

## The Approach to Land Use Planning in a Changing Technology

The last five papers have been applications of parts of Foster's reconstruction in economics. But they have been suggestive rather than extensive, detailed, and empirically based tests of that reconstruction. Among his papers is but one that provides such extended application and test. It was written in 1942, so the data on which it is based are not current. But it still appears valuable in helping modern readers evaluate the significance of Foster's contribution to economic analysis.

This paper deals with the problem of agriculture, toward the solution of which our community has made little progress in the four decades since it was written. Introductory economics texts still fruitlessly analyze the agricultural problem into its supply and demand components, while the community continues to assume various institutional patterns as it debates which technologies, which ownership patterns, and which government policies are proper.

Foster's approach to the problem of agriculture is threefold. First, he traces the evolution of agricultural practice, both institutional and technological. Second, he identifies the existing confusion over how to proceed to solve the problem of land use. Third, he applies his principles of institutional adjustment to the solution of that problem. He shows that a clear comprehension of the instrumental criterion of judgment leads, in this case, to the goal of minimizing the scarcity of agricultural products. The goal is not to defend the sanctity of any existing institutions or to allocate rural labor to urban occupations.

Foster's conclusions are still warranted: Present confusion over land use policy results from the conjunction of advancing technological possibilities with static valuations of appropriate behavior. From Europe came preconceptions that private property and pecuniary accountancy are appropriate in determining land use, while from the American frontier came preconceptions about the appropriateness of rugged individualism and equality. These static preconceptions have given the United States a land policy based on constant physical units, laissez-faire, and speculation. It is to the replacement of these preconceptions and this policy that this early analysis can still contribute.

The point of this essay presented itself while the author was inquiring into the part played by technological change in determining the intensivity

of land use. Everyone seems to recognize that the developmental character of technology has been a factor in determining how intensively land is cultivated. Many writers on agricultural economics state that technological change is *the* determining factor. Most of them make some such statement and then proceed to disregard their brief statement and its implications in their analysis of land problems. This evasion is most easily accomplished by inserting a paragraph, or even a chapter, pointing out the importance of technological change, and then proceeding with the analysis in terms implicating institutional aspects as basic data. "Why call ye me Lord, Lord and do not what I say?"

Failure to keep in mind the distinction between institutional and technological aspects of the problems involved in land use planning has resulted in much confusion. Occasion will arise to point this out as the present consideration proceeds. The total lack of unanimity among agricultural economists as to how land use planning is to be accomplished and, indeed, whether it is efficacious to try it is obvious to anyone who will examine the literature on the subject. This confusion prompted the present writer to examine the points of orientation, the frames of reference, from which the multitude of opinions regarding land use planning are developed. As will be shown, technological situations do not permit promiscuous interpretation or formulation, and so the diversity of opinion must be the result of different *institutional* frames of reference. And institutional frames of reference allow any number of interpretations and presentations, depending on the peculiar bias or taste of the individual analyst. This, too, will be developed more fully as the study progresses.

The first need in land use planning is to find some acceptable and common basis for approaching the issue. This study purports to clarify the problem of determining that basis. The difficulty of this task was not at first clear, but as the work progressed, it became apparent that adequate demonstration would far exceed the delimitations necessarily imposed on the present study. However, it is hoped that this statement will serve the purpose of clarifying the insight of the present writer at least.

#### *Procedure*

Since this study is a consideration of the basis for land use planning, it is proper that some consideration be given to the evolution of the present situation. Probably no situation can be completely understood without some idea of how it came about. This is true particularly of the institutional aspects of economic problems. As R. H. Tawney puts it, "the supreme interest of economic history lies, it seems to me, in the clue it offers

to the development of those dimly conceived presuppositions as to social expediency which influence the actions not only of statesmen, but of humble individuals and classes, and influence, perhaps, most decisively those who are least conscious of any theoretical basis."<sup>1</sup>

The history of land use in the United States is considered first. Space limitations preclude such a history in any detail, but it is hoped that sufficient continuity and substance is maintained for the purpose at hand, which is to furnish some background for a correct apprehension of the present state of affairs in land use and land use planning in the United States.

The present state of practice and analysis is then treated. Confusion will be seen to be the most apparent characteristic of current practice and analysis; this, as has already been indicated, was what prompted the present study. Reasons for the almost completely critical treatment at this point are brought out in subsequent considerations.

Next, the basic principles upon which a logical approach to land use planning may be made are presented. Lack of corroborative authority will be noted, but this lack is not an oversight: There is none to use. A rather wide, if hurried, survey of the literature failed to disclose any coherent treatment of a basis for land use planning not subject to the criticism already leveled at the field as a whole. The point of view presented in this report was developed from oral lectures and from literature outside the field of agricultural economics more than from the strictly pertinent literature. At points, as will be noticed, recourse is taken to totally noneconomic literature for synonymy of viewpoint. This diffuseness of material is a result of the failure of writers on land problems to present an approach that allows logical treatment. Also, the character of the problem under discussion and space limitations necessitate the extensive use of generalizations and illustration rather than detailed consideration and exposition.

### *Background*

Modern commercial agriculture arose with the growth of towns—urbanites must eat. In the cracks and crevices of the European feudal economy, a commercial economy was able to survive, and during the commercial revolution of the fifteenth, sixteenth, and seventeenth centuries, agriculture changed from a self-supporting industry to a profit-making business. Of course, the manorial system suffered no sudden breakdown; its transition toward conformity with the money accountancy covered several centuries and exhibited many stallings and much violence. By the end of the twelfth century, signs of decay were already appearing in some

localities, particularly around the towns and cities. By the time of the Black Death (1348–1350), the system of money rentals and market sales had spread to most of Western Europe and England. Not that it had become the only system, but it had become an accepted system. At the same time, landlords had also “begun to withdraw their demesne lands from the village farm, to consolidate, enclose, and cultivate them in separate ownership.”<sup>2</sup> By the end of the eighteenth century, the enclosure movement was virtually complete. In England, sheep grazed where corn once was grown, and the deserted village was a commonplace.

