According to Kurt Lewin’s, (1951) aphorism “There is nothing so practical as a good theory.” A good theory can generate rules of correspondence that connect the theory’s main insights with applied or empirical research. If Tiebout’s article is good migration theory, we will like to trace the empirical applications verifying his theory as we go.

In section 1 of this paper we highlight the most important contributions and controversies of migration research in social sciences by using bibliometric or scientometric evaluations of migration surveys that are based on Garfield's work (Garfield.library.upenn.edu) on the propagation of scientific thinking. (Garfield initiated the old "Science Citation Index, the forerunner of the modern equivalent "Web of Science" database)

Public policy implications of Tiebout's theoretical model (1956) is discussed in section 2. In section 3 we analyze a public health part of Dust Bowl migration in California in 1930's as a contributor to our understanding of this complex system.

1. Approaches to migration.

The social sciences migration bibliographies and surveys might be by definition "partial" because of the interdisciplinary nature of the subject. We note the annotated bibliography from Price and Sikes (1975), Greenwood's migration surveys in economics (1975 and 1985), Greenwood et al. (1991), Cebula (1979), Ghatak (1996), Molloy et al. (2011) for migration in America, Todaro's survey for less developed countries (1976) and Molho's review (2013) for Europe. In sociology, the Ritchey's survey (1976) is worth noting also.

The U.S. statistical data on migration are based on decennial censuses, surveys and lately on the "national longitudinal survey of youth." Greenwood (1975) in his classical migration survey noted that the survey had used almost 250 references and had the following configuration:

1. Determinants of migration

A. Gross migration

1. Distance
2. Income (Human capital theory)
3. Psychic costs
4. Information
5. Personal characteristics

B. Net migration

2. Consequences

- a. Efficiency of markets
- b. Externalities (brain-drain)
- c. Simultaneous equations models

Greenwood's main conclusion is that the migration literature focused on the determinants and not on the consequences of migration, while noting the multidisciplinary nature of the work, "Not only economists, but also demographers, sociologists and geographers have made numerous contributions to the migration literature since 1960." His references have had wide variation in terms of their citation impact during the last 40 years since that first publication.

Table 1: High impact references in Greenwood's survey (1975) by subject

Geography: Ravestein E.G (1885)

Sociology: Stouffer S. A (1940)
Zipf G. K. (1949)
Coleman J.S. (1966)

Economics: Becker G.S (1964)
Hicks J.R (1932)
Todaro M. P (1969)
Sjaastad L. A. (1962)
Schultz, T.W. (1961)

Demography: Lee E. S (1966)

Regional Science: Isard W (1960)

Source: Web of Science

Herein we extend Greenwood's migration view based on partially expanded interdisciplinary literature in social sciences.

The geographer Ravenstein (1885) may be regarded as one of the founders of migration analysis with his paper in the Journal of the Royal Statistical Society, where he formulated a comprehensive theory of the determinants of migration. Since then many scientists from different disciplines theorize about the complex interrelationships between

migration and economic, social and psychological factors.

Hicks' publication (1932) has played a vital role in migration studies that followed, particularly in contributions of the latter in economics. His argument was that wage differentials between regions are the main cause of migration.

The next important theoretical approach was the gravity, or spatial interaction, model. In early use of this framework, the migration system is considered to be similar, conceptually, to a celestial system. Population size in a migration field acts like a mass in a gravitational field. Numerous studies of migration have been based on this Newtonian paradigm. It will suffice to mention the derivation of the potential model by Stouffer (1940) and Zipf (1949) published in sociological journals. Later in the 1950s, the gravity model was generalized by substituting demographic variables with economic variables, such as vacancies, wages, employment and income. In the 1960s simultaneous equation models were used to quantify migration determinants and forecast population.

The search for regularities is a central theme in the Newtonian model of Science as well as in our picture of the world. Frisch (1969) stated in his Nobel Prize lecture in economics, "Indeed, science too has a constant craving for regularities. Science considers it a triumph whenever it has been able by some partial transformations here and there, to discover new and stranger regularities." Due to lack of predictability at the individual level, combined with the large numbers of individuals, regularities appear only to be observed in the aggregate behavior of the human beings. Although, since then, micro-behavior has been linked to these macro perspectives using probability theory, entropy modeling and information theory.

