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Arctic National Wildlife Refuge: a Casualty of Leasing Law or Candidate For Privatization?

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ABSTRACT

Should the Arctic National Wildlife Refuge (ANWR) be used to drill for oil, or should this type of economic development be forbidden, in favor of protecting environmental amenities? In economics, this is a classical question of the allocation of resources, and we propose to answer it in a similar manner in this case, even though such reasoning is not typical of debates in this field. We answer the ANWR challenge with arguments favoring solutions emerging from private property arrangements, and provide an illustrative example of markets at work. We take neither side, but urge that the free enterprise system be allowed to address the issue. It is our claim that this is a superior system, as entrepreneurs who make mistakes suffer economic penalties, and this feedback mechanism is either entirely missing in political and bureaucratic institutions, or at the very least greatly attenuated there.

Key words: Arctic National Wildlife Refuge; Bidding; Conflict resolution; Existence value; Free market environmentalism; JEL classification: K32; Markets; N5; P14; Private property.

INTRODUCTION

The government has been withholding opportunities for private owners to allocate resources efficiently and effectively by enacting legislation that allows continuous bureaucratic control over valuable resources. The Arctic National Wildlife Refuge

(ANWR) in Alaska is a poignant example of how the government has restricted the market, and indirectly consumers as a whole,[1] in deciding how natural resources are to be used. Individual buyers and sellers in the marketplace are not given the chance to decide resource allocation in this case. Instead, the ownership remains in the hands of bureaucrats and the choice of how to use the resources is left to the skewed political process of special interest groups and special interest political agendas.

Arctic National Wildlife Range (http://pubs.usgs.gov/fs/fs-0028-01/fs-0028-01.htm) was created in the 1960s and designated as government owned property "for the purpose of preserving unique wildlife, wilderness and recreational values" (http://www.r7.fws.gov/nwr/arctic/purposes.html). The Alaska National Interests Conservation Act (ANILCA) of 1980 followed, which enlarged government ownership to 100 million acres. Nineteen million of those acres comprise the Arctic National Wildlife Refuge. We focus on this area of land, and specifically the 1.5 million acre coastal plain called Area 1002, for two reasons—wildlife and oil.

Drilling for oil in ANWR is supported by those who feel strongly about decreasing domestic dependence on foreign energy sources. With the war in Iraq, and the overall political volatility in the Middle East, the major supplier of the world's oil, it is important for the U.S to consider expanding domestic production.[2] In addition, the infrastructure needed to transport the oil to U.S. markets is already in place in the nearby Prudhoe Bay. This area has already been open to leased oil drilling, and much has been learned about how to minimize the risks associated with recovering oil in the Arctic (Lee, 2001, 217).

On the other hand, ANWR is considered by anti market environmentalists to be as valuable pristine, untouched wilderness. Both the scenic landscapes and the wildlife within the area have "existence value" of their own (Anderson, 2002, 1), it is claimed. Drilling for oil is not worth disrupting the ecosystem contained within ANWR, especially because the amount of oil is uncertain, and any mistake made in the process is seen by socialist environmentalists as unacceptable. These left-wing supporters think that forcing conservation measures on individuals is the only way to accomplish their goals.

ENVIRONMENTAL SOCIALISM

"Existence value" is defined as "the value that individuals may attach to the mere knowledge of the existence of something, as opposed to having direct use of that thing" (http://economics.about.com/library/glossary/bldef-existence-value.htm).

"Existence value" compounds the difficulties of calculation pointed out by the Austrians in the socialist calculation debate (Anderson, 2002, 2; Ebeling, 1993; Hayek, 1948; Herbener, 1996; Hoff, 1981; Horwitz, 1996; Keizer, 1987, 1997;

[1] This is because the businessmen are far more beholden to the dollar vote of the citizens than are the politicians and bureaucrats to the political voters. The former occurs every day, on numerous occasions; the latter, once every four years, assuming George Bush does not "postpone" them. The dollar vote may be focused narrowly, on a blue tie, or a paper clip. In the ballot box, one must vote for Bush or Kerry, even if neither is fully satisfactory.

[2] A current illustration of this can be seen in Newsweek, November 11, 2002, pp. 26–30.

