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Nature's Law: The Evolutionary Origin of Property Rights

Kathryn Loncarich*

I. Introduction

Alice Walton isn't like the rest of us. The daughter of Walmart founder Sam Walton spent more than \$20 million on art in a Sotheby's auction by telephone in a single day, all while riding a three-year-old gelding in preparation to compete in the National Cutting Horse Association Futurity.¹ During her struggles to quit smoking, rather than buying packages of Nicorette or hypnotist sessions, Ms. Walton purchased Alfred Maur and Tom Wesselmann smoking-inspired works of art.²

In one of the thousands of stores that have financed Alice Walton's \$33.9 billion net worth,³ Lisa worked behind the deli counter.⁴ After two years of service and one raise, she made \$9.10 an hour, \$13,000 a year. "I don't have underwear without

*Harvard Law School, J.D.; University of Iowa, B.A. I would like to thank the clinical faculty at the University of Baltimore School of Law, particularly Michele Estrin Gilman, Leigh Goodmark, Daniel Hatcher, Ben Barros, Margaret Johnson, and Keith Hirokawa for their thoughtful feedback and advice on this piece. I also received valuable feedback from participants at the Albany Law School Scholarship and Teaching Development Workshop, the Clinical Law Review Writing Workshop, and a Works-in-Progress presentation at the American Association of Law Schools Conference in Los Angeles, California. I am also grateful for the research assistance of Hannah Levin and Katie Walsh.

1. Rebecca Mead, *Alice's Wonderland: A Walmart Heiress Builds a Museum in the Ozarks*, NEW YORKER, June 27, 2011, at 28-29. Ms. Walton placed nineteenth in the competition, winning a cash prize of almost \$13,000. *Id.*

2. *Id.* at 33.

3. *Bloomberg's Billionaires Index*, BLOOMBERG, <http://www.bloomberg.com/billionaires/> (last visited Feb. 1, 2014).

4. Alice Hines & Christina Wilkie, *Walmart's Internal Compensation Documents Reveal Systematic Limit on Advancement*, HUFFINGTON POST (Nov. 16, 2012), http://www.huffingtonpost.com/2012/11/16/walmarts-internal-compensation-plan_n_2145086.html.

holes in them,” Lisa said. “Everyone at work wears T-shirts that are threadbare. I have just enough to eat and get gas to make it to work for the next two weeks.”⁵ Seven months pregnant with no health insurance, Lisa was forced to file for bankruptcy.⁶

The disparity of wealth in the United States continues to widen. Currently, the wealthiest 1% take a quarter of the nation’s income and control 40% of its wealth,⁷ while over forty-six million Americans live at or below the poverty level.⁸ With rising food prices, an increasingly competitive rental housing market, and stagnating wages, more and more Americans are struggling to afford basic life necessities.

Despite this growing disparity, the American property

5. Hines & Wilkie, *supra* note 4.

6. *Id.* If Lisa could afford to travel to Bentonville, Arkansas, she would be able to visit the Crystal Bridges Museum of American Art; admission is free thanks to Wal-Mart’s sponsorship. *FAQ*, CRYSTAL BRIDGES AM. ART MUSEUM, <http://crystalbridges.org/About/FAQ> (last visited Feb. 1, 2014). Walmart has recently acknowledged that the wages it has been paying its employees are far from adequate by increasing wages for entry-level employees to \$9 per hour, which will increase to \$10 per hour in 2016. Managers likewise enjoyed a modest wage increase to \$13 per hour, which will increase to \$15 per hour in 2016. See Doug McMillon, *In Letter to Associates, Walmart CEO Doug McMillon Announces Higher Pay*, WALMART (Feb. 19, 2015), <http://blog.walmart.com/in-letter-to-associates-walmart-ceo-doug-mcmillon-announces-higher-pay>. These modest pay raises, however, fall far short of providing Walmart employees with a living wage. Prior to these increased wages, the federal government paid Walmart employees approximately \$6.2 billion a year in public subsidies, such as Medicaid, food stamps, energy assistance, and child care support. Even with the new wage increases, entry-level employees working full time with two or more members in their household will continue to qualify for these taxpayer-funded programs. AMERICANS FOR TAX FAIRNESS, *THE WALMART TAX SUBSIDY: WALMART’S WAGE HIKE TO \$10/HOUR STILL REQUIRES LARGE TAXPAYER SUBSIDIES*, AMERICANS FOR TAX FAIRNESS (2014), *available at* <http://www.americansfortaxfairness.org/files/Taxpayers-and-Walmart-ATF.pdf>. The inadequacy of the Walmart pay raise is exacerbated in urban areas that have increased costs of living. For example, a living wage for a single parent of one child in Baltimore Maryland working full time is \$22.88/hour, in Chicago is \$20.86, and in New York City is \$24.69. See *Poverty in America: The Living Wage Calculator*, MIT, <http://livingwage.mit.edu/> (last visited May 5, 2015).

7. Joseph Stiglitz, *Of the 1%, by the 1%, for the 1%*, VANITY FAIR (May 2011), <http://www.vanityfair.com/society/features/2011/05/top-one-percent-201105>.

8. CARMEN DENAVAS-WALT ET AL., U.S. CENSUS BUREAU, *INCOME, POVERTY, AND HEALTH INSURANCE COVERAGE IN THE UNITED STATES: 2011* 13 (2012).

system has failed to respond adequately to the needs of the poor and middle-class. Property owners enjoy an almost-unrestrained right to do what they please with their property, including rights to prevent others from entering or using their property. While property scholars have argued that this near-absolute right to exclude is essential to our property system, they have failed to adequately analyze the origin of this right.

Much of our modern understanding of property may be attributed to evolution. Deference to ownership—including strong rights to exclude and exclusive use—is not limited to humans, but displayed in a wide array of animals. While animals are often in competition with each other for food, shelter, and access to mates, many species respect a prior possessor's right to exclusive access to these valuable resources. Animals in competition for resources will not seriously challenge a prior possessor's right to these resources, even if such resources directly impact the competitor's fitness. Failure to abide by these ownership rules can lead to grave consequences, including physical injury and even death.

In his essay, "Evolutionary Theory and the Origin of Property Rights," James Krier explores whether property was formed through human innovation or evolutionary processes. Using evolutionary biology and game theory, he concludes that property likely developed through a combination of evolution and human design and set forth an outline for a theory on the evolution of property.⁹

Krier hypothesizes that property rights emerged in our biological ancestors as a result of evolutionary forces. He reasons that because humans only began to develop the capacity for language and abstract thinking approximately 100,000 years ago, "property rights first emerged among early humans as a product of defense to possession, rather than as a product of design, simply because early humans probably lacked the intellectual equipment essential to the design process."¹⁰ During most of the last 100,000 years, when humans lived as hunter-gatherers, they obtained private property rights in food, tools, weapons, and habitation as an unintended consequence, rather

9. See generally James E. Krier, *Evolutionary Theory and the Origin of Property Rights*, 95 CORNELL L. REV. 139 (2009).

10. Krier, *supra* note 9, at 157.

than a product of, conscious design. Land and its resources, however, continued to be held in common.¹¹

Krier surmises that it was only with the rise in agriculture that humans began to consciously determine how to treat property. When agriculture was developed approximately 10,000 years ago, the status of land “eventually changed from communal to individual ownership.”¹² Increased farming caused people to become less nomadic and settle the land. With more permanent settlement, populations grew, small communities formed, and these communities established governing bodies to overcome problems that typically arise with communal land: shirking and consumption.¹³ This development, according to Krier, was a product of human design, rather than evolutionary forces.¹⁴ Over the years, these small communities gave way to organized nation states and eventually to our modern-day world with its complex property regimes.

This article contributes to the outline of the origin of property rights set forth by Professor Krier, by more fully analyzing the role of evolutionary biology in the development of property rights. This article focuses on the pre-political formation of property ownership and the initial formation of concepts of property and ownership. Expanding on Krier’s analysis, this article considers the implications of this evolutionary foundation on our modern property regime, particularly given the growing chasm between the wealthy on one side and the poor and middle-class on the other.

Part II discusses the growing disparity of wealth in America and our property system’s failure to respond to this inequity. While current debates among property scholars have attempted to address concerns of inequality, Part III discusses how scholars have inadequately analyzed the origin of the rights that accompany ownership. Part IV explores the evolution of property rights in nature. The property rights displayed by animals in the wild mirror many of our common law property rules, and Part V argues that our common law property system is based on the same unconscious evolutionary strategy that

11. *Id.* at 158.

12. *Id.*

13. *Id.* at 159.

14. *Id.*

causes the deference to ownership that is displayed in animal behavior. Part VI discusses what this evolutionary foundation to our default property rules means for our modern property regime.