In the social sciences this principle can be traced back to Que'telet's work "Social Physique" in 1835. Scientists built models –"theories in manipulative form" for describing population distribution and development.

Isard's vision and generation of the Regional Science in the 1950s had an integration effect on the communication and collaboration in social sciences, especially between economics, sociology, anthropology, psychology and geography. Migration had a spatial definition, because migration involves movement over space and every space represents a unique distribution of opportunities, transport costs and search information costs. Isard's definition of regional science, "discipline concerns the careful and patient study of social problems with regional or spatial dimensions," could be considered a common platform for migration research.

The Nobel Prize winners Becker (1962) and his co-worker at Chicago Coleman (1956) had a very visible impact on migration literature. The migrant evaluates his expected utility in Becker's words. Becker's "human capital theory" was equally important in "education economics" and migration theory.

Sjaastad (1962) in his classic article noted, "... little has been done to determine the influence of migration as an equilibrating mechanism in a changing economy." In

Demography, a popular approach to migration is the multiregional demographic model, which is based both on Lotka's stable population theory, Markov's assumption, and Leslie's matrix model (Sarafoglou, 1987).

Greenwood cited Isard's (1960) work in Regional Science, as the "father" of Regional Sciences in his "green book," co-authored with Liossatos (1979), he introduced a non-Newtonian dynamics framework for spatial dynamics. Donaghy (2002), in his article "The "green book, twenty years on" argued that "the book has begotten little secondary scholarship" because of its mathematical complexity.

Another group of scientists from Stuttgart University under the leadership of W. Weidlich started a parallel migration research activity by using statistical physics, e.g. Master equation (a stochastic differential equation), for migration independently from Isard-Liossatos. Weidlich used concepts from Synergetics for population dynamics. This field developed in theoretical physics by Hermann Haken (1981) also in Stuttgart. Synergetics is based on "self-organization of non-equilibrium systems." Weidlich (1983, 2000) had a higher impact in Master equation application in migratory systems than even the father of regional science, Isard (Holmberg and Sarafoglou, 1988).

Using the Sociology of Knowledge, the efforts of Isard-Liossatos and Weidlich could be classified as "multiple discoveries," but we know from the history of multiple discoveries that one of them usually becomes more dominant than others in terms of recognition (Sarafoglou et al., 2012).

The migration-concept of a "spatial choice set" introduced by regional scientists (Greenwood et al., 1991) was implemented in experimental economics (Lieber, 1979).

Finally, the enormous evolution of modern migration research since Ravenstein's work has been based on four components: A. Population data (quantity and quality), B. Statistical and mathematical methods, C. Software development, and D. Computer capacity.

The isomorphism between social and physical or natural sciences in migration research is obvious. The initial gravity models with simple Newtonian dynamics have been gradually substituted by stochastic models with more sophisticated non-Newtonian dynamics via information theory.

2. Public Policy and Migration : The Tiebout hypothesis

Tiebout was Musgrave's student at the University of Michigan in the beginning of the 1950s. Samuelson's article (1954) "A pure theory of public expenditure" was his inspiration for his work on "A pure theory of local expenditure" (1956). In this article Samuelson could not determine the optimal allocation of public goods: "No decentralized pricing system can serve to determine optimally these levels of collective consumption." The student Tiebout tried to solve Samuelson's problem by using local public goods and migration. Tiebout died in 1968 at the age of 43. He was not a prolific author, but he was

a high impact author. His 1956-article in *Journal of Political Economy* is one of the most cited articles in regional policy with more than 3,300 citations in scholarly journals according to the bibliometric database Web of Science.

His life-time citation score is ca. 4000 citations according to the Web of Science, which means that his 1956-student-paper was an extreme achievement. Tiebout wrote a regional economics dissertation, which was accepted in 1957 at the University of Michigan. Although he had a strong background in public finance, he preferred to work mostly with regional science than public finance in his short academic research career (1957-1968). Walter Isard's newly established regional science in the 1950:s was more attractive to him than Richard Musgrave's traditional public finance.