Kirzner, 1988; Klein, 1996; Lavoie, 1981, 1985; Lewin, 1998; Pasour, 1983; Rothbard, 1971, 1976; Salerno, 1990, 1995; Steele, 1981, 1992). For here, it is not a "mere" matter of determining which is more valuable, say, steel in cars or in tractors; or, to keep closer to our present concerns, caribou or oil pipelines. With full private property rights, markets solve such problems based on private property and profits and losses every day. But "existence value," by its very nature, is not amenable, even in principle, to any such solution. For in all these other cases, the interests of the owners of one good (steel cars, caribou) may be set against those of the other (steel tractors, oil pipelines) and the presumption is that the one set of owners able to outbid the other for the scarce resource will determine maximum value usage. However, in the case of "existence value," there are by definition no two sets of owners, and scarce resources to be allocated between them. Rather, according to the advocates of this curious doctrine, anyone and everyone, without exception, property owners and non-property owners, are somehow, magically, allowed to attain for themselves the right to determine land usage.

A rational allocation of resources is based upon people bidding for things like steel tractors and oil pipelines, and their owners, attempting to profit maximize, selling or renting them to the highest bidders, ceteris paribus. In that way, we may expect that the market will always and everywhere tend in the direction of allocating resources in accordance with the wishes of all system participants. But it is quite another matter when one of the resources to be allocated is not *owned* by anyone; where all people may in effect claim property rights; e.g., assert the right to make decisions as to the "existence value" of land they had not purchased, nor homesteaded. Then, all bets are off and the economy is if at sea without a rudder. For one thing, different people may have opposite "existence values" concerning the same resource. To watermelon[3] environmentalists, the ANWR may be a pristine wilderness, deserving of protection at pretty much all and any costs. To others, this territory might seem a vast waste, fit only for paving over and thus bringing into economic civilization. Who is to choose, given that there are no owners?[4] For another something akin to this sort of voting, economic democracy, as it were, was already tried, in the U.S.S.R. and Eastern Europe. There, it was judged a gigantic failure. What is the case, then, for employing such a model in the "land of the free, home of the brave?" This is not to say, of course, that political democracy was prevalent in these polities. Nothing could be further from the truth. However, democratic rule over industry is *economically* indistinguishable from the Soviet central planning. The only difference is the size of the central planning board. In one case, at least theoretically, it is the entire country; in the other, it is limited to a small oligarchy. But as far as prices, profits and losses, private property are concerned, the be all and end all of rational economics, they are all absent, equally absent, in both cases.[5]

[3] Red on the inside, green on the outside.

[4] It might be claimed that the appropriate owner is the U.S. government, and that these decisions ought to be made, in a democracy, by majority vote. But by what right does this organization claim ownership of the land? Certainly not by homesteading (Block, 1990; Locke, 1948; Rothbard, 1973, 32), for it is stipulated that at least so far, no one has mixed his labor with this particular land.

[5] For additional critiques of the doctrine of "existence value" see Nelson, 1997; Rosenthal and Nelson, 1992.

The argument for conservation or drilling can only be rationally decided in the context of private ownership. The government currently owns the land that is being disputed. However, as we have seen, this is a recipe for, at best, centralized socialist planning. As a result, the best use of ANWR simply cannot be determined because accurate economic calculation can only occur if the property is privately owned. Without a profit and loss system, and private property, there is no sure way to identify whether the benefits of drilling for oil outweigh that of the wildlife and landscape. Assertions of "existence value," however, can be used to justify (or nullify) anything without providing a mechanism by which the claims can be substantiated.[6]

The best course of action regarding oil vs. caribou is difficult to determine because it involves subjective values. Some environmentalists subjectively value the scenic landscapes and diverse wildlife. For such people, drilling for oil may be regarded as an ugly distortion to the Arctic environment. Another person looking at the same picture may be impressed with the cooperation between human ingenuity and nature's beauty. Yet others may not care at all about the wildlife, particularly if their job depends on oil exploration and development. Subjective values are easily reflected within a free market system of prices, and allocation of these valuable resources is most efficiently achieved by Adam Smith's "invisible hand."

Mises (1933, 1969) argued that the pricing systems in socialist economies were necessarily deficient because if the government owns the means of production, as our government does in the case of ANWR, than correct pricing of these goods cannot be generated. One of the reasons for this is that goods in the hands of government are merely internal transfers, and not subject to the pricing methods of the market (http://cepa.newschool.edu/het/paretian/social.htm). Anderson and Leal (2001, 77) emphasize the effects of this internal transfers concept in regards to resource allocation within ANWR:

"Recognizing that politics will determine the distribution of values from the energy and environmental resources, both sides will invest time and money lobbying government. But lobbying does not create wealth; it only redistributes it. With many energy resources in the hands of state and federal bureaucrats, the transfer game has become extremely important for both oil companies and environmental groups, which realize that their wealth will be determined by bureaucratic decisions."

