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An Abundance of Land Some Questions of Scale and the Spirit

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An Abundance of Land*

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I. Introduction

Americans are a continental people. Some nations can be classed as maritime, some as insular, others as border lands or buffer states. Examples fitting all of these classifications can be found among the United States, but overall it is the land-mass that dominates our self-perception. It is the theme of this paper that the manner in which that land mass was occupied has left an indelible imprint upon the economy, its institutions, and the value systems that cement the social fabric.

It was settled quickly. That is the most important point. Some individuals born before the Lewis and Clark expedition set out from St. Louis in 1804 were still alive in 1893 when Frederick Jackson Turner proclaimed the closing of the frontier. The scope of the enterprise was gigantic, but the scale of the units in which settlement was accomplished was largely determined by the labor force of the family. In miles the distances were great, and in acre-units the farms were large by old-world standards. With the exception of the cotton South and parts of California, the task was accomplished with decision-units that seldom exceeded the family scale.

These twin dimensions of speed and scale provide the key units in which we can analyze the impact of an abundance of land upon the course of American

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history. In the limits of this short paper it will be possible to explore only a few of the major trends. We can begin with the manner in which the land was surveyed.

II. The Creation of a National Market

Initial plans for the disposition of the public lands assumed that they would be settled in large blocks, with settlement companies taking the lead. Jefferson's original plan of 1784 contemplated survey ahead of settlement, in a grid pattern based on "hundreds" of 10 nautical miles square. As adopted in 1785, this plan was modified to provide for townships six miles square, based on the English statute mile. The early intent was that only townships would be marked in the original survey, leaving to settlement companies the task of marking out the separate square miles or sections, and smaller subdivisions.

This system failed, or more exactly, it was never implemented. Pressure from squatter settlers led to a law in 1800 requiring the sale and hence the survey of public lands in half-sections; in 1805 a land law required subdivision into quarter-sections of 160 acres, and this was later reduced to 80-acre tracts in 1820 and to quarter-quarter sections or 40-acre tracts in 1832. The major settlement of the Mississippi valley and the western lands was thus accomplished under land laws that authorized the survey, at public expense, of units as small as 40 acres. This became the conventional transaction unit.

The primary condition for an efficient market in land was created early in our settlement history. The product was specified, it was divisible, and title was easily and cheaply recorded and transferred. This was without doubt the single most important act of public policy that promoted speedy

settlement. A foundation was laid for early land-based credit, supported with secure titles. A basis was created for the unambiguous specification of tax obligations, which facilitated the financing of public roads and schools from local revenues. Units of local government could be assembled in building-block fashion. In older lands and less systematically surveyed areas, the boundary-line quarrel has been a curse on relations among neighbors. These quarrels were minimal in the public-domain states.

The forty-acre tract has been a remarkably durable transaction unit. In most states it was and is the management unit in forestry, and the base unit in forest taxation. It was the claim-unit in iron-ore mining in the Great Lake states, and remained the trading and tax unit when mining shifted from direct-shipping ores to taconite. It is the base for the determination of riparian rights or for issuing permits for water withdrawal or irrigation in a number of states. In more recent years, it has been the building-block in suburban land sales and housing developments. From Ohio to the Great Plains the texture of the landscape is dominated by the 40-acre grid.

A secure base for credit, a secure base for taxation, a transaction unit that was within the financial reach of all but the poorest settlers -- these were the legacies of the public land survey. It was the forerunner of the standardized package that we recognize today as the symbol of the supermarket.

And a supermarket in land it was. Settlement flowed westward with such speed that there was no opportunity for local and regional markets to establish and solidify positions of trade dominance in farm supplies, consumer goods, or product markets. The land grants to promote railroad building guaranteed a dispersal of land-sales efforts as the railroads sought settlement that would generate the traffic they needed for survival.

The result was a national market, largely created in the thirty years following the end of the Civil War. The ready availability of an abundance of land pulled people across the continent with such speed that business firms were unable to develop the spatial monopolies in market areas that were typical of Europe at the onset of the industrial era.