Tiebout's 1956-paper had a very slow citation growth during the period 1956-1965. The paper received 7 citations during the first decade after the publication. State and local finance was not a popular research theme in the 1950s and 1960s. In the Cold War era, one should expect the state and local administration to be more popular than federal administration and national planning with Leontief's applications. On the contrary, the Washington DC central decision-making was very strong during this period in the US (Fischel, 2006). Political scientists considered this era "supremacy of the centralized government."

The citations for Tiebout's paper (1956) increased dramatically after Oates' (1969) publication of property tax analysis based on the term coined as the "Tiebout hypothesis". Home-ownership, property taxes and property values were important to any American. Keynesianism and the "grand" government lost importance for the voters in the 1970:s. Microeconomics research gained popularity at the cost of macroeconomics and stabilization policy research agendas. The associated local government research gained momentum.

The intellectual relation between Oates (1969) and Tiebout (1956) can be a great philosophical discussion. Although Tiebout had not mentioned property taxes and property values in his paper, the "Tiebout hypothesis" became the cornerstone for local property tax capitalization. Tiebout's tax is a head tax. By introducing taxes on land rents or property taxes and property tax capitalization into the Tiebout model, the model becomes more realistic but also more complicated (Cebula 2002 and 2009 and Coombs et al. 2012). Oates' addition to Tiebout's ideas was in itself a major contribution.

This Oates-interpretation of Tiebout recalls the old debate between "Keynesian Economics" and the "Economics of Keynes." Was the "IS-LM model" a pedagogical instrument for students to understand the Keynesian thought, or was the "IS-LM model" a mathematical formulation consistent with the "General Theory?" This IS-LM discussion generated thousands of journal and book pages, but the Axel Leijonhufvud's seminal work (1968) is worth noting for his Keynesian synthesis.

If Oates (1969) catalyzed the 'take off' citation process of Tiebout's paper, the next most influential citations came from the political scientists Vincent and Elinor Ostrom (1971)

and the environmentalist Lester Thurow (1971). Elinor Ostrom was a Nobel laureate for "her analysis of economic governance, especially the commons," which of course links back to Tiebout's work on local property tax and individual immigration chain behavior.

The second Tiebout citation "take off" took place in 1974, after Henderson's paper on "types of cities" with ca. 300 citations and Rosen's paper on "hedonic prices" with more than 2300 citations. Buchanan's citation in 1975 in 'public choice' solidified the importance of the Tiebout hypothesis. Buchanan's Nobel award cited "his development of the contractual and constitutional bases for the theory of economic and political decision-making."

During the first period of citations of Tiebout's work, 1956-1975, the "hypothesis" was cited 96 times according to the Web of Science. The eponymous citations of the first period generated sufficient dynamics for new citations in the next forty years.

Another older philosophical explanation of Tiebout's interpretation with respect to taxes and public goods by other scholars might be similar to Plato's "Allegory of the Cave" in his "Republic." According to this allegory, prisoners isolated in a cave with limited lighting could see the shadows of the objects and tried to identify them. This allegory symbolizes the constraints of human knowledge in relation to the reality.

The Nobel laureate in Physics Weinberg used Plato's allegory of the cave to describe the development of nuclear physics in the 1960s:

We have not been able to get out of this cave, but by looking long and hard at the shadows on the cave wall, we can at least make out the shapes of symmetries, which, though broken, are exact principles governing all phenomena, expressions of the beauty of the world outside. (Baggott, 2011)

The political dimensions of Tiebout's theory were also controversial. Many political scientists considered his theory as a "manifestation of a libertarian-conservative approach to government." The truth is that both Tiebout and Tiebout's family had strong democratic perspectives!

The well-known aphorism, "There is nothing so practical as a good theory," has many "fathers": Maxwell and Lewin. The physicist James C. Maxwell (1831-1879) is cited by mathematicians and Kurt Lewin (1951) is cited by psychologists and social scientists.

The French mathematician Henri Poincare (1854-1912) was in the same spirit with Maxwell and Lewin: "...le souci du beau nous conduit aux memes choix que celui de l' utile." A good theory can generate rules of correspondence that connect the theory's main insights with the applied or empirical research. Publications with labels "basic" or "pure" are flagship articles in any journal. On the contrary, labels "applied", or "empirical" have lower status in the publisher's world.