II. Property's Modern-Day Problems

American property law protects strong ownership rights that significantly disadvantage the poor and middle-class, particularly in light of the ever-growing disparity of wealth in our country. The basis for our conception of property is based in large part on nineteenth-century Anglo-American common law. At the core of property, many have argued, is the right to exclude.¹⁵ While the right to exclude is not absolute, the common law only recognizes very limited exceptions.¹⁶ Even though there have unquestionably been changes to our property system

15. Thomas W. Merrill & Henry E. Smith, *What Happened to Property in Law and Economics?*, 111 YALE L.J. 357, 387 (2001). Most recently, information theorists, including Thomas Merrill and Henry Smith, have argued that the right to exclusion is essential to property. For information theorists, our property system is based on a need for information. Unlike other areas of the law, property rights are *in rem*, held against the entire world, thus “property rights must be communicated to wide a disparate group of potential violators.” *Id.* A strong right to exclude others from property efficiently communicates to everyone in the rest of the world that they must stay out. “Property presents a simple message to the outside world. . . . the dutyholder only needs to know that he does not own the asset in order to know that he must keep out. This keeps informational demands on the dutyholder to a minimum.” Henry E. Smith, *The Language of Property: Form, Context, and Audience*, 55 STAN. L. REV. 1105, 1147 (2003). The idea of possession being fundamental to a concept of property, however, is not new. In the eighteenth century, Blackstone famously characterized property as the “sole and despotic dominion which one man claims and exercises over the external things of the world, in total exclusion of the right of any other individual in the universe.” 2 WILLIAM BLACKSTONE, COMMENTARIES *2. *But see* Carol M. Rose, *Canons of Property Talk, or, Blackstone’s Anxiety*, 108 YALE L.J. 601, 603 (1998) (Blackstone “was thoroughly aware of . . . pervasive and serious qualifications on exclusive dominion.”); David B. Schorr, *How Blackstone Became a Blackstonian*, 10 THEORETICAL INQUIRIES L. 103, 105 (2009) (characterizing the association of Blackstone with “exclusive-dominion view” as “perverse”).

16. Gregory S. Alexander, *The Social-Obligation Norm in American Property Law*, 94 CORNELL L. REV. 745, 747 (2009) (citing RESTATEMENT (SECOND) OF TORTS § 204 (1965)) [hereinafter *The Social-Obligation Norm*]. One exception to the right to exclude that Alexander points out is the common law requirement that property owners allow police onto their property to make an arrest or prevent a crime from occurring. *Id.*

over the past two centuries, these changes have fallen far short of revolutionizing our property system, despite the changing needs and growing complexities of society.¹⁷ This part explores the struggles faced by the poor and middle-class and how our property system has failed protect their interests.

A. *The Great Divergence*

Since the 1970s, the gap between the wealthiest Americans and everyone else has continued to widen. The “Great Divergence”—as economists have labeled this period¹⁸—has been a period of prosperity for the wealthiest Americans and a period of decreased wealth for the poor and middle-class. During this period, the majority of Americans have experienced income stagnation, a housing price bubble that burst and resulted in plummeting housing prices, and an increase in the cost of food. The result of this Great Divergence is that the poor and middle-class have been forced to struggle to afford basic life necessities.

1. Wages

Despite the economic growth that occurred in the late-1980s and late-1990s, the vast majority of income gains went to the richest Americans.¹⁹ In the 1970’s, the wealthiest 10% of Americans received approximately one-third of the nation’s income, while in 2010, their share rose to almost one-half of the nation’s income.²⁰ Strikingly, the top 1% control approximately

17. See Ezra Rosser, *The Ambition and Transformative Potential of Progressive Property*, 101 CALIF. L. REV. 107, 125 (2013) (characterizing property law as having a “conservative core”).

18. See, e.g., PAUL KRUGMAN, *THE CONSCIENCE OF A LIBERAL* 124 (W. W. Norton & Co. eds. 2007) (Economist and New York Times columnist Paul Krugman has referred to this trend as the “Great Divergence”); see also TIMOTHY NOAH, *THE GREAT DIVERGENCE: AMERICA’S GROWING INEQUALITY CRISIS AND WHAT WE CAN DO ABOUT IT* 4 (2012).

19. Timothy Noah, *The United States of Inequality*, SLATE (Sept. 3, 2010), http://www.slate.com/articles/news_and_politics/the_great_divergence/features/2010/the_united_states_of_inequality/introducing_the_great_divergence.html.

20. See Thomas Piketty & Emmanuel Saez, *Top Incomes and the Great Recession: Recent Evolutions and Policy Implications* (Nov. 8-9, 2012), at 20-21, figs. 1A & 1B (conference draft), available at

24% of the nation's income.²¹ The middle-class, however, saw virtually no income growth. The average income of the bottom 90% of Americans has grown only 1% (adjusted for inflation) since 1980.²² The poor have fared no better during this time. The real value of the federal minimum wage has dropped over a quarter in value in the last forty years.²³ The effect of the Great Divergence on income inequality has been potent. As economists Thomas Piketty and Emmanuel Saez have stated:

[T]he orders of magnitude are truly enormous. More than 15% of US national income were shifted from the bottom 90% to the top 10% in the US over the past 30 years. In effect, the top 1% alone has absorbed almost 60% of aggregate US income growth between 1976 and 2007.²⁴

<http://www.imf.org/external/np/res/seminars/2012/arc/pdf/PS.pdf> (last visited Feb. 8, 2015). In 2007, the percentage of total income going to the top 10% peaked at 50% and then declined slightly by 2010 to 48%. *Id.*

21. *See id.* Some have calculated that the top 1% only control 20% of the nation's income, a slightly lower, but still striking figure. *Id.* Some have argued that the richest 1% control as much as 24% of the total income. *See* Noah, *supra* note 19.

22. Jan Diehm & Katy Hall, *Inequality in U.S. Is Scarily High, Rising*, HUFFINGTON POST (June 12, 2013, 9:49 AM), http://www.huffingtonpost.com/2013/06/12/inequality-us-_n_3421381.html (citing David Cay Johnston, *9 Things the Rich Don't Want You to Know About Taxes*, WILLAMETTE WEEK (April 13, 2011, 12:01 AM), http://wwweek.com/portland/article-17350%20-9_things_the_rich_dont_want_you_to_know_about_taxes.html).

23. CRAIG K. ELWELL & LINDA LEVINE, CONG. RESEARCH SERV., INFLATION AND THE REAL MINIMUM WAGE: A FACT SHEET 2 (June 21, 2013), *available at* <http://www.fas.org/sgp/crs/misc/R42973.pdf> (last visited Feb. 8, 2015). The real value of the minimum wage has dropped 26% in the last four decades. In 1968, the real value of the federal minimum wage was \$10.70, while in 2009 the real value was only \$7.90. Real value reflects the purchasing power to help account for changes in inflation. The real value used here is reflected in May 2013 dollars, using the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W). *Id.* While President Obama has set forth a proposal to raise the minimum wage to \$10.10/hour, this wage is still an inadequate living wage to support a family of four or even a single person in many states. *See* Dr. Amy K. Glasmeier, *Living Wage Calculator*, MIT (Feb. 2, 2014), <http://livingwage.mit.edu/> (last updated Mar. 24, 2014).

24. Piketty & Saez, *supra* note 20, at 3, Table 2 (noting that similar trends are occurring in the United Kingdom and Canada but not in Continental Europe and Japan).

The result of the Great Divergence is that wage earners have been forced to be more productive while making the same or less.²⁵ Moreover, the decline of union membership due to the proliferation of “right to work” laws has left lower- and middle-class workers with little bargaining power over employers to negotiate wages, benefits and hours.²⁶

2. Housing

The stagnation of wages has made it difficult for the poor and middle-class to afford necessities, including housing and food. The rate of homeownership steadily increased until 2007, even as the price of housing skyrocketed from 2001 to 2007.²⁷ The increase in home ownership and home values was unquestionably attributable to the emergence of financial products, like mortgage-backed securities, in the 1990s, which again financially benefited the one-percent. These products allowed investment banks to “legally buy, sell and repackage [mortgages] spawn[ing] a secondary mortgage market that never before existed.”²⁸ During this same time, credit was readily available to homeowners and those looking to purchase new homes. Balloon mortgages were often given to people to purchase houses they simply could not afford under a traditional 15- or 30-year mortgage.²⁹ In addition, these increasing home

25. Susan Fleck et al., *The Compensation-Productivity Gap: A Visual Essay*, MONTHLY LAB. REV. 57 (Jan. 2011), <http://www.bls.gov/opub/mlr/2011/01/art3full.pdf>; *Updated Compensation-Productivity Charts*, U.S. BUREAU OF LABOR STATISTICS, <http://www.bls.gov/lpc/#tables> (last visited Feb. 8, 2015).

26. Union membership has declined by 50% from 1973 (24.0%) to 2012 (11.2%). Twenty-five states have passed “Right to Work” statutes, which prohibit union security agreements that require employees to join or pay fees to the union as a condition of employment.