What makes a nation? The traditional answer has been to define it in political terms. The answer for America is not without a political content but it is above all an economic answer, defined as a market area. Available land generated the traffic that supported the transport network that tied widely scattered regions into a single market. This has surely been one of the major dimensions of success in American land policy.

III. The Resultant Enterprise Mix

The business structure that emerged was geared to the supply of a wide mixture of both producer and consumer goods. It was balanced in a rough way, in that it was not focused narrowly on the processing of raw materials, or on the merchandising of imported goods. It was from the beginning a structure of manufacturing, processing and trade, with no predominant sector. Railroad building required the products of heavy industry, while small farms and small towns provided a market for hardware, building materials, textiles and the products of light industry.

To understand the significance of this industrial mix it is instructive to look at the USSR. Heavy industry predominates. There is no ready supply of small tools. Tractors are available, but nails and wire are all but unobtainable. Building materials are scarce, and light industrial products in chronic short supply. To take another example, the new-world economies in Latin America were dominated in their period of early settlement by a

trading mentality. In broad terms, their business communities were not production-oriented. Their market areas were the environs of seaboard cities, with a taste for imported goods. Emerging industrial activity was focused on raw material processing. The supply of manufactured goods to internal markets was not rewarding because the size of the market was small. Venezuela, one of the most industrialized of Latin American countries and with the highest per capita income in Latin America, reckoned as late as the 1950's that only one-third of its population was included in the market economy. This situation reflects a failure of land policy, and not industrial policy. It is this aspect of retarded growth that was avoided in the United States and major credit goes to the policies by which we disposed of our abundant land.

IV. The Impact on Labor Markets

The enterprise mix was important in another sense. There was not only a balance between heavy and light industry, or producer goods and consumer goods manufacture, there was also a durable balance between agriculture and industry. The possibility of land ownership on a wide scale had one overwhelming advantage: It made agriculture respectable, and above all, in the eyes of agriculturalists. Farming as an occupation was not demeaning. One result was that the food supply kept pace with urban and industrial growth. A rough balance was maintained between the technology that released labor from farming and the technology that provided alternative non-farm jobs.

When industrialization did begin in earnest, it did so without the debilitating influence of an agricultural labor surplus. In a relevant intercontinental sense, labor never was cheap in America. As one British industrialist remarked at the end of the Nineteenth Century, when speaking

of Britain, "men have been cheaper than machines. Today ... men are getting dear and machines are getting cheap. The whip of dear labour was applied to the backs of American manufacturers years ago."^{1/}

The impact of an abundance of land was great on labor markets, as well as on the markets for goods and commodities. In American historiography, this impact has typically been analyzed in terms of the safety-valve theory that traces from the work of Frederick Jackson Turner. According to that theory, the agrarian frontier maintained relatively high industrial wage levels by providing a safety valve where protest and discontent could be vented, and where surplus labor could be drained off from any Eastern markets that showed evidences of labor redundancy.

It is my view that this interpretation of our land settlement history has been inverted. It was not as safety valve but as stockpile that the continental population of small farms had its greatest impact on labor markets. The abundance of land held labor on the farms until it was needed in industry. The truly remarkable feature of the American transition to an industrial state was not that labor could not be kept on the farm. It was rather that labor stayed on the farm as long into the industrial era as it did. The really massive exodus of labor from U.S. agriculture occurred after 1950. There was never a wave of dispossessed or redundant rural labor in America to compare with that experienced in Scotland, Ireland or the English midlands in the early decades of the industrial revolution.

Widespread land ownership led not only to rapid settlement but it raised the opportunity wage rate that farmers had to be offered before they would

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Andrew Shonfeld, "A Question of Upbringing", The Observer (London), August 5, 1962.

leave farming. The full impact of the abundance of land on labor markets in the U.S. came in the twentieth century. It involved agriculture's ability to hold management and labor in farming after 1870 at a stage of industrial development when expanding non-farm employment opportunities might have impaired our ability to develop agriculture to its full capacity. The peak labor input into American agriculture occurred in the early 1920's. It was 24 billion man-hours in 1920. In 1975 it was one-fifth of the 1920 level, and 80 percent of the decline had occurred after 1944.