"The reverential portion recognizes the power of theory to achieve parsimonious understanding and to guide useful applications—precisely the wisdom of Lewin's

statement” (Greenwald, 2012). Tiebout’s pure theory is an example of Maxwell’s and Lewin’s quote and has generated thousands of empirical works!

Citations in economics and regional science are the most frequent, but citations in political science, environmental studies and law are important too for the Tiebout citation profile.

Table 2: Tiebout (1956) citations during the period 1956-2014 by subject

Economics.....	1390	citations
Urban studies	524	“
Political science.....	467	“
Environmental studies.....	441	“
Law.....	412	“
Public administration.....	261	
Planning development.....	217	
Geography.....	185	
Business finance.....	177	
Social sciences interdisciplinary.....	67	
Sociology.....	66	
Education research.....	65	
International relations.....	50	“
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.....		
Sum of citations.....	3300	“

Tiebout’s hypothesis (1956) is that “The consumer voter may be viewed as picking that community which best satisfies his preference pattern for public goods. ... Given these revenue and expenditure patterns, the consumer-voter moves to that community whose local government best satisfies his set of preferences.”

This preference pattern for migration decision-making can be based on public goods combined with liabilities often in the form of taxes. Tullock (1971) was in the same navigation direction with Tiebout. And, Tiebout accepted Samuelson’s definition (1954) of a public good: no individual consumption of such a good subtracts from another’s consumption of that good.

3. Dust Bowl Migrants and Health.

Let us return to the case of Valley Fever when little was known of its origin and many of its symptoms mimicked the flu, pneumonia or tuberculosis. Unknown at the time, but well established today, the disease is traced to a fungus in soil that experiences seasonal swings between precipitation (for growth) and heat and drought (to create small fragments, 2-5 μm in length, of the brittle fungus that are inhaled). Most victims typically recover after a few weeks of shortness of breath and feelings of exhaustion. But, many others regress to debilitating weakness, perhaps scarring of the lungs and lesions of the skin. To some, the disease is fatal (Smith, 1940; Pappagianis and Einstein, 1976). Would these migrants have chosen another destination if the facts were known?

Highly endemic areas for Valley Fever (coccidioidomycosis, or “cocci”) include California’s San Joaquin Valley, where the malady gets its name, and south and east along a broad swath of territory along both sides of the US-Mexico border, through Central America and deep into South America (Laniado-Laborin, 2007). Overall, even today throughout the endemic region, cocci surveillance is poor. Yet, some statistics give us an idea of the seriousness of the disease. On average, 150,000 people in the U.S. are estimated to contract valley fever annually where, between 1990 and 2008, an annual average of 161 deaths were attributed to cocci (Huang, et al., 2012). Most of these cases are unreported because initial symptoms are not severe and normal resistance prevails over time. Most documented cases come from the U.S. state of Arizona where, in 2007, approximately 3000 cases were reported (there were 6000 cases reported nation-wide), with an associated 1735 hospital visits and \$86 million in hospital charges (ADHS, 2007, 2010; Tsang, et al., 2010).

In California, Pappagianis (1994) documented increases in cocci cases from 1991 to 1993, and Flaherman, et al. (2007) find an average of 70 deaths each year from valley fever between 1997 and 2008. Medical records for Kern County, California, attribute approximately \$45 million in direct costs for hospitalization and outpatient care for Valley Fever cases during the period 1991–1993 (CDC, 1994). Bakersfield, a destination city for Dust Bowl migrants, is in Kern County. And, Kern County shares much of the San Joaquin Valley.

Only recently, in 1997, were physicians in the US required to report a diagnosed case of cocci (ADHS 2010). Too, methods of laboratory blood tests for cocci have changed over time, and the time-dependent record of surveillance for cocci is poor (Sprigg, et.al, 2014).