All this was in violation of the common sense of the time, particularly during the earlier phases of the transition. The struggle often broke out into open revolt, as in northern France in 1358, in England in 1381, and in Germany in 1524–1525.<sup>3</sup> The transition to commercial agriculture was legislated against, lamented in literature, and condemned in the pulpit. Tawney states that the effort to continue the old system “constitutes surely one of the most remarkable attempts to control changing economic conditions by government action which has ever been made.”<sup>4</sup> As we shall see, if he had stated that it was a remarkable attempt to outlaw the consequences of a changing technology, he would have been more to the point.

The early commercialization of agriculture was a result of developments in nonagricultural technologies. Sailing aids such as the compass and astrolabe permitted the commercial revolution to get under way; the development of mechanical techniques in textiles, metallurgy, and power gave the evolution of industry such a spurt that it is called the Industrial Revolution.

Techniques in strictly agricultural pursuits were tardy in their development. It was the publication of Jethro Tull’s book in 1731 that is generally considered the beginning of the scientific movement in agriculture.<sup>5</sup> Those who first followed the indications of Tull and his successors—Lord Townsend, Robert Bakewell, Arthur Young, and others—made fortunes and made inevitable the universal acceptance of the new techniques in cultivation and organization.<sup>6</sup>

Note should be taken here that these changes in technique occurred in a situation in which the land was, and had long been, intensively cultivated. The existence of easily acquired land was not a factor, as it was in the United States during the greater part of its history. Nevertheless, the new technological developments resulted in a reduced intensivity in most European countries, especially in England.

Changes in agriculture are almost always belated; they are usually slow. Many aspects of the manorial system still exist, even the open field with its multitude of scattered strips. Many obligations of the villein to his lord

are still imposed on the tenant. All this persists even at a time when a new burst of scientific advancement threatens to destroy the age to which agriculture has not yet completely adjusted itself.

The short sketch just given indicates the climate of opinion that characterized the settlers of the New World. They came with a long background of pecuniary standards and with property rights a sturdy part of their common sense. These factors were to play their part in shaping the land policy of the United States.

Until about 1900, the most obvious economic fact of American life was the presense of seemingly unlimited and easily attained natural resources. Unexploited land had been a major factor during 150 years of colonial experience and remained a part of the picture more than a century after the attainment of independence.

On the frontier, the manner of life was almost completely different from that in the more settled areas. The individual was a virtually complete economy: he was his own blacksmith, carpenter, tanner, planter, weaver, baker, candlestick maker, and even his own army. His development of such an array of arts was not in the pattern of his inheritance; it was a new way of life that brought forward new attitudes and a new demeanor, that created the frontiersman as a pattern. Of course, there was no such thing as "the frontiersman" in the sense that all who successfully encountered the frontier portrayed the same personality and character. Individuality was perhaps the most striking common characteristic. But the conditions under which people lived necessarily brought forth new mores and folkways. Their range of honesties was different; their attitude toward authority was different; their concepts of fair practice were different; their hospitality was different; even their language became different. In a sense, they created a new civilization and in large part reflected it as individuals. There was no mistaking a frontiersman when he came to town, and yet the most obvious thing about him was his very difference from every other frontiersman and vast difference from the people in the old settled communities. It may be said that a common characteristic of frontiersmen was their belief in a man's right to be different.

This type of man was selected by the run of circumstances to lead America's parade to the west. His concepts set the pattern in each newly settled area. He had to change his techniques as he passed from one type of unsettled region to another,<sup>7</sup> but there was always the golden opportunity offered by free resources until the land of America came under private ownership. This brought him up with a start, as we shall see, and he kicked up quite a racket about it. The frontier has been the physical fact in U.S. history that has given functional reality to that peculiar complex

of ideas and attitudes that are called the *American* when he is spoken of as a type. The frontier gave validity in a real sense to the fundamental ideal of human equality without reference to economic status. In short, the frontier furnished the most basic elements in American conceptuology, including its moral sense.

Coupling the effects of the frontier with the European-inherited attitude toward ownership yields the frame of mind that has shaped the land policy of the United States. When T. E. C. Leslie wrote, in 1888, that American conditions lend themselves well to the idea that there is beneficence in the arrangements of the economic world,<sup>8</sup> he was looking at the country's incomparable development during the period when a frontier held wages to the level that a man could wrest from free resources. Leslie was unaware of the implications of the disappearance of that frontier, in terms of the withdrawal of capitalism's ticket to effectiveness—effectiveness not only of laissez-faire in America, but also of the same order in Europe. For it was the American frontier that absorbed much of the surplus production during the period. This is witnessed by the fact that the United States was the greatest debtor nation in the world at the turn of the twentieth century.

The historians have not yet seemed to realize that if the frontier *was* a dominant factor until 1890 the *absence* of the frontier has been just as dominant *since* 1890. They have accepted the thesis that the frontier shaped American life, but they have not so readily accepted the corollary that the absence of the frontier must change the shape. They have told us that it promoted individualism, stimulated self-reliance, fostered equality and political democracy; they have not told us, at least not emphatically, that the absence of the frontier tends as surely through undernourishment to destroy those things that its existence stimulated. Either historians have claimed too much for the frontier as a cause for what is considered American or they must face now the very difficult task of telling us how we can preserve the frontier virtues and other virtues essential to democracy when there is no frontier.<sup>9</sup>

The disappearance of the frontier was perhaps the most important event in U.S. history. It brought about a reversal of the government's policy of bestowing titles to public lands on anyone who contemplated any enterprise calculated to be of ultimate public benefit; it prompted attention to humus conservation; it forced consideration of the effects of land use on the hydrologic cycle. In short, it forced recognition of the interdependence of the various groups in the nation's economy, that is, it brought into focus the necessity of land use planning.