Hayek (1945) maintained that the central planning system required calculations that were essentially impossible because they required information that is not attainable by the "public servants." Without an accurately functioning price system, it is simply impossible for any central authority to gather the information which exists only in the minds of millions of market participants. In addition, "the economic incentives provided in a market economy could not be reproduced in a collective system" (http://cepa.newschool.edu/het/paretian/social.htm).

[6]For example, if oil producers claimed "existence value" in pumping oil and conservationists claimed "existence value" in the pristine land, what mechanism do we have to determine who would receive the greatest benefits from the property? How can the merits of these "claims" be determined scientifically? They cannot be. The present authors hereby assert that claims of "existence value" boil down to interpersonal comparisons of utility which are not recognized as valid in economic argumentation (Rothbard, 1997). They are illogical, and cannot be recognized in scientific economic discourse.

To summarize to this point: "existence value" is a will-o-the-wisp. It is not conducive to a bargaining process, to markets, which are the bedrock of our economy. Suppose, we posit it to exist, arguendo. That still does not address the issue of *whose* "existence value." Markets and private property rights, allow for a process of bidding, thereby providing the only means we have to peacefully, and non arbitrarily resolve such conflicts.

GOVERNMENT LEASING VS. OWNERSHIP

One must acknowledge the fact that allocation decisions made within both the government and the market are invariably based on asymmetric information. In 1987 the United States Department of Interior conducted the Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment. This 227-page study is just one of hundreds of similar documents that compiles available information by these "public servants" in order to assist the government bureaucrats in making allocation decisions. Hodel (1987), prefaces this document as follows:

"At that time [during the creation of ANILCA, 1980], the Congress specifically left open the *question of future management* of the 1.5 million acre coastal plain of the 19 million acre Arctic National Wildlife Refuge because of the area's potentially enormous oil and gas resources.... I have selected as my preferred alternative, making available for consideration the entire Arctic Refuge coastal plain for oil and gas *leasing*....The step-by-step environmental planning, review, and evaluation procedures included in a *leasing* program *provide the best opportunity for the Department to decide what areas to lease, based on the most accurate and advanced information available at each step of the leasing process*. Although the exact process depends upon the leasing program established by the Congress..." (http://www.r7.fws.gov/nwr/ arctic/purposes.html) [italics added].

This document is the government's means of handling asymmetric information (http://www.economist.com/research/Economics/alphabetic.cfm?TERM=ANTITRUST; http://www.nobel.se/economics/laureates/2001/public.html; http://www.people.virginia.edu/~cah2k/assyy2k.htm). Needless to say, reports of this type are time consuming, costly, and do not account for the subjective costs at hand. As Anderson and Leal (2001, 76) point out, "although experts can assess the time-and-place-specific environmental and technical constraints, all costs ultimately are subjective and depend on the values that individuals place on resources." Within the market, any changes in the asymmetric information relevant to particular decisions (such as the use of ANWR) are quickly incorporated into the price. The market is much more efficient and capable of handling asymmetric information because prices directly reflect individuals' subjective values.

Hodel (1987) clearly emphasizes that market forces do not allocate ANWR resources. Rather, these decisions are (and will continue to be) riddled with bi-partisan opinions of government representatives far removed from the actual issue and lobbyists who advocate actions for their respective groups. Problems arise since none of these groups have to bear the full costs associated with their choices, always a recipe for disaster. This third party intervention cannot make the best decisions based on "the most accurate and advanced information available" (http://www.r7.fws.gov/nwr/ arctic/purposes.html) because the land in question simply is not private property. When

people make a decision concerning the use of their own property, they take into account many more alternatives than they do when supporting political determinations about the use of property owned by others.