When the exodus of farm labor did occur, it involved a significant proportion of workers who were familiar with machinery, were oriented to a commercial mode of life, and possessed a work ethic that made them valuable additions to the industrial labor force. This was a major legacy of our land policies and settlement history.

V. Dimensions of Equity at the Land Frontier

We did not avoid jealousy or envy in our internal development because of our abundance of land, but these traits did not dominate political ideologies. Those whose lives were touched most directly by this abundance were singularly free of any consciousness of class, in its European or Marxist dimensions. Their political reactions were often erratic and sometimes violent, but they were dedicated to making the system work, seldom to its destruction. Up to this generation, the radical tradition in American agriculture has combined protest with property.

There was a large measure of horizontal equity at the frontier of agricultural settlement. People with similar abilities could be seen to have roughly comparable opportunities. The rigors of frontier life and the commonality of tasks in an economy of survival led to an avoidance of that most

corrosive aspect of inequality -- the unequal treatment of equals, whether measured in terms of age, education, skill, or dedication of purpose. This existence of a rough measure of economic justice in terms of horizontal equity was a base that could support a substantial degree of tolerance for extreme violations in vertical equity, or the gap between the incomes of the rich and the poor.

A European visitor to America once remarked that his first reactions (male, of course) were that our young girls looked so mature and our old women looked so young. If he had looked more closely at the fabric of rural society in the Midwest and West, he might have added that the poor behaved as if they were going to be rich, and the rich embraced their wealth with the ardor and abandon of a sailor with a Saturday night pass. There were no great and durable land-based fortunes in America created out of agricultural land. In this dimension the U.S. joins Canada, Norway, Finland and Switzerland as the only presently developed countries to enter the industrial era free of the burden of an agrarian aristocracy with a disproportionate capacity to create new wealth, or to dissipate it.

An optimum condition for capital formation was generated. In an agrarian society characterized by large land holdings it is often not true that savings equal investment. If by savings we mean "a surplus", then in some cultures and societies that surplus has entered the consumption stream and has not supported new capital. "Savings equal consumption" would be a more descriptive equation to use in analyzing the ante-bellum American South, the export-oriented agrarian societies of Latin America, or some of today's newly independent nations.

A legacy of the presence of an abundance of land was that it fostered horizontal equity on a scale that reduced the sting of vertical inequity. It

created political tolerance for the disparity in income distribution that is an essential part of the process of rapid capital formation in any economic system. The task of creating farms out of this abundance of land demonstrated the purposes of investment and formation of capital in terms that were understood at all income levels. A cynic might conclude that it kept the natives quiet while the economic chieftans extracted a surplus for capital investment. A more perceptive interpretation is to point out that our abundance of land was no bundle of bones thrown to yelping dogs to keep them quiet, but an exercise in do-it-yourself capital formation that was educational in the most profound sense of that term.

VI. The Rewards of a Capacity to Fail

One aspect of this abundance of land gives rise to a seeming paradox. The widespread availability of land generated the evolution of a system that sought to increase the supply of land through productivity increases based on human intellectual achievement. This was a response to a challenge but it should not be interpreted as confirmation of the aphorism that necessity is the mother of invention. There is a very poor correlation between the truly necessitous and intellectual achievements that enhance the value of human labor.

The very abundance of space, and the challenge it presented to those who would convert it to agricultural use, created a structure of rewards that stimulated innovation, creative adaptation and continuing experimentation. It provided the "soft landing" in case of failure that was sufficient to stimulate risk-taking on the scale required.