The government's land policy has always been based on constant physi-

cal units without regard to soil types or the most appropriate use. From the North West Ordinance of 1787 to the Homestead Act of 1862, subsequent military bounties, and so forth, the policy of land disposal has been in terms of so many acres per person. This policy will be seen to have caused many maladjustments and to be causing some confusion in current efforts toward readjustment. The same policy carried over from the government to the speculators who bought large tracts of the North West Territory and to the railroads, which received 129 million acres from the federal government in addition to large tracts from the states (they sold the land to settlers in standard units, usually a quarter of a section). To this day, the fallacy of the standard unit permeates thinking about farming.

It is not necessary, for the purpose at hand, to describe the historical details. Perhaps enough has already been said to give background to a general discussion of the current state of affairs in the analysis of land use planning. But some indication of the technological progress in agricultural pursuits should be helpful in focusing on the present situation.

In 1839, Congress created a small Division of Agriculture and tucked it away in a corner of the Patent Office.<sup>10</sup> During Abraham Lincoln's administration, the Bureau of Agriculture was established, and in 1889 it was expanded into the Department of Agriculture with a cabinet officer at its head. The first agricultural college was established in Michigan in 1857, and the first experiment station in Connecticut during 1875. Since then, the activities purporting to develop agricultural technology have expanded to every part of the nation and offer direct contact and service to every farmer. The Department of Agriculture alone had, in 1932, more than 22,000 employees.<sup>11</sup> All this activity had its results. For example, the average yearly milk production per cow on U.S. dairy farms rose from 1,436 pounds in 1850 to 4,600 pounds in 1927.<sup>12</sup> There are 1.6 million tractors in use in the United States.<sup>13</sup> Each 500,000 tractors can "easily release for other uses land now producing 70,000,000 bushels of grain and 2,500,000 tons of hay as stock feed."<sup>14</sup> It is estimated that now a bushel of wheat can be and is produced with about ten minutes of farm labor.<sup>15</sup> "In 1920 less than 5 percent of the wheat crop was harvested with combines; in 1938 approximately 50 percent of the crop was 'combined.'"<sup>16</sup> This scattered listing could be extended indefinitely. Carl T. Schmidt puts it this way: "In 1787 it took all the food produced by nineteen farmers to feed themselves and one city person. In every year recently, nineteen people on farms have produced enough food for 66 non-farm persons. Here are compressed into a few words the results of a sweeping technological revolution, the contrast between the scythe and the harvester-thresher."<sup>17</sup>

This information may be misleading, as indeed it seems to be to Schmidt himself, in that the farmer in 1787 produced not only food but also most of his nonagricultural consumption. It probably is not true that the farmer produces 425 percent more now than in 1787. Rather, he produces hardly anything but agricultural products. However, the statement does suggest the direction of past development in agriculture. But the indication of increased total efficiency is more a guess than it is statistical analysis because the factor of displaced function and specialization enters in a way that makes accurate calculation impossible with the available data. However, Schmidt estimates that "by 1929 the average farmer and farm laborer produced 150 per cent more than he did in 1870."<sup>18</sup> This seems to the present writer a reasonable estimate. Yet, still another factor enters to disconcert any effort to compare the efficiency of the new mechanized system with the older methods: that is the lack of uniform application of the newer techniques. "The less productive half of the farms reported by the census in 1930 sold only 11 percent of the farm products entering commercial channels in 1929."<sup>19</sup> This would indicate that the difference in efficiency between the old and newer methods is even greater than the figures would indicate.

It is clear that productive efficiency in agriculture, in the technological sense, is increasing and has been increasing all along. This fact is of much importance in considering the approach to land use planning. For if planning is to accomplish its aim, it must allow accommodation to a constantly changing technology and not merely to a new situation. The nature of this aim, or goal, and the character of technological change will be more fully developed in the discussion of the principle of technological determination.

The concepts of property rights, the pecuniary standard brought from Europe, and the concepts of rugged individualism and equality nurtured by the frontier gave the United States a land policy based on constant physical units, laissez-faire, and speculation. It should be noted that all these worked in reasonable harmony as long as there was free or easily attainable land. But with the disappearance of the frontier, equal opportunity and other equality concepts came more and more into conflict with the other items of the American thought pattern. That is, maladjustments arose and demanded attention. The situation required planning, since any attention at all to such matters is an admission that some degree of planning is necessary. The recognized necessity of planning placed in the setting of attitudes and habits of thought already described was bound to produce confusion. It did.



*Present Confusion*

It would be impossible to detail the individual instances of confused thought demonstrated in discussions of the basis for land use planning. The purpose here is to give attention to enough instances to indicate the present state of analysis.

The general pattern of ideas called "agrarianism" has outcroppings in most literature on land use. It is based on the idea of self-sufficiency in each farm unit of family size and ownership. Its ultimate basis is a spiritual one, a longing for the "good old days"; these are far enough removed that their inadequacies can be forgotten, and spiritual values can be attached at will. In fact, the chief advocate of this position, T. J. Cauley, is reduced to stating his solution to the land problem in these terms: "There must be, in effect, a spiritual rebirth of the masses of the people."<sup>20</sup> Of course, it is impossible, even if granted desirable, to return to the self-sufficient homestead. Agrarianism is actually an evasion of the problem. It is beside the point to argue with a tractor. The machine is a physical reality, as are all the engineering, metallurgy, chemistry, and industry it represents. To shout that it *should* not exist will not remove one flake of paint or change in the slightest degree the ratio of expansion of gasoline in combustion. Actually, agrarianism applied to all of agriculture is hardly more than to say "gosh! wasn't it wonderful when Granpa was a boy!" Yet, agrarianism persists as a strong element in land use planning.