Let us consider the ramifications of a government-leasing program. Whichever group is granted such rights will only be entitled to use that property for a specified number of years—not to own the property. Now, to be sure, there is nothing wrong with a lease. This form of contract appears all throughout modern commercial endeavor. It is imperative, however, that some responsible adult, economically speaking, be the leaseholder, and we have seen that government is constitutionally unable to play any such role. This is especially important in environmental issues, since long term considerations play an important role in this context. No renter of a car concerns himself with an oil change. The detrimental effects of failure to engage in such a procedure will not become apparent until the car lease has long ago expired. Thus, the car rental company must concern itself with such long term planning. If it cannot, there is wastage, precisely what occurs when government gets into the environmental leasing business (Lee, 2001, 218).

It might be argued that government leasing may not be effective if the lessees are subject to a contract for only say, ten years. For this has the potential to minimize the incentives of these particular renters to take into account long-term supply and demand. If an oil company is granted a ten-year lease on a tract of ANWR, who is to say that it will take into account the value of the property after the ten years of oil drilling? This, however, is but a superficial critique of the present policy. For there is nothing wrong, in principle, with the ancient an honorable practice of leasing. If company A owns land, and leases it to B, and if B "runs it into the ground," then A will suffer. The difficulty in the present case is that when government is in charge, if it fails to ensure that the lessee maintains the property in an economical manner, it suffers no financial reverses that will bankrupt it. The state can always make up any such losses through taxation.

When examining the management of ANWR in the case of government leasing versus full private property, we must focus attention on the three essential components of private property rights—that they be

1. Clearly defined.
2. Defendable.
3. Transferable.

The property in question involves not only the surface ownership rights, but that for minerals as well. Currently these are two separate commodities. If one party owns the surface land, another party can own the mineral rights underneath the same land. "[Alaska] state law generally does not allow a surface owner to prevent a mineral rights owner from developing his or her assets" (Snyder and Shaw, 1995, 2). When the Federal Government wants to open a tract of land for leasing, both sides must be allowed to compete in the marketplace for both the surface and mineral property rights. The government currently restricts environmental groups under current leasing practices from even bidding on oil and gas leases—which are contracts conveying the

mineral rights (Anderson and Leal, 2001, 85). If environmentalists want to protect the land by purchasing the rights to it, they must not be restricted to only being able to own surface rights. Thus, it is essential ANWR be well defined in terms of surface and mineral rights. That is, the government must cede to private enterprise not only the land surface, but also the right to dig.[7]

For the most part, the United States judicial system is well established to provide remedies against violations of private property rights. Most infringements on private property by another party, such as trespass, can be successfully resolved in a court of law. The property owner can sue the violator and seek damages for their wrongful actions, and an injunction against further such incursions.

But there are egregious exceptions. Primarily amongst them is government ownership, which does not allow individual users of the land such rights and incentives. In addition, government ownership allows for special interests, such as in case of ANWR now under examination, to prevail in the event of any conflict of interest. Then, too, there is the doctrine of eminent domain, under which the state may seize private property, sometimes merely to transfer it to another private citizen, and either pay nothing at all, or what *it* determines to be "market value" (Epstein, 1985; http://www.mises.org/blog/archives/002009.asp).

Private property arrangements allocate resources efficiently by enabling markets to transmit information about various individuals' subjective valuations of those resources. Asymmetric information is then revealed through prices, and the problems associated with differences in subjective valuations can be mitigated in the market. People exercise more prudence and care when making decisions regarding their own property than when doing so with the property of others. Therefore, successful solutions to issues concerning environmental resource allocation are best achieved under these circumstances, as opposed to government ownership or leasing arrangements. The following illustration provides evidence that private property rights facilitate coordination of interests, which result in mutually advantageous agreements.

THE AUDUBON EXAMPLE

The Audubon Society privately owns and operates the Rainey Wildlife Sanctuary, a 26,000-acre preserve located at the edge of the Intracoastal Waterway and Vermillion Bay in Louisiana. Since the 1950s, the sanctuary has been pumping natural gas from the 37 wells located within the preserved land, and by 1995 had gained more than $25 million in revenues from the recovery of resources (Snyder and Shaw, 1995, 1). Although not usually thought of in these terms, this is a private business. As such, it has incentives to find the balance between conservation and resource development. The Society allows drilling to occur within its sanctuary because it can personally determine the degree of environmentally sound practices used in extracting the natural