27. ELWELL & LEVINE, *supra* note 23, at 2. From 1989 to 2001, home ownership rose from 62.8% to 67.7%. Edward N. Wolff, *The Asset Price Melt-Down and the Wealth of the Middle Class*, US2010 PROJECT 2, 3 (May 2013), <http://www.s4.brown.edu/us2010/data/report/report05012013.pdf>. While home prices increased by 19% from 2001 to 2007, home ownership also increased to 68.6%. *Id.*

28. Lydia R. Nussbaum, *ADR's Place in Foreclosure: Remedying the Flaws of a Securitized Housing Market*, 34 CARDOZO L. REV. 1889, 1890 (2013).

29. Wolff, *supra* note 27, at 3. Sub-prime mortgages are now infamous for their exceedingly high interest rates in at the end of a 3, 5, or 7-year period or

values allowed homeowners to refinance their mortgages or obtain second mortgages to extract more equity from their home, leaving them with larger principles on their mortgages.³⁰ As a result of this readily available credit, lower- and middle-class homeowners became highly leveraged against their homes.³¹

The housing bubble burst with the onset of the Great Recession. The median price for existing homes dropped 24% by 2010, and plummeted by over half in Las Vegas, Phoenix, and Miami.³² The widely-held belief that housing prices would increase indefinitely turned out to be a fallacy.

The Great Divergence coupled with the Great Recession has significantly impacted renters as well. With an unstable housing market and more stringent financial qualification requirements to obtain a mortgage, for many people, renting has become more appealing than home ownership. The increased demand in the rental market has brought higher rents and limited the availability of affordable housing for many low-income individuals. Across the country, an individual working a full-time minimum wage job cannot afford the fair market rent of a two-bedroom apartment.³³ The number of individuals living with an extreme rent burden or living in severely inadequate housing has increased by 20%.³⁴ In addition, families have been forced to double-up; the rate of individuals and families living in overcrowded housing rate also significantly increased among natural born United States households from 2.21% in 2005 to 9.83% in 2008.³⁵

balloon payments that were due at the expiration of the loan. *Id.*

30. *Id.*

31. *Id.* “[A]verage mortgage debt per household swelled by a staggering 59% in real terms between 2001 and 2007, and the value of outstanding mortgage loans as a share of total house value rose from 0.334 to 0.349, despite the 19% increase in real housing value.” *Id.*

32. *Id.* at 2-3.

33. See ELINA BRAVVE ET AL., NAT’L LOW INCOME HOUSING COALITION, OUT OF REACH 2012: AMERICA’S FORGOTTEN HOUSING CRISIS 11 (2012), available at <http://nlihc.org/oor/2012> (last visited Feb. 8, 2015). “Affordable housing” is defined as rental value of 30% or less of monthly income. *Id.* at 4.

34. U.S. DEP’T OF HOUS. AND URBAN DEV., OFFICE OF POL’Y DEV. AND RESEARCH, WORST CASE HOUSING NEEDS 2009: REP. TO CONGRESS 1 (Feb. 2011) (defining severe rent burden as a tenant paying more than one-half of his or her monthly income in rent).

35. GARY PAINTER, WHAT HAPPENS TO HOUSEHOLD FORMATION IN A RECESSION, RESEARCH INST. FOR HOUS. AM. & MORTG. BANKERS ASS’N. 26–27

3. Food

Rising food prices have also affected the poor and middle-class. According to the United States Census Bureau, over the past decade, the costs of regular food items increased more rapidly than the rate of inflation.³⁶ The United States government estimates that it costs \$176.60 each week to feed a family of four, amounting to over half of the pre-tax income of a worker making the federal minimum wage of \$7.25 per hour.³⁷ The cost of food is exacerbated for residents of poor neighborhoods, many of whom do not have access to regular grocery stores or fresh fruit and vegetables and are forced to pay premium prices for processed foods at convenience stores and bodegas.³⁸

B. *Property Law's Failure to Respond to Changing Societal Needs*

Despite this growing disparity of wealth, the American property system had done little to protect the interests of the poor and middle-class. This system is largely based on Anglo-American common law that protects near-absolute ownership rights, including the rights to exclude, use, and transfer property.

(April, 2010).

36. See, e.g., U.S. CENSUS BUREAU, STATISTICAL ABSTRACT OF THE UNITED STATES, PRICES: FOOD COST AND PRICES (2012), *available at* http://www.census.gov/compendia/statab/cats/prices/food_cost_and_prices.html (last visited Feb. 10, 2015). For example, in real 2010 dollars (adjusted for inflation), from 2000 to 2010, the price per pound of flour has increased from \$.28 to \$.44; the price per pound of ground beef has increased from \$1.63 to \$2.38; the price of a dozen eggs has increased from \$.96 to \$1.79; and the price per pound of apples has increased from \$.82 to \$1.20. *Id.*

37. *Id.* The number cited is based on 2010 data, which is the most recently available numbers. *Id.* The government also provides a "thrifty" plan for nutritious eating, which is calculated to cost a family of four \$135.60 each week; this amount is equivalent to just under 19 hours of work for a minimum wage worker. *Id.* Given the lack of availability of grocery stores in many low-income areas, however, it is not reasonable to expect people to be able to abide by this plan. *Id.*

38. See ECONOMIC RESEARCH SERVICES (ERS), U.S. DEP'T OF AGRIC., FOOD ACCESS RESEARCH ATLAS (March 1, 2013), <http://www.ers.usda.gov/data-products/food-access-research-atlas.aspx>.

With few exceptions, under current American property law, a person has the right to acquire as much property as he or she can afford. This person may do what he or she likes with this property. One can hoard his money in a bank or donate it entirely to a charity.

While the law protects strong property rights, there are limits. In one's home, an individual may run around naked as long as the curtains are drawn or scramble eggs at two o'clock in the morning while singing the Book of Mormon soundtrack as long as your singing does not generate a complaint from the neighbors. The law of nuisance, which is guided by the common law maxim, *sic utere tuo ut alienum non laedas* (so use your land in such a way as not to injure the land of others), limits what owners may do with their property.³⁹ Likewise, owning property does not insulate property owners from criminal law; property owners may not engage in illegal activity on their property.⁴⁰ For example, a property owner may not run a methamphetamine lab in his or her house. Not only is the activity illegal, but it is also a nuisance because the fumes and risk of explosions endanger the health and safety of one's neighbors.

Ownership also comes with the near-absolute right to exclude. Property rights are *in rem* and thus exercised against the rest of the world. With few exceptions, A has the right to exclude B, C, D, and E (and everyone else) from her property, and B, C, D, and E have duties not to enter A's property uninvited or otherwise risk liability for trespass. A is expected to reciprocate these duties and not enter B, C, D, or E's property unless invited. Similarly, A can exclude B, C, D, and E from his or her stock of food, and B, C, D, and E have a duty not to take A's food or else risk being arrested for theft. A, in turn, owes reciprocal duties with respect to everyone else's food.

These rules work well as long as A, B, C, D, and E have access to adequate shelter, food, and other life necessities. These

39. See G.A.I., *Sic Utere Tuo ut Alienum Non Laedas*, 5 MICH. L. REV. 673 (1907).

40. *The Social-Obligation Norm*, *supra* note 16, at 747. Indeed, as an exception to property owners' right to exclusion, the common law requires property owners to allow police on their premises to conduct an arrest or to prevent illegal activity. *Id.*

rules, however, do not function as well when 46 million Americans are living at or below the federal poverty level, and 20 million Americans are living in extreme poverty, meaning at or below half of the federal poverty level.⁴¹ Without resources to obtain adequate food and shelter, the poorest of our society end up owing duties to everyone else without receiving any meaningful reciprocal rights; this not only deprives the poor of the benefits of our property system, but also prohibits them from lawfully accessing resources necessary to their survival.⁴²

Some may argue that this problem is taken care of by federal safety net programs, such as subsidized housing, the Supplemental Nutrition Assistance Program (SNAP), and Temporary Assistance to Needy Families (TANF), all of which are financed by taxing property owners.⁴³ These programs, however, fail to redistribute wealth adequately and fail to provide sufficient protections for the growing poor in our country. State housing authorities simply do not have the funding to accommodate the ever-growing demand for public and subsidized housing.⁴⁴ Individuals who qualify for these programs are left waiting on years-long wait lists and forced to try to find alternative housing on the open market.⁴⁵ SNAP

41. DENAVAS-WALT ET AL., *supra* note 8, at 13.

42. See Jeremy Waldron, *Community and Property – For Those Who Have Neither*, 10 THEORETICAL INQUIRIES 161, 178 (2009). Some have argued that the law should develop a poverty defense in our law, similar to the defense of poverty in civil and criminal child neglect. See Michele Estrin Gilman, *The Poverty Defense*, 47 U. RICHMOND L. REV. 495 (2013).

43. SNAP is more commonly known as food stamps. During the Clinton Administration, TANF was developed to replace the welfare program known as the Aid to Families with Dependent Children (AFDC), the Jobs Opportunities and Basic Skills Training (JOBS) program, and the Emergency Assistance (EA) program.