The real problem is how to use the soil in terms of the present state of technological development (with allowance for innovation trends in the discernible future) so as to realize the greatest general welfare; it is not the problem of how to regain a frontier economy. Insofar as subsistence farming is a part of the program of readjustment, it is an admission of inability to solve the real problem, or it is an evasion of the problem altogether. Apart from the efficacy of attaining the goal of agrarianism, the goal simply cannot be attained. But it has offered an expedient to meet, in part, the problem of surplus farmers at a time when the traditional absorption of displaced agricultural workers into industry has been disrupted. Some of these workers can be, and have been, placed on subsistence farms, but this is an expedient, not an answer. It simply means the withdrawal of a portion of society into a separate, a nonparticipating, class. No one seriously considers this the answer; it is nothing more than an effort to circumvent a situation which smacks of violence and disruption if unattended. And since no desirable solution could be determined on the basis of current analysis, any expedient would be acceptable, even though

it might render ultimate solution more difficult. Yet, the problem of displaced farmers threatens to become more urgent. "For example, in a study of cotton production in the High Plains cotton area in Texas, it was shown that if all farmers used two-row tractor equipment the land farmed in 1934 could have been operated with only 58 percent of the farmers actually reported by the census of 1935. If all the farmers used four-row equipment, only 33 percent of the farmers reported by the census would have been needed to operate the same area."<sup>21</sup>

Not only has the confusion of thought in regard to land problems resulted in the hunt for expedients and panaceas, but also it has brought about a general "passing the buck" attitude among those in authority and upon whom, consequently, falls most heavily the responsibility for effective attack on the problem. It has become fashionable among those who write and speak on such subjects to blame big industry for the ills of agriculture. Often, this attitude indicates the search for a scapegoat, and such a search is invariably a reflection of confusion, evasion, or possibly facetiousness—and the two latter are most frequently predicated on the first. Big business, particularly those producing farm equipment, has operated on the basis of controlled production, while the farmer "produces as much as he can and sells for whatever he gets."<sup>22</sup> The present [Roosevelt] administration has sought to meet this situation by applying to agriculture the operating principles of the manufacturer. Since the advantages of controlled production are entirely relative, the ultimate outcome of such a policy is obvious. To reap the benefits of controlled production, each industry seeks to create a scarcity of its product as compared to production in the economy as a whole, and in particular as compared to those products which figure as cost in the production of the controlled commodity. Widely applied, this policy would result in a progressive diminution of total production and a consequent reduction in the standard of living for the economy as a whole. And while this impoverishment is progressing, each group can blame the other for the progressively more stringent situation. The present administration seems to be aware of this dilemma, but, because of the absence of an acceptable basis for attacking the problem as a whole, it has applied the expedient just mentioned.

In reality, there is no distinction, in an economic sense, between agricultural production and any other production. They are all phases of the "going concern" which is the economy, all parts of which are interdependent with all the other parts. Land use is one of those parts and cannot be considered separate from the economy as a whole. But this fact does not validate passing the buck to some vague "they." Agriculture is as real a part of the economy as any other part. And it is not a question of whether

its problems *can* be solved; they *must* be solved, however difficult and hopeless they appear. There is nothing to be lost in seeking solutions; there is much to be lost in refusing to consider the problems.

A further instance of confusion in thinking about land problems is the failure to distinguish between their institutional and technological aspects. This confusion is rampant. It might be presumed that since Thorstein Veblen made his plea for logic, in the sense of science, in economic analysis, and since Veblen and subsequent critics have shown conclusively that confusion of institutional and technological factors precludes logical analysis altogether, that analysts charged with correcting maladjustments would be careful of maintaining that distinction. But such is not the case. From the *Report* of the Secretary of Agriculture to the latest textbook, this confusion makes its appearance.

From the institutional standpoint, *any* analysis is possible, and *any* conclusion is possible, and *any* remedial procedure is possible. If an institutional factor be taken as the basic datum, then analysis of the problem becomes mere excuse hunting, and logic plays no part in it. And if logic be dispensed with, then remedies will be adopted on the basis of who makes the loudest noise, and who has the greater political power. In contradistinction, the technological aspects allow no such divergent solutions. An existential fact cannot be argued with, but a status arrangement may be debated into infinity.

Perhaps a few examples will make the matter clearer.

In the *Yearbook* for 1940, the following statement is made: "Since about 100 acres of corn is the minimum for which a farmer can operate a picker economically, expansion of the mechanical pickers is limited."<sup>23</sup> The assumption is that the institutional aspects of ownership resulting in a 100-acre average farm are basic data and are not subject to alteration. This obviously is not the case. Rather, the corn picker is a basic datum—it has certain capacities and limitations, and that is that—no deliberate change of its properties can be accomplished at will. Any change in the picker is the result of solving engineering problems, not the result of a decision to change. The statement should have read that the size of the farm unit must be altered to allow use of the mechanical picker.

Another instance: "Briefly, the job is to make technical progress create and not destroy jobs. . . . When technology retards employment, it becomes a public problem."<sup>24</sup> Here, again, the statement is in reverse. Technology is not the problem; unemployment is the problem. It is inevitable that technological progress destroys jobs, but it is not inevitable that this should create unemployment (as distinguished from leisure). Furthermore, technical progress cannot be *made* to do anything—no fiat of gov-

ernment can change the properties of tungsten steel. But intelligent institutional modification can allow advantages of those properties to be realized in terms of increased technological efficiency.

Another example of the same confusion: "The urgent need is to develop methods of directing technological change into socially desirable paths."<sup>25</sup> The urgent need is to direct social change into paths that will permit us to realize benefits from technological development.

From a popular treatment:

The farmers have demanded, along with the rest of the nation, an income to provide a higher standard of living. In some cases it seems clear that the agricultural and economic system cannot contribute an income of such amount, and that farmers are demanding a higher standard of living than they can afford under the present system which requires from the sale of a single crop sufficient income to support the farmers' families throughout the year and to make payments on land, on automobiles and tractors, and on other expensive farming equipment.<sup>26</sup>

And this comes out at a time when production of every item is curtailed because of institutional obstructions to their distribution. The authors assume that those institutional obstructions are basic data and are not subject, therefore, to modification; they could not possibly think that there is technological inability to produce more "automobiles and tractors and other expensive equipment."