A distinguishing feature of the history of American land settlement is that for three hundred years ending about 1930 the abundance of the land

base reduced the cost of failure. Not the risk of failure, which was great, but its cost in real terms. If you went broke, you could go somewhere else and start over. If you went far enough West, there were valleys that were gardens. The response to failure was to push on, as well as to turn back. This led to a gigantic system of experimentation in farm development that enables us to describe the settlement history of America as a system of replicated test plots on a continental scale. The Land Grant Colleges and the Agricultural Experiment Stations, of which we sing so proudly, are an institutionalized and systematized version of a process that speeds constructive learning by a system of controlled failures. In the history of land settlement failure was not new. What was new was an abundance of land that permitted application of the lessons learned from failure within a single human lifespan. Those who experimented could fail, and survive to try again.

The land was often abused in the process. In the transitional zone between the humid mid-West and the Great Plains, two generations were required to unlearn the folk-ways of a European agricultural heritage that was unsuited to a semi-arid region. The resultant dust-storms of the 1930's are a blot on the pages of our agricultural history.

In the Lake States, and later in the far West, timber-harvesting was wasteful, much land was cleared that should have remained in forests, and the ecologic damage took at least a half-century to repair.

In historical perspective, the damage diminishes in importance. The destruction of a stock of capital is not necessarily bad. The crucial determinant is not that the forests were cut. The key question is: What was done with the capital thus created? In the case of timber, enormous amounts of capital were created quickly. Railroads were built, homes and farms constructed,

towns sprang up. In continental terms the timber was not wasted. The continent was settled, the investment in buildings required for the transition from crop farming to animal agriculture was made possible, and a national market was created. These are no minor achievements. In retrospect, we can condemn the heedless abandon with which they were executed. The cost was great, but the benefits were even greater.

VII. International Impacts of an Abundance of Land

We have dealt to this point with the domestic consequences of abundant land but this leaves an important part of the story untold. The international dimension is not less important and its impact was not fully manifest until after the Second World War. It began a century ago, with an influx of cheap grain into Europe following the railroad building era that resumed in the United States at the end of the Civil War. Agricultural policies in England, Sweden, Denmark, Germany and France after about 1870 were to a major degree a reaction to the shifting ratio of prices between imported and domestic grains. In England and in Denmark this shift reenforced a movement toward free trade. In Sweden, Germany and France it strengthened the arguments of those who urged protectionist policies. After 1880, the additional appearance of cheap grain from Australia and Russia on the European market provided the clinching argument in France for adoption of the Méline tariff in 1892, setting France irreversibly on a protectionist course that persists to the present day.

After 1945, cheap North American grain had an unanticipated impact on the industrial development of Germany and Japan. With their protectionist policies destroyed by defeat in war, the plentiful supply of U.S. and Canadian grain and U.S. soybeans gave Germany and Japan the assured food supply needed to underwrite their rapid postwar recovery.

Since the dawn of the industrial era the key to rapid industrial advance has been the availability of a relatively cheap food supply. Until the 1950's this was obtained by Great Britain from North America and the colonies, and by France from Africa. The absence of comparable sources provided Hitler with supporting arguments for his push to the East, and Japan with incentives for its military and economic penetration in Manchuria, Korea, and Taiwan. It is ironic that defeat in war was the key to alternative supplies, underwritten by the abundance and productivity of North American land.

The dramatic grain imports by the Soviet Union since 1972 provide decisive evidence of the importance of food in industrial development strategy. The division of labor among the developed countries of the world has been dominated to the present day by the availability of North American food surpluses. The "soft landing" in case of failure that abundant land provided pioneering American farmers in the Nineteenth Century has been extended in the past three decades to cover the entire trading world. Not the least of this world's worries today is provided by the nagging question: Has the validity of this insurance policy expired? From whence will come the cheap food to underwrite the development of the less-developed world?

VIII. Urban Illusions of Abundant Land

Threats to the continued availability of an agricultural surplus in the United States do not arise from any likely deterioration in land quality or productivity. Neither is there a threat from the rapid expansion of our cities, if measured on a continental scale and in acres only. But there is a threat to specific types of agricultural land use, posed by unconstrained urban growth in areas with unique soil and climatic endowments. The Pacific

Coast states and Hawaii provide extreme examples of the near-irreversible loss of lands of this quality.