[7] This is to be sharply distinguished from the ad coelum doctrine according to which once one owns the land surface, these rights also apply to a decreasing sized cone down the center of the earth, and, indeed, to an increasing sized cone into the heavens (http://www.netvista.net/~hpb/cases/alevizo1.html; http://www.straightdope.com/classics/a5_136.html; http://www.mrsc.org/mc/courts/supreme/055wn2d/055wn2d0416.htm). For a critique of this doctrine, see Block (1996) and Block and Block (1998), and also citations on homesteading.

gas, as well as, in good capitalist tradition, benefit from the resulting profits. The revenues gained from cooperation allow the Audubon society to expand their conservation efforts.[8] Defining the property rights of ownership was a major issue with the Audubon Society in the case of the Rainey Sanctuary, as it is with the current leasing practices in the ANWR. The Audubon Society obtained the property through a donation by Grace Rainey Rogers in 1924, at which time she transferred the surface property rights (Snyder and Shaw, 1995, 2). She made the donation under the stipulation that the land was to be used for "wildlife sanctuary only", and therefore any exploration and drilling for natural resources would have violated this condition (Snyder and Shaw, 1995, 1). This did not pose a problem for the Audubon Society at the time because its only incentives were to preserve wildlife. The question of the mineral rights did not come into play for another 20 years.

In 1940, the discovery of natural gas in the area brought about the development of extremely productive well neighboring the Sanctuary. Audubon went back to Grace Rainey Rogers asking for her to allow drilling on Rainey, and in turn she agreed to allow it and share the royalties 50/50 (Snyder and Shaw, 1995, 2). Two different accounts of what happened with the mineral property rights have arisen.

First, the National Audubon Society made an authorized statement in a 1991 World Energy Council Journal article essentially stating that Rogers had not completely transferred the mineral rights. Due to this property rights issue, Audubon was compelled to sign a lease allowing drilling because if they failed to do so, then the party with partial mineral rights could have drilled for oil by any means they chose—potentially in an environmentally unfriendly means (Snyder and Shaw, 1995, 2). Second, these authors uncovered more evidence to suggest that Rogers had *not* retained any mineral rights in the transfer of the property. Instead, the Audubon Society was prevented from drilling due to the "wildlife sanctuary only" stipulation (Snyder and Shaw, 1995, 2). The difference between these two accounts is simply a matter of image for the environmentalists. If you accept the first, the Audubon Society comes across as trying to prevent harmful drilling practices from being forced on the sanctuary by the partial mineral owners[9]. If you accept the second, the Audubon environmentalists are viewed as self-interested individuals looking to maximize the value of their land both environmentally and monetarily.

The Audubon Society takes an anti-drilling position when it comes to ANWR,[10] because if their green views prevail in the political sector, they capture the benefits of preserving a pristine environment with only minimal lobbying costs—far less than what ownership would entail. Audubon does not personally incur the cost of giving up revenues from energy development; rather they are spread over the entire population because it is government owned property. If environmentalist groups were to own

[8] In sharp contrast, when oil or natural gas is found on the property of others, whether private or governmental, the Audubon Society is a staunch opponent of similar development (http://www.audubon.org/).

[9] This is ironic because these partial mineral owners are the ones who donated the land in the first place. The heirs of these questionable rights even went as far as to reduce their percentage of royalties from 50% to 40%. See http://prb.datalane.net/sanctuary.htm and Snyder and Shaw, 1995.

[10] See National Audubon Society Website http://www.audubon.org/

tracts of ANWR (assuming both the surface rights as well as the mineral rights), a replication of the Rainey Sanctuary seems quite likely.

In eleven western states, the U.S. Government owns 265 million acres of land used by some 25,000 ranchers. Jimmy and Frances Goss are just one of these cattle ranching families whose livelihood depends on the cattle ranching business. The Goss's ancestors settled in the area in the 1800s and herded cattle over 100,000 acres of forest and grassland. The government disregarded their homesteading right when the area the family's cows once grazed turned into the Lincoln National Forest. The government now owns this land and charges them to use what under libertarian principle is rightfully theirs (http://www.fs.fed.us/r3/lincoln/).