Then there is confusion of a more naïve sort. For example, in the *Report of the Secretary of Agriculture* for 1939, the following statement is found: "Fundamentally, it is an urban problem, because urban industry, by its very nature, is capable of almost limitless expansion, while agricultural production encounters the limitations of the human stomach."<sup>27</sup> But then, in *Technology on the Farm* we find that "it has been estimated that between 14 million and 15 million acres of crop and pasture land, in addition to that used in 1937, would be needed to produce food and feed crops sufficient to supply an adequate diet to the farm population in 8 Southern States."<sup>28</sup> What became of the "limitations of the human stomach"? No, the limitations are not yet reached. The problem is not a result of inability to consume more farm products; rather, it is the inability, because of institutional maladjustment, to secure those products. The trend toward urbanization of surplus farm people is a real one, but it is because of technological developments allowing fewer farmers to operate the land, rather than because of any limit to consumption of agricultural products.

It would seem that enough has been said to indicate the degree of confusion in current literature dealing with land problems. Land use planning is one of those problems, but before it can be resolved, some logical basis

for planning must be comprehended. To use the word *planning* indicates a goal, an aim or objective to be accomplished. To use the word with a disavowal of aim is merely to make nonsense. It is assumed that general welfare is the ultimate objective as, indeed, it is to all economic activities. And to this objective, few, if any, would object. But when it comes to what constitutes "general welfare," much debate may arise. What one holds to be welfare depends on what one conceives to be the nature of "value." Thus, the first step in establishing a logical basis for the approach to land use planning is to clarify the meaning of "welfare" in terms of "value." Accordingly, an effort toward this end is made in the discussion of the principles underlying the approach to land use planning.

### *Principles Applied to Land Use Planning*

#### *Technological Determination*

"If, therefore we credit the spade at all—if we credit science at all—we are bound eventually to be forced to adopt it as our sole standard of truth and criterion of value and to dismiss institutional claims altogether as false and base."<sup>29</sup>

In the previous section it was pointed out that analysis on an institutional basis permits any number of conclusions and any procedure that happens to suit the taste of the individual analyst. To demand that land use planning be approached from the standpoint of institutional ends to be attained or maintained is to preclude altogether any possibility of agreement between even two persons. *Beliefs*, as distinguished from knowledge, are capable of infinite variation, even as regards a single item. In order to maintain anything approaching logic in the scientific sense, the analysis must be made on the basis of existential fact. And existential facts indicate no *ultimate* in terms of a state of affairs. "To the modern scientist the phenomena of growth and change are the most obtrusive and most consequential facts observable in economic life."<sup>30</sup> There is no discernible limit to such change indicated anywhere in human experience.

Only by introducing an occult factor, that is to say a magic factor, can any *ultimate* state of affairs be determined in anything. But it is here that error most easily creeps in. The above statement does not indicate that all truth is relative; quite the contrary. Two groups, each containing three units, make a sum of six units—not sometimes and not from a particular point of measurement, but every time from any and all points of measurement. In this sense, technological sequences are mandatory; they allow no juggling if factual and conceptual subject-matter are to be kept in conju-

gate correspondence.<sup>31</sup> And if concepts and factual subject-matter are not kept in conjugate correspondence, we are off into the magic again, where no correspondence with anything is necessary except the tastes or wishes of the individual. This has characterized economic science from the beginning, but the same could be said of any other science at a similar stage of development. It is said that Galileo suffered official torture because the earth revolves around the sun, and farmers in the United States refused to accept the first iron mouldboard on the plow in the belief that iron poisoned the earth.<sup>32</sup> All along the line, as Thomas Huxley would put it, beautiful theories have been, and are being, destroyed by ugly facts. And insofar as this has occurred, science has displaced, and is displacing, magic.

Economists have been increasingly aware of the futility of any attempt at logical analysis on the basis of a magic, or imaginary, theory of value. From Aristotle to the neoclassicists, the search has been pushed for a theory of value that would permit economic analysis in conjugate correspondence with existential fact. The ancient Greeks sought to analyze their economy in the light of "justice"; the canonists explained economic intercourse on the basis of "God's Will"; the mercantilists used "national honor" as the sum end of economic analysis; physiocratic doctrine explained the "natural order" of the economic world; classical theory showed the working of "human nature" toward the establishment of "natural order"; neoclassical theory explained how "happiness," maximum "utility," and "equilibrium" were attained through the functions of the current economy. But during the time that all this "nonsense" was going on, the economic actuality of making a living was proceeding. Looked at from any angle, this process of making a living is a continuum of existential items (processes and objects), the causal interconnectedness of which is discernible and understandable. There is not *one* imaginary item in the entire continuum—*no* imaginary entity *ever* produced one pin, or dug one potato, or plowed one field, or delivered one letter, or composed one song. The entire process of providing the means for human life and experience is a technological sequence in the sense that it is factual, actual, and subject to human comprehension. Despite this fact, analysts have persisted in imputing magic meanings to the continuum that is the economy.

Suspicion of what has just been said has resulted in a movement toward a totally "empirical" economic analysis disavowing any concept of value whatever. (Note Gustav Cassel's efforts.) This, of course, is nonsense. The very act of analysis, and particularly planning, is admission of the valuating functions. The admission may be tacit, but it is real nevertheless. In

fact, all purposeful human activity is in terms of some estimate of value; the word *purposeful* has meaning only in terms of value. "If you cannot see the moral value of common things, it is not because you are spiritual but because you are bored."<sup>33</sup> No, analysis cannot proceed at all without some conception of value.