44. BRAVVE ET AL., *supra* note 33, at 2-4. In the last fifteen years, the nation has lost 150,000 homes from the available affordable housing stock. Budget cuts continue to constrain the United States Department of Housing and Urban Development from providing additional affordable housing. In fiscal year 2012, HUD's budget was cut by 9%—\$3.7 billion—compared to the previous year. The Public Housing Capital Funding also suffers from funding problems, receiving 8% less in funding in fiscal year 2012, despite an estimate \$25 billion in public housing capital needs. The HOME program also suffered a budget cut of 38% in fiscal year 2012, which is likely to result in 31,000 fewer affordable rental homes. *Id.*

45. *Id.* at 2-4. For example, in Baltimore County, Maryland—a county with no public housing—the wait for a housing voucher is now ten years.

benefits only provide support for food purchases and offers no assistance for other basic life necessities.⁴⁶ Moreover, the TANF program only supplies short-term benefits and beneficiaries must comply with work requirements, which can be difficult for single parents. Under federal law, an individual may receive TANF benefits for a total of five years; however, this time limit may be shortened by states.

C. *Property Scholars' Response*

As debates over the growing disparity of wealth have intensified, property scholars have engaged in their own discussions over what should be the guiding principles of a property system. Central to this debate is the right to exclude.⁴⁷ This part will briefly discuss the debate between information theorists and progressive property scholars.

Information theorists, including Thomas Merrill and Henry Smith, have argued that property law should promote stable rules. Property is a “device” to transmit information. Unlike contractual rights that can be negotiated and tailored to the parties’ specific interests, property rights are *in rem*, good against the rest of the world. Therefore, a standardized set of rights should accompany ownership to serve as a “key shorthand method of delineating rights that saves on the transaction costs of delineating and processing information about rights in terms of uses and users.”⁴⁸ These standardized rights allow non-

46. See STACY DEAN & DOTTIE ROSENBAUM, CTR. ON BUDGET AND POL’Y PRIORITIES, SNAP BENEFITS WILL BE CUT FOR NEARLY ALL PARTICIPANTS IN NOVEMBER 2013 (last revised Aug. 2, 2013, last updated Jan. 9, 2014), available at <http://www.cbpp.org/cms/index.cfm?fa=view&id=3899>. While the 2009 Recovery Act offered a boost to SNAP benefits, this support ended in November 2013, causing nearly all SNAP recipients to lose hundreds of dollars in benefits per year. *Id.*

47. See Rosser, *supra* note 17, at 109 (arguing progressive property scholars’ failure to adequately consider the right to acquire, including “the troubling origins of ownership in the United States” has constrained the progressive vision of property). Indeed, scholars’ focus on the right to exclude has been a source of criticism. “Debates that center on exclusion and force progressives to defend relatively modest assertions, such as those that dominate property law today, limit progressive imagination and ambition.” *Id.*

48. Henry E. Smith, *Self-Help and the Nature of Property*, 1 J.L. ECON. & POL’Y 69, 79 (2005).

owners to efficiently comprehend what duties they owe other property owners. Property thus serves as a “device for coordinating both personal and impersonal interactions over things.”⁴⁹ Based on the *numerus clausus* principle, property is constrained to a limited number of immutable standardized forms.⁵⁰ As part of this “standard package of legal rights” accompanying ownership, the right to exclude “is fundamental to the concept of property.”⁵¹

On the other side, progressive property scholars—including Gregory Alexander, Eduardo Peñalver, and Joseph Singer—argue that the right to exclude need not be central to our property system.⁵² “The core of ownership is more complex than the right to exclude standing alone.”⁵³ Property “implicates

49. Thomas W. Merrill & Henry E. Smith, *The Morality of Property*, 48 WM. & MARY L. REV. 1849, 1850 (2007).

50. Thomas W. Merrill & Henry E. Smith, *The Property/Contract Interface*, 101 COLUM. L. REV. 773, 797 (2001).

51. See, e.g., Merrill & Smith, *supra* note 49, at 1849 (arguing that “the differentiating feature of a system of property—the right of the owner to act as the exclusive gatekeeper of the owned thing—must be regarded as a moral right”); Thomas W. Merrill, *Property and the Right to Exclude*, 77 NEB. L. REV. 730, 731 (1998) (“in demarcating the line between ‘property’ and ‘nonproperty’—or ‘unowned things’ . . . —the right to exclude others is a necessary and sufficient condition of identifying the existence of property”); Henry E. Smith, *Property as the Law of Things*, 125 HARV. L. REV. 1691, 1702 (2012) (“Because it makes sense in modern property systems to delegate to owners a choice from a range of uses and because protection allows for stability, appropriability, facilitation of planning and investment, liberty, and autonomy, we typically start with an exclusion strategy—and that goes not just for private property but for common and public property as well.”); see also *Loretto v. Teleprompter Manhattan CATV Corp.*, 458 U.S. 419, 433 (1982) (quoting *Kaiser Aetna v. United States*, 444 U.S. 164, 176 (1979)). The Supreme Court has upheld the importance of exclusion: “[the] right to exclude [is] ‘one of the most essential sticks in the bundle of rights that are commonly characterized as property.’” *Id.* (quoting *Kaiser Aetna*, 444 U.S. at 176).

52. See Gregory S. Alexander et al., *A Statement of Progressive Property*, 94 CORNELL L. REV. 743, 743 (2009). While Progressive Property scholars note that the right to exclude has been “extremely influential in the discussion of property rights,” it is “inadequate as the sole basis for resolving property conflicts or for designing property institutions.” *Id.*

53. Gregory S. Alexander, Reply, *The Complex Core of Property*, 94 CORNELL L. REV. 1063, 1070 (2009). In addition, Singer has recently argued that the right to exclude should be viewed as a standard, rather than a near-absolute rule. Relying on public accommodations and trespass laws, Singer argues that “[r]ecent changes in legal doctrine have in some cases defined the scope of the right to exclude through standards rather than rules.” Joseph William Singer, *The Rule of Reason in Property Law*, 46 U.C. DAVIS L. REV.

plural and incommensurable values,”⁵⁴ and has the potential—and possibly a tradition—of promoting human flourishing.⁵⁵

Gregory Alexander argues that an underlying social-obligation norm exists in American property law, though it has “never been explicitly recognized as such nor systematically developed.”⁵⁶ This norm, Alexander argues, should be developed and strengthened because it enables “individuals to live lives worthy of human dignity.”⁵⁷ Alexander relies on Aristotelian

1369, 1391 (2013) (arguing standards can be more predictable than rules in property law).

54. Alexander et al., *supra* note 52, at 743. What these values precisely are depends on which theory you are discussing; progressive property scholars have yet to decide on a unified theory.

55. See Eduardo M. Peñalver, *Land Virtues*, 94 CORNELL L. REV. 821, 864 (2009). While this Article will focus solely on Gregory Alexander’s social-obligation norm theory of progressive property law, Eduardo M. Peñalver, Joseph Singer and Jedediah Purdy have also set forth progressive visions of property law. In *Land Virtues*, Peñalver argues that a property owner’s obligations arise from Aristotelian virtues that are “conducive to human flourishing.” *Id.* Land’s memory and our interconnectedness through land use require “balancing an interest in the aggregate welfare or wealth of society with a concern for the full spectrum of the other human goods that land-use decision implicate.” *Id.* at 867-68. Because Peñalver’s theory focuses on land use specifically and this Article discusses both real and personal property, Peñalver’s theory will not be the focus of this Article. Under Singer’s democratic model of property, property is a “social and political institution” that serves the plural values of a free and democratic society, including autonomy, mobility, freedom, and equality. Joseph Singer, *Democratic Estates: Property Law in a Free and Democratic Society*, 94 CORNELL L. REV. 1009, 1010, 1054-55 (2009). Because Singer’s property theory focuses on post-political property and this Article looks at the pre-political evolution of property rights, Singer’s theory is not central to this discussion. In addition to these progressive property scholars, Jedediah Purdy argues that property law should aim to enhance functional freedom by opening up meaningful choices for individuals and promoting reciprocity over hierarchy. Jedediah Purdy, *A Freedom-Promoting Approach to Property: A Renewed Tradition for New Debates*, 72 U. CHI. L. REV. 1237, 1264-65 (2005). According to Purdy, property regimes should be viewed in terms of how well they promote functional freedom, by asking “how free people are . . . what are they able to do, which forms of human potential they have turned into actual capabilities that they can in fact exercise.” *Id.* at 1244. While Purdy’s scholarship closely aligns with the progressive vision of property, he has not formally associated with the progressive property movement. Jane Baron has set forth a wonderful summary of these theories. See Jane B. Baron, *The Contested Commitments of Property*, 61 HASTINGS L.J. 917, 927-32 (2010).

56. *The Social-Obligation Norm*, *supra* note 16, at 745.