Thank goodness for the Audubon Society and its Rainey Wildlife Sanctuary. This is a heaven-sent illustration of a rather complex issue. This example is "invaluable to illustrating the fact that there are alternative possibilities which can result in market transactions that are often never considered in bureaucratic and political decision-making. The ANWR debate has been continuously discussed as having only two options, drilling for oil or not drilling in order to preserve the wildlife. Rainey shows how the establishment of property rights can result in a profitable 'compromise' for both parties.[11]

CONCLUSION

What would happen if all of a sudden private property rights enlightenment took over in Washington DC? Legislation would be enacted to open ANWR to an auction of private bidders. The two main groups, oil companies and environmentalist groups, would eventually be given the chance to bid against each other in an attempt to purchase the property rights of both the surface and mineral rights that are the most valuable to each interest. In the political arena, any government decision favors one group at the expense of another, and thus there is always a win / lose or zero sum game situation. Privatization always results in a win / win or positive sum game situation due to the nature of voluntary trade. It moreover has the possibility of producing a symbiotic relationship between environmental concerns and oil resource recovery as the Audubon Society example illustrates.

REFERENCES

Anderson, Terry L. and Leal, Donald R. (2001). *Free Market Environmentalism*. Revised Edition. Palgrave Publishers Ltd. New York, NY.

Anderson, William L. (2002). "ANWR and Private Property." http://www.mises.org/fullstory.asp?control=941.com.

Block, Walter. (1990). "Earning Happiness Through Homesteading Unowned Land: a comment on 'Buying Misery with Federal Land' by Richard Stroup," *Journal of Social Political and Economic Studies*, Vol. 15, No. 2, Summer, pp. 237–253.

Block, Walter and Matthew Block. (1996). "Roads, Bridges, Sunlight and Private Property Rights," *Journal Des Economistes Et Des Etudes Humaines*, Vol. VII, No. 2/3, June–September, pp. 351–362; http://141.164.133.3/faculty/Block/Blockarticles/roads1_vol7.htm

[11]This is a quote from an unusually insightful referee of This Journal, in response to an earlier version of this paper.

Block, Walter. (1998). "Roads, Bridges, Sunlight and Private Property: Reply to Gordon Tullock," *Journal des Economistes et des Etudes Humaines*, Vol. 8, No. 2/3, June–September, pp. 315–326; http://141.164.133.3/faculty/Block/Blockarticles/roads2_vol8.htm.

Ebeling, Richard M. (1993). "Economic Calculation Under Socialism: Ludwig von Mises and His Predecessors," in Jeffrey Herbener, ed., *The Meaning of Ludwig von Mises*, Norwell, MA: Kluwer Academic Press, pp. 56–101.

Epstein, Richard A. (1985). *Takings: Private Property and the Power of Eminent Domain*, Harvard University Press, Cambridge, Massachusetts and London, England.

Hayek, F. A. (1945). "The Use of Knowledge in Society." *American Economic Review*. Vol. 35 No. 4: 519–530.

Hayek, F. A. (1948). "Socialist Calculation I, II, & III," *Individualism and Economic Order*, Chicago: University of Chicago Press.

Herbener, Jeffrey M. (1996). "Calculation and the Question of Mathematics," *Review of Austrian Economics*, 9 (1), pp. 151–162.

History of Economic Thought. Economics New School. "The Socialist Calculation Debate" http://cepa.newschool.edu/het/paretian/social.htm 10/25/02.

Hodel, Donald Paul. (1987). United States Department of the Interior. Arctic National Wildlife Refuge, Alaska, Coastal Plain Resource Assessment: Report and Recommendation to the Congress of the United States Final Legislative Environmental Impact Statement, April.

Hoff, Trygve J. B. (1981). *Economic Calculation in a Socialist Society*, Indianapolis: Liberty Press.

Horwitz, Steven. (1996). "Money, Money Prices, and the Socialist Calculation Debates." *Advances in Austrian Economics*, Vol. 3, pp. 59–77.

Keizer, William. (1987). "Two Forgotten Articles by Ludwig von Mises on the Rationality of Socialist Economic Calculation," *Review of Austrian Economics*, 1, pp. 109–122.

Keizer, Willem. (1997). "Schumpeter's Walrasian Stand in the Socialist Calculation Debate". In Austrian Economics in Debate, edited by Willem Keizer, Bert Riben and Rudy Van Zijp. London: Routledge.

Kirzner, Israel M. (1988). "The Economic Calculation Debate: Lessons for Austrians," *Review of Austrian Economics*, 2, pp. 1–18.

Klein, Peter G. (1996). "Economic Calculation and the Limits of Organization" *Review of Austrian Economics*, 9 (2), pp. 3–28.

Lavoie, Don. (1985). *Rivalry and Central Planning: The Socialist Calculation Debate Reconsidered*, New York: Cambridge University Press.