Then what is the nature of value? It is to be found in the causal relationships between the items in a continuum. Any item in any causal sequence makes sense, that is, can be handled logically, only in terms of its causal relationships to the other items in the same sequence.<sup>34</sup> We have always functioned on the basis of that concept, but we have been so nearly unconscious of it and its significance that we have allowed the magicians to persuade us that we were really doing something for which there is no referent at all. In any purposeful activity in which people engage, they act in terms of the causal interconnectedness of the items involved in the activity. For example, soldiers may make much display (ritual) of believing in God, but they *keep their powder dry*: if they do not, they cease to be an army; in fact, they are apt to cease to be. For another example, when a surveyor finds his transit out of place, he does not figure in terms of the satisfaction of human "wants"; he thinks in terms of the disruption of a sequence (plotting surface areas), an important item in which is dislocated. And his estimation of the loss is his estimation of the importance the transit plays in that sequence.

Then what is economic value? It has already been pointed out that the economic function is a technological function (not forgetting that ritual is often mistaken for economics). It is the provision of the means of life and experience—it is "making a living." It also has been pointed out that no imaginary, nonreferential concept can possibly enter into the economic function. Then the economic value of any item in the continuum that is the economy is that item's part in facilitating the function of the continuum. And the facilitation is, of necessity, in terms of its causal relationships with the other items in the sequence of which it is a part. Economic value is *technological efficiency*. It is as simple as that, and it cannot be, in any logical sense, anything else. It cannot be, because that is the only verifiable, observable, existential meaning of any item in the economy—*any* economy. It is the only economically *functional* estimation that any human being has *ever* experienced. To impute nonreferential estimations is to go off again into the world of magic. And magic cannot be handled in terms of logic. Economics is discovering the mythical nature of the goblins of its childhood, but goblins have a lamentable habit of reappearing in their accustomed places.

But how does all this apply to land use planning? Land use planning is

one of the items in the continuum that is the present economy, and like any other item its meaning is in terms of its part in facilitating or incrementing technological efficiency. Logical analysis can be made on this basis. It may be said with entire propriety that land use is a function of the state of technological development. It is recognized that institutional obstructions exist and that they enter in a negative sense into the problem. But they offer no basis for a logical approach to the problem; they merely inhibit accommodation of organization and operation to the technological situation. The problem in regard to the institutional obstructions is an educational one, not an economic one in the strict sense. The approach to land use planning must be on the basis of how to attain the greatest summation of economic values, and the summation of values is what is meant by welfare. This objective, welfare, can be attained directly in proportion as the approach to the problem is based on the most efficient land use as determined by the state of technological development.

#### *Recognized Interdependence*

The physical sciences are blessed with facility of application. This is not the case, to as great a degree, in economic inquiry. People will accept physical innovations, a gravity meter or a refrigerator, without requiring to know how it works or why its result is produced. In deliberate economic changes, people require to know the solutions as well as the answers. In fact, the application of economic planning of any sort *means* the operational participation of people, and they cannot engage in economic activity without some comprehension of what they are to do and the purpose for so doing. And, of course, land use planning cannot be applied without the participation of the people whose relationship to the land is thereby affected. Here, again, misunderstanding creeps in easily. It is not meant that the results of economic inquiry must be operative before they can be understood. This would, in view of the previous statement, be a paradox. In all logical inquiry, hypothetical ends-in-view are a requisite. The ends-in-view are the criteria allowing selection of data to be used in resolving a problematic situation. Otherwise, any datum would be as meaningful in reference to a given inquiry as would any other datum. Selection of data is necessary; otherwise, there would be only hodge-podge. It is the ends-in-view that give probability of validity to the usefulness of any particular datum.

Emphasis should be placed here on the fact that the ends-in-view are hypotheses. If they are taken to be the *answer*, then inquiry ceases to be logical; it becomes mere excuse hunting. But the point is that the ends-in-



view are beyond the boundaries of present existential knowledge; they are hypothetical resolutions of problematic situations. Upon resolution, the ends-in-view, insofar as they correspond with the resultant facts, become items of knowledge in the logical sense, that is, in the sense of having meaning in terms of their correlation with other items in the continuum of which they are parts.

Land planning, indeed any economic inquiry, need not deviate from logical inquiry in this regard. It does so only in that, and insofar as, the existential conditions of the problem are not determined. And, of course, "the futility of attempting to solve a problem whose conditions have not been determined is taken for granted."<sup>35</sup> The conditions of the problem of land use planning, as of other economic problems, are comparatively difficult of determination, but that is no excuse for not determining them and resolving them logically. That is the function of economic science.

But after determination of the conditions that constitute the problem, and after logical resolution of the problem in terms of welfare, the application of the solution remains. The application can be initiated by the sovereign, whether the people, as in a democracy, or an individual, as in an autocracy, but the successful operation of the solution necessitates that the people involved understand what is happening and why. The degree to which the people involved in cooperative enterprise such as land use planning will function interrelatedly is determined by the degree of their recognition of interdependence. This is called the principle of recognized interdependence, and in planning land use it should be kept in mind. Successful application is not to be expected if the plan does not stay within the limits of recognized interdependence. It seems to the present writer that Americans are aware of a greater degree of interdependence in regard to land use than the planning authority is willing to take advantage of.

The principle of recognized interdependence is, in a sense, a derivative of the principle of technological determination. It is the "state of the industrial arts" that determines the degree of specialization of which this principle is a function. The degree of specialization in land use has constantly been increasing, and in the discernible future gives promise of continuing the same trend. This means greater interdependence if our theory of welfare in terms of technological efficiency be valid. And this indicates a continuously greater need for logical land use planning. But application of any plan must be within the limits set by recognized interdependencies.

#### *Minimum Dislocation*

The principle of minimum dislocation is correlative with the two al-

ready proposed. At first sight it may appear antithetical to the principle of technological determination, since technological change requires constant accommodation if the greatest aggregate of values is to be realized. However, to minimize the amount of dislocation necessary to realize greater values proffered by technological developments is in complete rapport with the first principle. The principle does not require an absence of dislocation, but rather a *minimum*.

In accommodating organization and procedure to the possibilities offered by technical developments, the difficulties are in overcoming the objections of those whose advantage lies in the present *organization* rather than in production. In fact, if the criterion of general welfare is to be accepted (and it is, universally), overcoming objections by those whose interests lie in scarcity is a necessity. This would seem to be axiomatic if value be regarded as technological efficiency, and it has been demonstrated that value regarded in any other sense does not permit scientific analysis. If we are not to forsake logical analysis and procedure altogether, the individual advantage must yield to the common good.