On a larger scale, it is increasingly difficult to make a functional distinction between urban and rural land uses in the midwest heartland of American agriculture. In the urban-industrial area traced by an arc that envelopes Duluth, Omaha, Kansas City, St. Louis, Cincinnati, and Pittsburgh the farm and the city interact with each other so powerfully that it must be treated as one large urban impact area. The nature of this impact has changed dramatically in the last three decades.

The most powerful change agent has been the interstate highway system. The funds to finance this system come primarily from taxes on motor fuel and tires. The revenue is a function of distance traveled. We spend the proceeds to link cities, and increasingly to save travel time and relieve congestion around cities. With distance only in the revenue function and distance plus time in the expenditure function, we have created a money-pump. The effect has been to generate windfall capital gains for landowners at the urban fringe, and to subsidize the suburbs.

Unrestricted urban sprawl has been subsidized in other ways as well. Housing finance has favored the single-family detached house. Income tax policy has discriminated against high-density rental housing by generous allowances for deductibility of property taxes and interest on borrowed money. Lower interest rates for the finance of public facilities have been available through tax-exempt municipal bonds to the municipalities that would bond themselves. These are clustered disproportionately in the suburbs. By using average-cost instead of marginal-cost pricing for the extension of public utilities, rate-payers in established urban areas are forced to subsidize new high-cost hook-ups at the urban fringe.

In these and other less obvious ways we have encouraged a lavish use of urban land, by subsidizing a demand for space. The abundance of our land base has fostered an illusion that we can ignore urban encroachments on agricultural land.

The test of this encroachment is not properly measured in acres. The decisive impact is not in terms of acres lost to farming but rather in terms of the growing urban dominance in decisions regarding land use. The zone of urban disturbance in agriculture is many times greater than the zone of urban occupancy of the land. It is this conflict between incompatible land uses that creates the most urgent demand for reformed land policies in years ahead.

IX. The Threat of Alienation

If we look forward to the year 2000, which I remind you involves the foresight that would have been required in 1950 to anticipate the world of 1975, we can suggest some probable conflicts that will reform our attitudes toward land. One possibility is that American agriculture in the final quarter of the 20th Century will present us with a sharp confrontation between the goals of full employment and efficiency in resource use. It is customary to present major policy choices as conflicts between efficiency and equity. This is the language in which the conflict between labor and capital is often couched. The more realistic confrontation may emerge between the goals of full employment and efficiency. Historically, the substitution of capital for labor and the retirement of jobs requiring manual labor has been one of the most prominent features of U.S. agriculture. Substitution of this type has been the goal of most of our farm technology and much of our agricultural research. At the same time, we have elevated full employment to the status

of a sacred goal. In all walks of life, in all social strata, in all ethnic and religious groups, there is agreement that full employment is a proper goal.

There is a fundamental conflict between the goals of destroying jobs in agriculture and implementing full employment. This is a confrontation that cuts through the whole economy. It is not confined to agriculture, but it may be more prominent in agriculture because the reversal may be more dramatic if it comes. I represent an agricultural experiment station and a profession of agricultural economists whose focus has been almost exclusively on the reduction of labor inputs in farming. We have not questioned the rightness of the goal of destroying jobs in farming as a measure of progress.

We have now reached a stage in our history when we have to face the fact that a job in agriculture is in no sense inferior. Value added per worker in agriculture is higher than in many non-farm occupations. The social attributes of agricultural employment compare favorably with almost all other occupations. It is possible to stockpile the temporarily unemployed or the under-employed in agriculture at lower social and economic cost than in almost any other sector of the economy. In these and many other ways we have reason to reexamine the assumption that it is good to destroy jobs in agriculture. An employment policy that is more even-handed than has been the case in the past seems to be one of the requirements for the next 25 years.