Lavoie, Don. (1981). "A Critique of the Standard Account of the Socialist Calculation Debate," *The Journal of Libertarian Studies,* Vol. V, No. 1, Winter, pp. 41–88.

Lee, Dwight R. (2001). "To Drill or Not to Drill: Let the Environmentalists Decide". *The Independent Review*, Volume VI, Number 2, Fall, Issue Number 1086–1653; pp. 217–226.

Lewin, Peter. (1998). "The Firm, Money and Economic Calculation," *American Journal of Economics and Sociology*, October.

Locke, John. (1948). *An Essay Concerning the True Origin, Extent and End of Civil Government*, in E. Barker, ed., *Social Contract*, New York: Oxford University Press, pp. 17–18.

Mises, Ludwig von. (1975) (1933). "Economic Calculation in the Socialist Commonwealth," in Hayek, F. A., ed., *Collectivist Economic Planning*, Clifton, N.J.: Kelley.

Mises, Ludwig von. (1981) (1969). *Socialism*, Indianapolis: Liberty Fund National Audubon Society: www.audubon.org.

Nelson, Robert H. (1997). "Does 'Existence Value' Exist? Environmental Economics Encroaches on Religion." *The Independent Review*. Vol. I, No.4, Spring, pp. 499–521.

Pasour, Jr., E. C. (1983). "Land-Use Planning: Implications of the Economic Calculation Debate," *The Journal of Libertarian Studies*, Vol. 7, No. 1, Spring, pp. 127–139.

Rosenthal, D. H. and R. H. Nelson. (1992). "Why existence value should not be used in cost-benefit analysis." *Journal of Policy Analysis and Management*. 11:1; pp. 116–122; http://www.osti.gov/energycitations/product.biblio.jsp?osti_id=6657978.

Rothbard, Murray N. (1971). "Lange, Mises and Praxeology: The Retreat from Marxism." *Toward Liberty*. Vol. II, Menlo Park, CA: Institute for Humane Studies, pp. 307–321. Reprinted in *The Logic of Action One: Method, Money, and the Austrian School*. Glos, UK: Edward Elgar Publishing Ltd., 1997, pp. 384–396.

Rothbard, Murray N. (1973). *For a New Liberty*, Macmillan, New York.

Rothbard, Murray N. (1976). "Ludwig von Mises and Economic Calculation Under Socialism," Moss, Laurence S., ed., *The Economics of Ludwig von Mises*, Kansas City: Sheed & Ward, pp. 67–77.

Rothbard, Murray N. (1982). "Law, Property Rights, and Air Pollution," *Cato Journal*, Vol. 2, No. 1, Spring; reprinted in *Economics and the Environment: A Reconciliation*, Walter Block, ed., Vancouver: The Fraser Institute, 1990. http://www.mises.org/rothbard/lawproperty.pdf

Murray N. Rothbard. (1997) (1956). "Toward a Reconstruction of Utility and Welfare Economics." reprinted in "The Logic of Action" Vol. I. Lyme, NH: Edward Elgar. pp. 225–227.

Salerno, Joseph. (1990). "Postscript: Why A Socialist Economy is 'Impossible,'" in *Ludwig von Mises, Economic Calculation in the Socialist Commonwealth*, Auburn, AL: Mises Institute, pp. 51–71.

Salerno, Joseph. (1995). "A Final Word: Calculation, Knowledge and Appraisement," *Review of Austrian Economics*, Vol. 9, No. 1, pp. 141–142; http://www.mises.org/journals/rae/pdf/rae9_1_8.pdf.

Snyder, Pamela and Jane Shaw. 1995. "PC Oil Drilling in a Wildlife Refuge." *Wall Street Journal,* September, 7.

Steele, David Ramsay. (1992). *From Marx to Mises: Post Capitalist Society and the Challenge of Economic Calculation*, La Salle, IL: Open Court.

Steele, David Ramsay. (1981). "Posing the Problem: The Impossibility of Economic Calculation Under Socialism," *The Journal of Libertarian Studies*, Vol. V, No. 1, Winter, pp. 7–22.

United States Fish and Wildlife Service. (2002). Arctic National Wildlife Refuge. "Purposes of the Arctic National Wildlife Refuge." October 2. http://www.r7.fws.gov/nwr/arctic/purposes.html.