As a matter of fact, we have always proceeded on the basis of the priority of common interests, but we have let the magicians confuse us with goblins and ritualistic noises.

If the goal of economic efficiency in Agriculture is placed in a setting of national considerations, it becomes a question of seeking the best alternatives that are open to the entire population. . . . because it seems all too clear that conditions are unfavorable for any easy and automatic adjustment to technological change. . . . inevitably the questions are raised:

What can be done to remedy the maladjustments arising from technological change—to cushion as much as possible the adverse effects of such change for the groups bearing the load of adjustment? How can agriculture take care of its population at levels of living desirable from the viewpoint of the general welfare?<sup>36</sup>

The problem is correctly appraised, but the answers subsequently given indicate a reluctance to follow out the implications of the accepted criterion, general welfare, for fear of destroying some of the advantages of individuals having common cause with the maladjustments. "There is danger lest, from love of a theory, a whole series of errors should be forcibly thrust into history."<sup>37</sup> And the "theory" in this instance is nothing more than rationalization of special interests.

In the present state of technological development and the consequent widespread interdependencies, if any planned adjustment is made there must be a commonly accepted agency to make the planning effective. The only agent in modern society that can be empowered with this function is

government. This is a necessity since the adjustments necessary to efficient land use are beyond the power of farmers to effect, even if they all worked in voluntary harmony and cooperation; adjustment must be made in part by groups whose interests are antithetical to efficient land use and who would, therefore, not cooperate.

Mention should be made here of one adjustment constantly necessary to the economy as a whole and to agriculture in particular. That is the adjustment resulting from technological displacement of labor. The number of farmers required to operate any given land area for a specified use is diminishing; in nonagricultural industry, also, it is true that the number of workers required to operate any given natural resource for a specified use is diminishing. It may be argued here that land area is limited and that the character of this area is not subject to as easy modification as is the case with nonagricultural industry. This would be a much stronger argument if there were an indication of a necessity for increased intensity. But such is not the case. As a matter of fact, as the technologies relating to land use develop, there is, in modern times, an indication of the desirability of an increased *extensivity* (Thomas Malthus's law has not operated). Also, the natural resources used in nonagricultural production are subject to no more willful modification than is the surface. Indeed, it would appear that the actual resource (surface) used in agriculture is more subject to ready modification (fertilizing, terracing, and so forth) than is the case with nonagricultural resources. Both are subject to the same technological limitations, and both are functions of the state of technological development.

Closely associated with this argument is the contention that although the limit of consumption of a particular nonagricultural product is as readily attained as in agricultural products, the possibilities of changing the character of industrial products is infinite; hence, absorption of labor by industry from agriculture is without limit in its possibilities. However, the argument is as well stated in reverse. The varieties of agricultural products developed are, and always have been, far more numerous than those actually produced in quantity. The difference between agriculture and industry in terms of possible differentiation in character of product is largely supposititious. Here, again, both agriculture and industry are subject to the same forces and are impelled in the same direction.

This argument is sometimes extended by the statement that industry can accommodate any number of additional workers by reducing hours per worker. Obviously, the same is true of agriculture. There is no reason *in the nature of the employment* for workers in agriculture to work longer hours than workers in any other phase of production.

A further argument looking toward establishing the necessity of absorbing agricultural workers into industry is based on the notion that capital equipment in nonagricultural production is, by its very nature, subject to more variation in amount, structure, and function than is capital equipment in agriculture. If this be true, then it would hold that in the shift of production from one type of capital equipment to others and in the production of new kinds of capital equipment nonagricultural industry would be more capable of absorbing additional workers. This would lend weight to the dictum that "the problem is to revive this transfusion of labor power" from rural to urban occupations.<sup>38</sup> But the variation in amount, structure, and function of capital applied to land is, and always has been, in excess of its actual application. And so it cannot be in the lack of new techniques and capital equipment that land operation and the production of its capital equipment need to release workers to industry.

It is true that the trend has been in the direction of shifting workers from agriculture to industry. But this shift depends on the pattern taken by technological developments, and the pattern of development of technology cannot be predetermined.<sup>39</sup> It is as apt to bring one set of adjustment-requirements as another. It seems to the present writer that industrial developments are currently in the direction of displacing labor more rapidly than in agriculture—and displacing it in the aggregate, not merely in spots. If this opinion holds, then a shift to industry of agricultural workers can be accomplished only by widening still farther the difference in per-worker hours between agriculture and industry. It could be, in fact it may be, that the realization of maximum values will necessitate a shift toward rural occupations with greatly increased leisure and its concomitant, shorter working hours in both industry and agriculture. Of course, it may be otherwise, but it is not at all clear that the great need at present is a transfusion of labor power from rural to urban occupations. It would seem, rather, that the principle of minimum dislocation, as well as the principles of technological determination and of recognized interdependence, requires readjustments in the entire economy toward a more nearly complete realization of the values to be had from a deliberate application of the most efficient organization and techniques.

To apply land use planning to any other end is to relegate it to the status of a tool for special interests. And if value is to be considered in terms of special interests, then there is no point whatever in logical analysis of land use planning or, for that matter, any other planning. But the necessity of planning land use is demonstrated by the existence of persistent maladjustment, and the "common sense" of the day is ready to accept that necessity. It is time that a rational approach to the problem be established.

### Conclusions

The conclusions to be drawn from this study are implicit throughout and are not infrequently stated. No detailed recapitulation is necessary here.