This could be associated with a rediscovery of an old truth in a new garment. It has been customary in rural circles, and sometimes politically rewarding, to talk about the preservation of the family farm. A new terminology is needed. We need to discover the fact that the classic example of the worker-managed firm in an industrial society has been the American family farm. One of the great policy problems facing industry is to devise effective

plans to permit workers to share in management decisions. We already have that structure in agriculture and we may be about to lose it.

The structural renovation of agriculture should be freed from the dead-weight baggage represented by an emotional attachment to a 19th Century concept of the family farm. It should be enlivened by a realization that this is the original, most successful form of worker-management in industry that we know. We have not had to struggle with problems of anomie and worker alienation in agriculture. We have had other problems, but alienation has generally not been characteristic of farming. It could arise. Hired farm labor has been increasing as a fraction of total labor inputs in agriculture for more than twenty years. As we turn from family labor to hired labor we can expect agriculture to face the same problem that industry now faces: How to relate the well being of the worker and the well being of the firm in a functional fashion that will enable workers to feel that they are a part of the firm, even though they have been divorced from ownership of the capital and tools with which they work.

X. The Threat of Bureaucratized Senescence

There is an off-farm dimension of problems of size and scale that will also become important in the next quarter century. Farm cooperatives have reflected the structure of the agricultural industry in which there were many small, worker-managed firms. They could join together in some form and support cooperatives, non-governmental local farm organizations, and a wide variety of professional and para-political associations. A significant amount of capital could be mobilized by relatively small fees and dues, or small withholdings and retentions from the marketing stream. It was realistic to say that these firms and these organizations were owned or controlled by

their members. We now have organizations in the service of supply to agriculture, in the marketing of agricultural products, and in the professional representation of agriculture that are nominally owned or controlled by their members but that in fact are not. The possibility of alienation in the marketing system or in the professional organizations serving agriculture is at least as great as it is in the work place on the farm. A number of firms and organizations are now so large, so remote and so bureaucratized that it is very difficult for the individual to identify with them, whether they be a private firm, or a cooperative. They share in common the problems of remoteness, an information flow that is hierarchical in nature, loss of quality in information, and ordinary bureaucratic lag that prevents optimum decision making. We have never had to reckon in American agriculture with the possibility that it would exhibit the senescence associated with the railroads, the steel industry, or more recently, the automobile business. We now must reckon with this prospect.

A large population of small firms and the fact that they could fail at low social costs meant that there was a continued process of sifting, winnowing and weeding out in agriculture. The fewer the firms, the less efficient is this weeding out process, and the greater the opportunity for bureaucratized management to entrench itself in power. This has been characteristic of every large organizational structure, and it could happen in agriculture. This was never a possibility before.

The first signs of this bureaucratic rigidity are already apparent. We have a dairy marketing cooperative in mid-America today that attempted to buy a milk-price increase with political contributions. The annual meeting of this cooperative was held in Minneapolis a few months ago and

no farmer members denounced the management. No one rose up on the floor of the meeting to call management to account. This exhibits the classic inability of large professional organizations to purge themselves. Their capacity for internal censure is weak, whether they are doctors, lawyers, accountants or, we must now regretfully add, farm cooperatives. This is new in the history of American agriculture. Farming has been the text-book example of atomistic competition. We must now face a future in which the size of firms and potentials for monopoly power in some dimensions of agriculture invite an application of the Anti-Trust laws.

XI. Do We Need A Land Ethic?

One reaction to the destructive creativity of our period of rapid settlement has been to point to the need for a land ethic. In a widely quoted study, Fred Bosselman and David Callies stress the recent change in emphasis from land as a commodity to land as a resource.^{2/} It is both, as they rightly point out. But this play on words obscures more than it reveals. The implication is apparently that land as a resource should not be traded, or dealt with in the market place. This seems to be the only interpretation that gives sense to the distinction.