57. *Id.*

virtue ethics⁵⁸ and the capabilities approach developed by Amartya Sen and Martha Nussbaum to argue that human flourishing allows individuals both the *opportunity* for a “well-lived, and distinctly human life” and the *capacity* to make meaningful choices among alternative versions of this “well-lived” life.⁵⁹ Human flourishing is a “multivariable concept” with a diverse range of incommensurable inputs (or *functionings*) that humans have reason to value, including health, freedom, practical reasoning, and sociality.⁶⁰

Communities, according to Alexander, are imperative to human flourishing because they are the “mediating vehicles through which we come to acquire the resources we need to flourish and to become fully socialized,” and are vital to shaping our preferences and aspirations.⁶¹ Because our own flourishing is dependent upon the community, members of the community are obligated to support social structures that ensure all members of the community are allowed the capabilities to flourish.⁶² Under this theory, property rights of the wealthiest Americans may have to give way to ensure that all members of the community have the resources to live a life that they have reason to value and make meaningful choices to shape their lives. The goals of property should focus on “cultivating the conditions necessary for members of our communities to live

58. *See id.* at 760. Under the Aristotelian view, though humans may strive for autonomy, we cannot escape our interdependent nature; “the human being is a social and political animal and is not self-sufficient alone.” *Id.*

59. *Id.* at 762; *see also* AMARTYA SEN, *THE IDEA OF JUSTICE* 228 (Belknap Press 2009).

60. *The Social-Obligation Norm*, *supra* note 16, at 751. Sen argues that for complex, reasoning human’s there is no one homogenous good thing, such as the hedonist’s pleasure—we are capable of varying preferences and valuing ends differently. “It is like seeking to make the life of the chef easier by finding something which—and which *alone*—we all like (such as smoked salmon, or perhaps french fries), or some one quality which we all must maximize (such as the saltiness of the food).” AMARTYA SEN, *DEVELOPMENT AS FREEDOM* 77 (1999).

61. *The Social-Obligation Norm*, *supra* note 16, at 766.

62. *Id.* at 770. Alexander’s arguments are not simply normative, but he also posits the positive argument that a social-obligation norm already exists—“albeit indirectly and confusingly”—in American property law. To support this assertion, Alexander relies on a variety of cases from eminent domain to nuisance to public goods to environmental regulations to copyright and patent law. *See generally id.* at 775-818.

[valuable] lives and to promote just social relations, where justice means something more than simply aggregate wealth-maximization.”⁶³

While progressive property scholars seek to shift our understanding of the purpose of our modern property system, inadequate attention has been given to how the foundation of our property regime emerged in the first place. By understanding the foundational development of our modern-day property system, we can begin to understand whether, as the information theorists argue, we should be limited to the standardized forms of ownership currently enjoyed by property-owners or, as progressive property scholars argue, we may successfully reimagine the structure of our property system and the purpose it plays in our modern society. The next part explores theories on the pre-political formation of property and the attendant problems with these theories based on scientific evidence.

III. Problems with the Theories on the Origin of Property Rights

While the right to exclude has been the “central fault line in property law and theory,”⁶⁴ little attention has been paid to how property rights, including the right to exclude, originally developed. Indeed, as James Krier has stated, the development “of property rights has been a topic in search of a theory.”⁶⁵ The origin of property was a subject of inquiry for a number of seventeenth-century philosophers—including Hugo Grotius, Samuel von Pufendorf, and John Locke—who believed that either social consent or government was necessary for the development of a stable property system.⁶⁶ These theories, however, are contradicted by scientific evidence that indicates evolution is

63. *Id.* at 819.

64. Baron, *supra* note 55, at 919.

65. Krier, *supra* note 9, at 139.

66. See Adam Mossoff, *What is Property? Putting the Pieces Back Together*, 45 ARIZ. L. REV. 371, 378 (2003). These theories of property were later incorporated into political and legal doctrine by William Blackstone, Thomas Rutherford, Lord Mansfield, James Kent, and others, whose writings influenced early American property institutions. *Id.*

potentially responsible for some of our most fundamental understanding of property rights.

Under Grotius' theory of the formation of property rights, in the beginning, private property did not exist, but instead all people had use-rights in resources:

[T]he human race [possessed] a general right over things of a lower nature . . . each man could at once take whatever he wished for his own needs, and could consume whatever was capable of being consumed. The enjoyment of this universal right then served the purpose of private ownership; for whatever each had thus taken for his own needs another could not take from him except by an unjust act.⁶⁷

Thus, a person could take what he or she needed, such as fish from a stream or apples from a tree, and no one could rightfully take that fish or apple away from the possessor; however, a person could not take full ownership of the stream or the tree. Once the person's use of the object ended, so too did any rights in that object.⁶⁸

For private property to emerge, it was not enough for a person to merely take possession of an object, but there needed to be some kind of conscious social agreement:

Property therefore must have been established either by express agreement, as by division, or by tacit consent, as by occupancy. For as soon as it was found inconvenient to hold things in common, before any division of lands had been established, it is natural to suppose it must have been generally agreed, that whatever any one had occupied should be accounted his own.⁶⁹

67. HUGO GROTIUS, *DE JURE BELLI AC PACIS LIBRI TRES* ("THE LAW OF WAR AND PEACE") 186 (Francis W. Kelsey trans., Oxford Univ. Press 1925) (1625).

68. See Mossoff, *supra* note 66, at 380.

69. GROTIUS, *supra* note 67, bk. 2, ch. 2; see also Mossoff, *supra* note 66, at 380.

Thus, for Grotius, property emerged through conscious human design by either an implicit or explicit social agreement among members of a community that possession of an object or land led to a right to exclude all others from using it.

Pufendorf followed Grotius' general theory on the formation of private property. For Pufendorf, in the beginning, all things were held in common and people had use-rights in the resources: "man had the right to apply to his own ends those things which were freely offered for the use of all."⁷⁰ For these use-rights to transform into property rights, there needed to be:

an external act or seizure, for this to produce a moral effect, that is, an obligation on the part of others to refrain from a thing already seized by some one else, an antecedent pact was required and an express pact, indeed, when several men divided among themselves things open to all; but a tacit pact sufficed when the things occupied at that time had been left unpossessed by the first dividers of things.⁷¹

Like Grotius, private property was a product of human design. Property formed through possession of an object or occupancy of land and an agreement among members of a community that morally required all others to respect the possessor's right to exclusively use that item.

Locke broke away from Grotius' and Pufendorf's requirement for a social agreement. Instead, Locke argued, private property is a natural right that was formed by man mixing his labor with a thing.⁷² Like Grotius and Pufendorf,

70. SAMUEL PUFENDORF, *DEJURE NATURAE ET GENTIUM* 16 (n.p., 1688).

71. PUFENDORF, *supra* note 70, at 547.

72. JOHN LOCKE, *SECOND TREATISE OF GOVERNMENT*, ch. 5, ¶¶ 31–32, 45–48 (Jonathan Bennett ed., 2008) (1690). Not all seventeenth century theorists believed that property could exist without the establishment of government. Jeremy Bentham, for example, thought the two concepts were inextricably linked. "Property and law are born together, and die together. Before laws were made there was no property; take away laws, and property ceases." JEREMY BENTHAM, *THE THEORY OF LEGISLATION* 113 (Richard Hildreth trans., 1975) (1802). As will be discussed in more detail below, this theory is

Locke began his theory of the formation of property in a pre-political the state of nature where people held all land and natural resources in common.⁷³ In the beginning “no body has originally a private Dominion, exclusive of the rest of Mankind.”⁷⁴ Man could appropriate things as his own by mixing his labor with them:⁷⁵

Whatsoever then he removes out of the state that nature hath provided, and left it in, he hath mixed his labour with, and joined to it something that is his own, and thereby makes it his property. It being by him removed from the common state nature hath placed it in, it hath by this labour something annexed to it, that excludes the common right of other men.⁷⁶

Under Locke's theory, property could exist without the consent of others; however, without some sort of social compact, property claims became less secure as resources grew limited. For Locke, the right to exclude is the very definition of property. Locke worried that ownership in the state of nature could lead to a “State of War.”⁷⁷ As populations grew, man's ability to enjoy his rightful property became “very uncertain, and constantly exposed to the invasion of others.” While individuals could make agreements to respect each other's property, they could not prevent outsiders from swooping in and stealing possessions away.⁷⁸ This is why man was willing to relinquish some of the

inaccurate from an anthropological and biological perspective.

73. LOCKE, *supra* note 72, ch. 5, ¶¶ 25-26.

74. *Id.* ¶ 26.

75. *Id.*; See Mossoff, *supra* note 66, at 387. As Mossoff points out, Locke identifies the right in the state of nature “to the means necessary for self preservation as a claim-right,” meaning that it is an inclusive right to allow all the general use resources available on the earth. *Id.* Grotius and Pufendorf, on the other hand, identified a use-right in the state of nature, which focuses more on exclusivity. *Id.*

76. LOCKE, *supra* note 72, ch. 5, ¶ 27.

77. *Id.* ¶ 17.