Since Thorstein Veblen "arose and compelled a whole generation of economists to search their hearts lest the truth be not in them," there has been a persistent search by economists for a basis for logical analysis.<sup>40</sup> This resolved at bottom into a search for a theory of value that corresponds to the existential facts in the economy, in any economy. The word *any* is used in view of the commonplace that "fundamental concepts must be independent of economic system."<sup>41</sup> The search has been apparent not only in economics but also in all the arts and sciences. The concept of value proposed here allows logical treatment and is in complete rapport with the run of the facts. Indeed, insistence on looking only at the existential facts is the only requisite basis for correctly discerning the nature of value: This is found to be technological efficiency. That has always been the functional theory, but only recently has it come to be formulated clearly enough to be useful in theoretical analysis.<sup>42</sup>

In applying the theory of value to land use planning, three principles are proposed by the present writer as the basis for an approach to the problem: (1) the principle of technological determination; (2) the principle of recognized interdependence; (3) the principle of minimum dislocation.

The first is the direct application of the theory of value and its concomitant theory of welfare to the problem of land use planning. It seems to this writer that no ulterior meaning can be imputed to the existential facts and still hope for logical analysis, however complex and consistent the internal structure of the analysis or formulation may be. Therefore, this principle is a *sine qua non* of logical economic analysis. It permits no observation beyond the run of the facts and therefore has valid claim to the adjective "scientific."

The second principle is correlative with the first and derived from it. It merely points out the fact that any planning of land use necessarily starts out from "what is" and can be applied successfully in proportion as the persons involved realize the degree of their interdependence in terms of welfare as the objective. This principle, too, holds for all cooperative activity and organization.

The third principle is conceived in terms of the first. It points out that technological efficiency may be violated, in terms of disruption, in deliberate change, that is, planned change, and that therefore planning must take into consideration the means whereby this will be at a minimum. It is possible to miss completely the objective of maximum welfare in terms of

technological efficiency, even when planning for that specific objective, if the principle of minimum dislocation is not correctly observed. All change involves some disruption of function, and so its negative effect on technological efficiency must be held to the minimum in order to realize the greatest aggregate welfare in terms of technological efficiency.

It is realized that land use planning is only one aspect of the problem of realizing the greatest welfare, but it is an important part and one urgently requiring solution. The three principles developed in this study are proposed as a basis for approaching that problem.

### Notes

1. R. H. Tawney, *The Agrarian Problem in the Sixteenth Century* (London: Longmans, Green, 1912), p. viii.
2. Lord Ernle, *English Farming* (London: Longmans, Green, 1927), p. 28.
3. N. S. B. Gras, *A History of Agriculture* (New York: F. S. Crafts, 1925), pp. 105-15.
4. Tawney, *Agrarian Problem*, p. 13.
5. Paul Montoux, *The Industrial Revolution in the Eighteenth Century* (London: Jonathan Cape, 1928), p. 163.
6. Louis W. Moffit, *England on the Eve of the Industrial Revolution* (New York: International Publishers, 1925), p. 8.
7. Walter Prescott Webb, "The Great Plains and the Industrial Revolution," paper read at a conference held at the University of Colorado, 1929, published in *The Trans-Mississippi West* (Boulder: University of Colorado Press, 1930), pp. 309-11.
8. T. E. C. Leslie, *Essays in Political Economy* (Dublin: Hodges, Figgs, 1888), p. 139.
9. Walter Prescott Webb, *Divided We Stand* (New York: Farrar and Reinhardt, 1937), pp. 157-58.
10. Charles A. Beard, *A Century of Progress* (New York: Harper, 1932), p. 131.
11. Ibid.
12. Ibid., p. 135.
13. U.S. Department of Agriculture, *Yearbook*, 1940, p. 513.
14. Ibid., p. 525.
15. Beard, *Progress*, p. 127.
16. *Yearbook*, 1940, p. 515.
17. Carl T. Schmidt, *American Farmers in the World Crisis* (New York: Oxford University Press, 1941), p. 61.
18. Ibid.
19. *Yearbook*, 1940, p. 532.
20. T. J. Cauley, *Agrarianism* (Chapel Hill: University of North Carolina Press, 1935), p. 210.
21. *Report of the Secretary of Agriculture*, 1939, p. 46.

22. Schmidt, *American Farmers*, p. 48.
23. *Yearbook*, 1940, p. 515.
24. *Report of the Secretary of Agriculture*, 1939, p. 47.
25. U.S. Department of Agriculture, *Technology on the Farm* (Washington, D.C.: U.S. Government Printing Office, 1940), p. 5.
26. D. W. Malott and B. F. Martin, *The Agricultural Industries* (New York: McGraw-Hill, 1939), p. 451.
27. *Report of the Secretary of Agriculture*, 1939, p. 47.
28. *Technology on the Farm*, p. 49.
29. C. E. Ayres, "The Gospel of Technology," in *American Philosophy Today and Tomorrow*, edited by H. M. Kallen and Sidney Hook (New York: Lee Furman, 1935), p. 41.
30. Thorstein Veblen, *The Place of Science in Modern Civilisation* (New York: Viking Press, 1919), p. 232.
31. John Dewey, *Logic: The Theory of Inquiry* (New York: Henry Holt, 1938), p. 491.
32. Roger Burlingame, *March of the Iron Men* (New York: Charles Scribner's Sons, 1938), p. 223.
33. Geoffrey Sainsbury, *The Dictatorship of Things* (London: Methuen, 1933), p. 165.
34. Dewey, *Logic*, *passim*, but particularly pp. 485–512.
35. *Ibid.*, pp. 494–95.
36. *Technology on the Farm*, p. 76.
37. Fustel de Coulanges, *The Origin of Property in Land*, trans. by Margaret Ashley (London: Swan Sonnenschein, 1904), p. 152.
38. *Report of the Secretary of Agriculture*, 1939, p. 47.
39. Veblen, *The Place of Science*, *passim*, but particularly pp. 431–56.
40. Paul T. Homan, *Contemporary Economic Thought* (New York: Harper, 1928), p. 107.
41. John Maurice Clark, *Preface to Social Economics* (New York: Farrar and Reinhart, 1936), p. 44.
42. Credit for this formulation belongs primarily to C. E. Ayres and his associates at the University of Texas.