It is more appropriate to turn the argument around. There is evidence from our courts, our legislatures, and our credit system that land has not been treated as just another commodity. It has not been regulated in interstate commerce until quite recently. Transactions in land are not subject to review by price-setting and rate-making bodies, as are the prices of

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Fred Bosselman and David Callies, The Quiet Revolution in Land Use Control, Council on Environmental Quality, Washington, D.C., 1971, p. 315.

other commodities that have a high component of public utility. It has not been possible to transfer use rights or ownership rights in land with the same freedom and efficiency that is possible with other tangible evidences of wealth.

Many cultures have sanctified land. Even in nominally monotheistic cultures it has often contributed an element of pantheism that in an extreme form can legitimately be called land worship. The remarkable feature of the settlement history of North America is that this land worship was constrained. Land was desired, but it was not sanctified. Instead of arguing for an ethic that would freeze land into uses deemed appropriate by this generation, it is more persuasive to argue that land should be treated more like a commodity, not less. It should be subject to the entire range of regulations, controls, review, and specification that are required in a market economy for the efficient functioning of markets.^{3/}

It is not that we lack a land ethic. It is rather that we have not divested ourselves of a now outmoded land ethic. Our Anglo-Saxon attitudes and land laws evolved to protect land users when there were no stable governments, no accessible systems of justice, inadequate modes of transport and marketing, and no functional systems of welfare other than the one provided by land ownership.

Nazi Germany had a land ethic. Marxism provides a variation that is less racist but no less rigid. Tribal societies are retarded by land ethics that are major barriers to the recognition of their human potential. What we now need to do is to demythologize land. The call for a land ethic is a call for worship at the feet of a false god.

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This point of view is persuasively argued by Richard F. Babcock, "On Land-Use Policy", Planning, The ASPO Magazine, June 1975, pp. 12-18.

XII. The True Measure of Resource Abundance

Surrounded by a world of science, we seem to be increasingly the victims of reasoning based on symbols. Surely one of the least helpful of these symbols has been the notion of "spaceship earth". The implication is one of totality, finiteness, and limits. In interpreting the symbol, we have forgotten Howard Odum's warning that we cannot **separate** the conceptual quartet of man and land, time and space.

We cannot define space without a concept of time. We cannot define land independently of man. In appraising our resource base, we are dealing with economic variables. There is no resource until one is recognized by man. Its quantity cannot be measured, except in terms of the use to which it is put. These uses, in turn, are a function of possibilities of substitution, rates of recovery, costs of transport, efficiency in conversion, and consumer tastes. These change, and the available stock of resources changes with them.

A stock of resources is thus not a physical quantity. The stock is created by man, in that it cannot be said to exist in economic terms until he can use it. We are unable to define a stock or supply of resources, except in terms of man's intelligence and skill. This intelligence and these skills are not finite. And therefore our stock of resources is not finite. A resource, in this view, is a cultural achievement, a unit of thought. The key is the potential for substitution.

It is in this sense that the concept of "spaceship earth" has had a perverse influence. It has hardened the idea that we live on a finite planet, and are in danger of exhausting its resources.

From this finite assumption we derive many of our basic philosophical and religious precepts. It is the basis for the concept of limited good,

on which so much of current political policy is based. If you get more, then I must be satisfied with less. If I am to prosper, I must do so at the expense of someone else. If the developing nations are to overcome their poverty, the developed nations must consume less. If there are to be resources for our grandchildren, we must cut back on our rate of use in this generation. As a policy for survival, we must **stop** growth, and strive for a stable state. We are victims of the "end of the frontier" psychosis. Our abundance of land has betrayed us.

But there is a sense in which our stock of resources is limited. We can put a stop to intellectual growth. We can reach levels of over-population that destroy social and political organization. We can have levels of congestion and overcrowding that cause us to "bite each others tails", as pigs do in close confinement.

In these ways we can limit or destroy our stock of resources. The surest way to do this is to destroy intellectual freedom in our universities and schools. This is where resources are created. And this is why the ultimate measure of our stock of resources for the future is to be found in our cultural commitment, in our social stability, and in our ability to live at peace with our fellow men.

It is a tragic betrayal of our inheritance to mistake the thing for the substance. What should we preserve but the spirit? This is the lesson taught us by our abundance of land.