78. THOMAS HOBBS, *LEVIATHAN* ch. 13, 81–84 (Michael Oakeshott ed., Oxford Univ. Press 1960) (1651). Thomas Hobbes, one of Locke's contemporaries had similar concerns. For Hobbes, in the state of nature, a person only needed to grab something out of the common stock of resources

freedoms he enjoyed in nature and enter into government to receive the protection government provided for his property.⁷⁹

Under each of these theories, stable property rights cannot exist without either community consent or government. Scientific evidence, however, demonstrates that individual claims on property date back to approximately eleven millennia ago, thousands of years before “forms of punishment and enforcement of property rights began to emerge.”⁸⁰ In addition, there is evidence that property rights “emerged and proliferated without the assistance of states or other centralized enforcement agencies.”⁸¹

Moreover, while Grotius, Pufendorf, and Locke began their analysis in a theoretical state of nature, scientific evidence indicates that property claims do indeed exist in nature. A wide range of animals, from sea urchins to mammals, display at least primitive conceptions of property, including the right to exclude and the right to exclusive use.⁸² These rights are the product of evolution, rather than conscious design or agreement.

James Krier set forth an evolutionary theory on the formation of property rights.⁸³ Under this theory, property

and treat it as his or her own to transform the thing into private property. Hobbes worried that the state of nature would lead to a state of war, where life was filled with ongoing battles of possession. *Id.*

79. LOCKE, *supra* note 72, ch. 5, ¶ 123-24 (“The great and chief end, therefore, of men’s uniting into commonwealths, and putting themselves under government, is the preservation of their property. To which in the state of nature there are many things wanting.”).

80. Krier, *supra* note 9, at 144 n.18 (quoting SAMUEL BOWLES, MICROECONOMICS: BEHAVIOR, INSTITUTIONS, AND EVOLUTION 382 (2004)).

81. *Id.*

82. Hannah Kokko et al., *From Hawks and Doves to Self-Consistent Games of Territorial Behavior*, 167 AM. NATURALIST 901, 901 (2006).

83. Krier, *supra* note 9, at 1. Krier begins his essay with a detailed account of economist Harold Demsetz’s theory on the formation of property rights. *Id.* In his seminal article, *Toward a Theory of Property Rights*, Demsetz argues that “the emergence of new property rights takes place in response to . . . new benefit-cost possibilities.” Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. 347, 350 (1967). In this article, Demsetz examined changes to property ownership in beaver hunting lands among Native American tribes living in Canada’s Labrador Peninsula with the growth of commercial trade with European settlers in the 1700s. *Id.* at 351-53. According to Carol Rose, Demsetz took Locke’s and Hobbes’ story of the formation of property and “told it once again.” Carol M. Rose, *Evolution of Property Rights*, in 2 THE NEW PALGRAVE DICTIONARY OF ECONOMICS AND THE

rights first developed through evolution. As will be discussed in more detail below, animals that evolved a strategy that respects ownership rights fare better than those that do not because they can concentrate on finding resources and reproducing rather than fighting over ownership; therefore, animals that follow this evolutionary decision rule are better represented in future generations.⁸⁴ As humans evolved and developed the capacity for language and abstract thinking, they began living in groups and more complex property rules were developed through conscious human design.⁸⁵

While Krier's essay is a great contribution to our understanding of the development of property rights, he stopped short of analyzing what specific contribution evolution has made to our modern understanding of property and what this means for our property system. The remainder of this article will build on Professor Krier's hypothesis by exploring the specific form of ownership displayed in animals, how these displays of ownership have influenced our common law understanding of ownership and property rights, and what this means for our modern day conception of property.

LAW 94 (Peter Newman ed., 1998). While Demsetz's article has been the "point of departure for virtually all efforts to explain changes in property rights," it will not be the point of departure for this Article. Thomas W. Merrill, *Introduction: The Demsetz Thesis and the Evolution of Property Rights*, 31 J. LEGAL STUD. 331, 331 (2002). Despite the detail with which Demsetz reduces individual property rights to transaction costs, Demsetz failed to give an adequate account of how property rights form in the first place. Krier, *supra* note 9, at 142. Indeed, it is unclear in Demsetz's article whether the hunting grounds started off as open access commons or limited access commons. See *id.* at 144–45 (citing Carol M. Rose, *The Several Futures of Property: Of Cyberspace and Folk Tales, Emission Trades and Ecosystems*, 83 MINN. L. REV. 129, 155 (1998)) (limited access commons is "commons on the inside, property on the outside"). Therefore, Demsetz's article is ambiguous as to whether the fur trader example is one of the emergence of private property rights (open access commons) or the transition from one form of private ownership to another (limited access commons). The scope of this article is limited to the former.

84. Krier, *supra* note 9, at 151. Krier likened this to Hume's theory of property arising as a convention, which he believed "arises gradually, and acquires force by a slow progression, and by our repeated experience of the inconveniences of transgressing it." *Id.* (citing DAVID HUME, A TREATISE ON HUMAN NATURE, bk. 3, pt 2, §2, at 490). Typically, an evolutionary stable strategy, such as respect for ownership, does not arise out of conscious decision-making, but rather this behavior is an inheritable trait. *Id.*

85. *Id.* at 158–59.

IV. Property Ownership in Animals

Animal behavior shares important evolutionary connections with human behavior. Species are not essentialist, unchanging forms,⁸⁶ but rather they have evolved over eons and continue to respond to evolutionary pressures today.⁸⁷

Evolution has three basic building blocks: replication, mutation, and selection. Evolution occurs on the genetic level; parents pass on genetic material—in the form of DNA—to their offspring.⁸⁸ Genetic material not only controls animals' variable physical features (size, coloring, shape of teeth, claws or horns), but also behavioral dispositions, leading to unconscious adaptive strategies or "decision rules" that "let animals behave in different ways in different circumstances" which can affect fitness.⁸⁹

[A]nimals can be considered choice machines . . .
Those organisms predisposed (typically though

86. Prior to the publication of *Origins of Species*, the essentialist theory was the leading explanation of diversity in the world. While this theory is commonly known in Christianity as the intelligent design theory, this theory has roots dating back to Plato. Plato believed in a metaphysical world of unchanging forms, separate and distinct from how objects and qualities appeared through the human sensations in the physical world. See generally Plato, *Cratylus*, in THE COLLECTED DIALOGUES OF PLATO INCLUDING THE LETTERS 421 (Edith Hamilton & Huntington Cairns eds., Lane Cooper et al. trans., 1961). For example, while there were many different tables in the world, there was a singular form of table in the metaphysical world that held the essence of a table for its countless iterations in the physical world. *Id.* at 389. "For neither does every smith, although he may be making the same instrument for the same purpose, make them all the same iron. The form must be the same, but the material may vary . . ." *Id.* at 428.

87. Prior to the Cambrian Explosion, for example, Earth was primarily composed of single-cellular organisms. ERNEST MAYR, WHAT EVOLUTION IS 209 (2001). During the Cambrian Explosion, which dates back to over 500 million years ago, environmental conditions on the Earth changed (including rising oxygen levels), leading to the emergence of a wide array of organisms. *Id.* The basic body structures for all animals alive today developed during this period. *Id.* In fact, "no fundamentally new body plan has originated since the 500 million years since the Cambrian" period. *Id.* It is from this common ancestry that both animals and humans have evolved. *Id.* at 257.

88. MARTIN A. NOWAK, EVOLUTIONARY DYNAMICS: EXPLORING THE EQUATIONS OF LIFE 9 (2006).

89. CARL ZIMMER, EVOLUTION: THE TRIUMPH OF AN IDEA 333 (citing scientific work of Stephen Emlen).

not exclusively through natural selection) to those behaviors (from among all possible behaviors) that increased the probabilities of survival and eventual reproduction more than do alternative behaviors “chosen” by other members of the species left more offspring, many of which would share these behavior inclinations. Such inclinations are frequently, of course, highly context specific and condition-dependent. That is, evolutionary processes can equip an organism with “if-then” algorithms (often hierarchically ranked) such that: if encountering environmental condition A, increase the probability of behaving in way Y; but if encountering condition B, increase the probability of behaving in way Z.⁹⁰

During the reproductive and developmental processes, mutations can occur that cause new traits to emerge in offspring. These new traits can also affect an animal's fitness, meaning the ability to survive and reproduce in a given environment.⁹¹ Finally, because animals compete for all of life's necessities, including food, shelter, and reproduction,⁹² natural selection determines what genes are better represented in future generations. Animals that are more fit will have higher reproductive success and their genes will be better represented in future generations.⁹³

90. Owen D. Jones et al., *Economics, Behavioral Biology, and Law*, 19 SUP. CT. ECON. REV. 103, 107-08 (2011) [hereinafter *Economics, Behavioral Biology, and Law*].