Medications administered, at times an anti-fungal therapy, for valley fever depend on the body’s immune system to fight the cocci fungus, and treatments are most effective when diagnosis is quick and accurate. However, the several weeks of incubation between exposure and first observed symptoms, and symptoms that often appear too minor to see a physician, contribute to the aforementioned statistics.

An obvious risk avoidance method, vaccination, is not available. Uncertainties about the extent of the disease have contributed to this. Windblown dust, some of which may

contain the cocci fungus, can fly hundreds of miles (see, e.g. Pappagianis and Einstein, 1978; Marx, et al., 2009). This, along with revelations of professional athletes contracting valley fever while training in the endemic zones and valley fever being reported well outside the “endemic zone,” (CDC, 2001) tell us that the disease is not confined within a small region.

There are many “ifs”: if cocci is perceived to be contained within a region; if the perceived number of victims having contracted the disease, or those at risk, is too small to offset the costs of research, development and clinical trials of a vaccine; if the associated costs for lost wages and hospital stays are not counted and verified ... all of which are perceptions without facts that stifle any incentive to produce a vaccine.

Yet, research shows that a vaccine is, indeed, possible (Cole, et al., 2004; Galgiani, 2008) and perhaps a change in the conventional business model for vaccine development should be modified, as Galgiani suggests.

It is interesting to note that only until the 2014 outbreak of Ebola in West Africa produced a sufficient number of victims for potential human clinical trials were pharmaceutical companies given incentive to rush in developing a cure for the virus, which has now found a way to escape anywhere in the world (Loftus, P. and B. McKay, 2014). The industry had been slow to invest, with prior outbreaks limited in scale and a virus believed confined within poor countries.

Other risk reduction measures, unavailable to the Dust Bowl migrants, include public education to avoid airborne dust, to recognize symptoms of valley fever, and to seek a doctor’s help early if one suspects infection. Successful identification, mapping and monitoring of dust source regions using NASA satellite systems (Morain, et al., 2005; Mahler, et al., 2006; Yin, et al., 2007;) and prediction of dust storms (Sprigg et al., 2012; Vukovich, et al., 2014) and of weather related dust-laden air (Sprigg, et al., 2008) offer further opportunity to reduce risk of infection (Sprigg, et al., 2014).

It may take an international partnership between industry and governments to solve or significantly reduce the problem of Valley Fever, mutually investing in risk avoidance measures, to “promote the general welfare,” a purpose of government, as the preamble to the U.S. Constitution states. Long-term views are needed, a particular quality of government, as important questions arise because the cocci fungus is so linked to variability of weather and future climates – and to how society responds. Will deserts and the range of cocci expand or “migrate” to unsuspecting populations? Employment in solar energy fields has become a new, high-risk occupation for cocci (Cal/OSHA, 2014); in this growing industry will new “migrant” workers from non-endemic areas be especially vulnerable?

Movement from the cities to the suburbs had a strong environmental component. People moved from cities to the suburbs for a “green and clean” environment. However, combined with poor soil management practices, the meteorological and climatological forces behind the dust bowl were too large in scale to be solved other than by long

distance migration, to a more benign and hospitable climate. Yet, a climate that harbored cocci, a debilitating disease. Isard's recognition of the importance of spatial dimensions in understanding migration is paramount in this case, and will be in anticipating migrations stimulated by climate change.

We may expect migration to lag slowly behind environmental triggers such as climate, which is global in context yet manifested in turbulent, often counter intuitive, regional variability. The mathematician and meteorologist, L. F. Richardson (1922), put it another way, "Big whirls have little whirls that feed on their velocity, and little whirls have lesser whirls and so on to viscosity." Viscosity in this case is the "regularity." The parallel in social and economic systems is striking, as in the economist Frisch's (1969) interpretation of science having a craving for regularity, yet we often see that "regularities appear only to be observed in the aggregate."

Economic and social anchors are strong and nature is complex. Environmental predictions are problematic, reminding us again of Plato's allegory of the cave. The situation leaves us open to arguments to ignore the too slowly emerging "shadows on the wall." Migrations, in this case, will be complex, fragmented, depending on the distribution of economic and social anchors and perceptions of environmental change, both of where one begins the journey and where one ends it. The Okies migrating from the Dust Bowl may not have fully understood the latter.

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