91. MAYR, *supra* note 87, at 98. While in a very simplistic sense, one may think fitness can be measured by counting an organisms offspring, fitness is really looking at the probability of (and to what extent) an organism's genes being represented in future generations. These genes can be carried by direct offspring and relatives. “Inclusive fitness’ takes into account the varying probability—according to degrees of consanguinity—that copies of genes will appear in near relatives other than offspring, such as siblings, cousins, and nieces and nephews. Thus, and counterintuitively, there are some circumstances in which an individual could increase her fitness by limiting her own reproductive efforts (and thus offspring) and using the saved resources to increase the reproduction of genetic relatives.” *Economics, Behavioral Biology, and Law*, *supra* note 90, at 117.

92. MAYR, *supra* note 87, at 124–25.

93. Indeed, natural selection, rather than some divine creator,

Evolution is likely to be the reason why animals and humans share similar traits or behavior.⁹⁴ Physiologically, most vertebrates have the same basic construction of their extremities; all vertebrates, except for fish, have two upper and two lower extremities, each having some form of five digits.⁹⁵ In addition, evolution is responsible for certain genetically-determined, competitively-advantageous behavioral traits shared between humans and animals. A wide range of animals displays at least a primitive respect for possession. This part explores how animals display ownership rights and why this behavior has evolved as a competitively advantageous solution. By understanding the specific components of these displays of ownership, we can better understand what role evolution has played in shaping our modern-day property system.

A. *Animal Contests*

While Jeremy Bentham famously claimed that “[p]roperty and law were born together, and would die together,”⁹⁶ there is ample evidence in the scientific literature to suggest that animals in the wild display at least primitive forms of ownership and respect for property. In order to understand how property rights evolved in animals, it is important to first understand how animals compete with one another for life-sustaining resources. As part of the competitive nature of survival, some animals fight. These fights often occur between conspecifics (animals of the same species) and can be costly in terms of time, energy, and health. Competitors, however, will not engage in David-versus-

significantly contributes to the complexity of organisms. *Economics, Behavioral Biology, and Law*, *supra* note 90, at 109. “Extremely complex biological organisms exist not because they were designed by a creator attending to every detail but because wasteful characteristics are typically selected out of the countless random variations by the competition of resources.” *Id.*

94. Most animals, including humans, share similar “tool kit” of genes that controls how the body is built. ZIMMER, *supra* note 89, at 137.

95. MAYR, *supra* note 87, at 26. Indeed, in the very early stages of development, human embryos look remarkably similar to embryos of other mammals like dogs, cows, and mice but also even fish and reptiles in their early stages. *Id.* at 29.

96. JEREMY BENTHAM, OF PROPERTY: IN THE THEORY OF LEGISLATION 145-47 (1914).

Goliath contests, where the fighting ability between the two competitors is so unequal that the stronger opponent is almost inevitably guaranteed to win. In addition, animal fights are generally not a fight-to-the-death style of combat, but rather they are more like a settlement negotiation where both parties are trying to gain information to reach a resolution without incurring the costs of further litigation. "The ultimate goal of a fight is that the winner may take sole possession of a resource, but since fighting entails costs such as time and energy expenditure and risk of injury, both opponents benefit from settling disputes as cheaply as possible."⁹⁷ Thus, many contests begin with posturing that allows competitors to size up their opponents.

Behavioral scientists have long studied the factors that affect how animals behave in contests.⁹⁸ Symmetrical contests are ones in which competitors are equally matched. In this type of contest, escalated fighting often occurs, meaning the fight is likely to result in serious injury or even death.⁹⁹ Asymmetrical contests are contests in which one contestant has a fighting advantage over the other. Asymmetries can include a number of factors that potentially affect the outcome of a fight, for example, body size or shape of weapons (e.g. horns, beaks, or teeth).¹⁰⁰ If an asymmetry directly affects an animal's ability to fight, it is called a "correlated" asymmetry; if an asymmetry has no direct effect on the organism's fighting ability, the asymmetry is referred to as a convention or "uncorrelated" asymmetry. When contests are asymmetrical, they are usually resolved prior to escalation, unless there is incomplete information or the

97. Pilar Lopez et al., *Fighting Rules and Rival Recognition Reduce Cost of Aggression in Male Lizards, Podarcis Hispanica*, 49 BEHAV. ECOLOGY SOCIOBIOLOGY 111, 111 (2001) (citing JOHN ARCHER, THE BEHAVIORAL BIOLOGY OF AGGRESSION (Cambridge Univ. Press 1988)); see also FELICITY A. HUNTINGFORD & ANGELA K. TURNER, ANIMAL CONFLICT (1987) (finding residency asymmetry had influence over the outcome of contests; however, this influence could be overcome by sufficient size differences).

98. Erika B. Wiltenmuth, *Agonistic and Sensory Behaviour of the Salamander *Desmognathus fuscescens* During Asymmetrical Contests*, 52 ANIMAL BEHAV. 841, 841 (1996) (finding residency status had a stronger influence on the outcome of fights than size differences among competitors).

99. John Maynard Smith & G. A. Parker, *The Logic of Asymmetric Contests*, 24 ANIMAL BEHAV. 159, 159–75 (1976).

100. *Id.*

payoff of winning exceeds the cost of injury.¹⁰¹

Size is typically an asymmetry used to decide disputes between conspecifics. A larger contestant has a fighting advantage due to his size on two levels. *First*, larger animals may just be superior fighters; they “may possess greater incentive, vigour, agility, or energy reserves that can be used in aggressive acts.”¹⁰² *Second*, larger animals may fight less often than average-sized animals. When two animals differ in size greatly, they are expected to avoid the costs fighting because the larger animal is so much more likely to win.¹⁰³ Average-sized animals, on the other hand, are expected to get into more fights—and possibly more intense fights—because their size is comparable to many other competitor conspecifics in the population.

B. *Prior-Resident Effect*

Despite the competitive fighting advantage larger conspecifics may have, in many contests, the bigger fighter does not necessarily win. Instead, fights are determined by which competitor is the prior possessor of the resource.¹⁰⁴ John Maynard Smith and Geoffrey Parker were the first to propose that animals use the uncorrelated asymmetry of residency (or possession)—rather than some other asymmetry—as a convention to settle disputes.¹⁰⁵

101. *Id.* When asymmetries are difficult to perceive, animal contests may be longer as the contestants attempt to gain more information about their competitor's fighting ability. *See, e.g.,* Michael P. Haley, *Resource-Holding Power Asymmetries, the Prior Residence Effect, and Reproductive Payoffs in Male Northern Elephant Seal Fights*, 34 BEHAV. ECOLOGY SOCIOBIOLOGY 427-34 (1994) (citing Magnus Enquist & Olof Leimar, *Evolution of Fighting Behaviour: Decision Rules and Assessment of Relative Strength*, 102 J. THEORETICAL BIOLOGY 387-410 (1983); Peter Hammerstein & Geoffrey A. Parker, *The Asymmetric War of Attrition*, 96 J. THEORETICAL BIOLOGY 647-82 (1982); G.A. Parker & D.I. Rubenstein, *Role Assessment, Reserve Strategy, and Acquisition of Information in Asymmetric Animal Conflicts*, 29 ANIMAL BEHAV. 221 (1981)).

102. Wiltenmuth, *supra* note 98, at 842.

103. *Id.* Without taking residency into account, salamanders of similar size are expected to fight more frequently and with more intensity. *Id.*

104. *See, e.g.,* Darrell J. Kemp & Christer Wiklund, *Residency Effects in Animal Contests*, 271 PROC. ROYAL SOC'Y. LONDON B 1707, 1707 (July 2004).

105. *See* Smith & Parker, *supra* note 99; *see also* JOHN MAYNARD SMITH,

For example, for the male speckled wood butterfly, the best place to find females is in the spots of sunlight on the woodland floor.¹⁰⁶ By night, male butterflies are safely tucked away within the treetops, but as the early morning light filters through the leaves, male butterflies begin occupying sunspots on the ground and following these spots throughout the day as they move with the trajectory of the sun.¹⁰⁷

Possession of the sunspot gives the possessor the right to exclude other male butterflies from entering the sunspot and the right to exclusive access to females that fly into the sunspot. When a female enters the sunspot, the male flies after her in an attempt to court her.¹⁰⁸ When, however, another male enters the sunspot, he is seen as a potential intruder, and a contest for occupation of the sunspot ensues. Both the resident male and potential intruder engage in a spiraling contest, in which both males fly close to each other, almost bumping into each other, and then they spiral vertically upwards towards the treetops.¹⁰⁹ The prior-resident almost always wins these contests and regains possession of his sunspot, even when the intruder appears to be bigger or have a competitive advantage.¹¹⁰

EVOLUTION AND THE THEORY OF GAMES (1982). This residency advantage has been likened by some as a psychological competitive advantage that owners have over intruders. See Kokko et al., *supra* note 82, at 901. As Jeffrey Stake pointed out, an uncorrelated asymmetry can be just as evolutionarily advantageous as a correlated asymmetry: “[a]voiding a physical fight by deference to the first in time is just as effective in preserving genes as avoiding a fight by deference to the larger body. An uncorrelated strategy can be evolutionarily stable even when there is a correlated strategy also available.” Jeffrey Evans Stake, *The Property “Instinct,”* 359 PHIL. TRANS. ROYAL. SOC’Y LONDON B 1763, 1764 (2004) [hereinafter *The Property “Instinct”*] (citing Peter Hammerstein, *The Role of Asymmetries in Animal Contests*, 29 ANIMAL BEHAV. 193 (1981)).

106. N.B. Davies, *Territorial Defence in the Speckled Wood Butterfly (Parage Aegeria): The Resident Always Wins*, 26 ANIMAL BEHAV. 138, 138 (1978) [hereinafter *Territorial Defense in the Speckled Wood Butterfly*].

107. *Id.* at 139.

108. *Id.* at 140.

109. *Id.* This rule only holds true when sunspots are sufficiently small. It is beneficial for a male to obtain a large sunspot because the larger sunspot increases the number of females that fly by. If a sunspot becomes too large, however, a male will not be able to detect and defend against all intruders. Therefore, male butterflies tend to share large sunspots that individuals are unable to defend by themselves. *Id.* at 142.

110. *Id.* at 145. The prior-resident effect is not limited to territory, but also can exist in other resources. Male baboons, for example, can exert

This behavior is far from limited to butterflies. Indeed, a vast array of animals—from insects to amphibians to mammals—determine the winner of contests with one simple rule: the owner always wins.¹¹¹ Indeed, this is demonstrated in experiments where scientists reverse animal roles. In contests for territory between dart-poison frogs, the prior-resident displayed much more aggressive behavior than the intruder and won in contests even when the intruder was significantly larger than the resident.¹¹² When the prior-resident was placed in the role of the intruder (and vice versa), it no longer displayed such

possessory rights over females through outward social behavior. If male baboon A forms a bond with a female and this is observed by male baboon B, B will not try to court A's female, even if B is bigger and stronger than A. Thankfully, females do have some say in the matter. In laboratory settings, male baboons tend to respect social bonds if the female prefers her partner, which results in the female being more valuable to her partner (and possibly making the male partner more willing to fight for her) because she is likely to stay with him longer. Christian Bachman & Hans Kummer, *Male Assessment of Female Choice in Hamadryas Baboons*, 6 BEHAV. ECOLOGY SOCIOBIOLOGY 315, 315–21 (1980).

111. See Smith & Parker, *supra* note 99, at 172. John Maynard Smith and G.A. Parker's prior-resident hypothesis has been challenged by others. Some scientists argue that the residency is not an uncorrelated asymmetry, but rather prior-possessors win in disputes because they are superior competitors. See, e.g., John Alcock, *Body Size and Its Effect on Male-Male Competition in Hyolaeus Alcyoneus (Hymenoptera: Colletidae)*, J. INSECT BEHAV. 149, 155 (1995) (when resident bees are removed from their perches, they are taken over by smaller bees; when prior-residents are released, they quickly displace replacement bees); Darrell J. Kemp & Christer Wiklund, *Residency Effects in Animal Contests*, 271 PROC. ROYAL SOC'Y. LONDON B 1707, 1710 (2004) (when roles of resident and intruders were reversed, the previous resident (now intruder) won territorial disputes); Ann E. Pratt et al., *The Assessment Game in Sand Fiddler Crab Contests for Breeding Burrows*, 65 ANIMAL BEHAV. 945 (2003) (resident crabs won fights over intruders because of larger claw size). Others argue that residents win because they value the property more than their competitors. See, e.g., John R. Krebs, *Territorial Defence in the Great Tit (Parus Major): Do Residents Always Win?*, 11 BEHAV. ECOLOGY SOCIOBIOLOGY 185, 190–91 (1982) (when residents are removed and replaced, the longer the replacement is allowed on the territory, the more likely replacement will win in fight against intruder, indicating payoff asymmetry); S.A. Fayed et al., *What Factors Contribute to an Ownership Advantage?*, 4 BIOLOGY LETTERS 143, 143–45 (2008) (finding owner's knowledge of resources on territory and established relations with neighbors had small to medium effect on winning contests, but neither were statistically significant; statistically significant effect on fight outcomes to have access to burrows during fighting).

112. Julia R. Baugh & Don C. Forester, *Prior Residence Effect in the Dart-Poison Frog, Dendrobates Pumilio*, 131 BEHAV. 207, 214 (1994).

signs of aggression.¹¹³

The prior-resident hypothesis is also demonstrated when confusion—usually accomplished through scientific manipulation—is created over ownership. In the speckled wood butterfly experiments, escalated fights occurred when Davies was able to create confusion over ownership by placing an intruder butterfly in an occupied sunspot without the intruder or prior-resident noticing each other.¹¹⁴ In these cases when two conspecifics believe they are the rightful owner, an escalated spiraling competition occurred that lasted approximately ten times longer than the normal resident-intruder fights.¹¹⁵ Similar results have been found in the damselflies, where residency asymmetries decided the winners of territorial disputes, except when there was confusion over the role of ownership, which led to escalated fighting.¹¹⁶ This escalated fighting can be explained through confusion over residency status, rather than some other asymmetry between the animals. Because both competitors believe they are the rightful owner, each believes the fight should be settled in his favor, which leads to the escalated fighting.¹¹⁷

113. *Id.*

114. *Territorial Defence in the Speckled Wood Butterfly*, *supra* note 106, at 145.

115. *Id.*

116. See Simon D. Gribbin & David J. Thompson, *The Effects of Size and Residency on Territorial Disputes and Short-Term Mating Success in the Damselfly* *Pyrrhosoma nymphula* (Sulzer) (Zygoptera: Coenagrionidae), 41 ANIMAL BEHAV. 689, 689–95 (1991) (finding resident won 97.5% of contests, only losing when there was confusion over residency); Ian F. Harvey & Philip S. Corbet, *Territorial Interactions Between Larvae of the Dragonfly* *Pyrrhosoma nymphula*: *Outcome of Encounters*, 34 ANIMAL BEHAV. 1550–61 (1986) (finding in contests where prior resident lost, the resident acted more like an intruder, suggesting errors occur in role identification); Jonathan K. Waage, *Confusion Over Residency and the Escalation of Damselfly Territorial Disputes*, 36 ANIMAL BEHAV. 586–95 (1988) (finding escalated fights in damselflies was caused by “confusion over residency”). Ownership role confusion has also been experimentally shown in the great tit bird, where escalated fights occurred 44% of the time when scientists created confusion over ownership between an owner and a replacement; however, escalated fighting only occurred 1% of the time between regular resident-intruder and resident-neighbor disputes. Krebs, *supra* note 111, at 189.

117. Gribbin & Thompson, *supra* note 116. Confusion over ownership can have much more gruesome results. Jordi Moya-Larano et al., *Territoriality in a Cannibalistic Burrowing Wolf Spider*, 83 ECOLOGY 856, 356–61 (2002) (residency status rather than size asymmetries determined whether the

Scientists believe the prior-resident effect is an evolutionary strategy because respect for ownership has survival benefits. Populations of species that respect ownership can dedicate more time and energy to finding resources and to mating successfully compared to populations that are continually fighting over ownership of resources.

C. *Game Theory Explanation of Prior-Resident Effect*

Game theorists have mathematically tested the prior-resident effect hypothesis.¹¹⁸ In the most simplistic game, two conspecific animals compete over a resource that will give the winner an increase of fitness (equal to value v) compared to less favorable alternative resources. With equal probability, each animal may be the first possessor or the intruder. Each animal is genetically-predetermined to either display Hawk (aggressive) behavior or Dove (passive) behavior. In aggressive contests between two Hawks, each animal has an equal chance of winning, and they fight until one is injured and retreats to the less favorable territory. Injury comes at the cost of c , equating to the animals' reduced fitness. In passive contests between two Doves, each animal has an equal chance of winning. While animals may engage in initial bluffing, neither animal will engage in a fight and the first to retreat is the loser.¹¹⁹ Under these rules, in mixed contests between one Hawk and one Dove, Hawks always win and receive the full value of the resource because Doves retreat before engaging in the fight. The individual payoffs for animals engaging in these fights is as follows:¹²⁰

	H	D
H obtains value:	$\frac{1}{2}(v-c)$	v
D obtains value:	0	$v/2$

resident or intruder remained in territory). When confusion over ownership arises in wolf spiders, if the two spiders were similar in size, fights often escalated, resulting in cannibalism one-third of the time. *Id.*

118. SMITH, *supra* note 105.

119. *Id.* at 11-12.

120. *Id.* at 12-15.

In a scenario where the value of the resource is greater than the potential cost of injury, or $v > c$, the aggressive Hawk behavior is competitively advantageous because Hawks always win against Doves and, in any Hawk-Hawk contest, the costs of injury are outweighed by the potential fitness gained by obtaining the disputed territory. Therefore, in this scenario, Hawk behavior is an evolutionary stable strategy (ESS), meaning no alternative survival strategy will be able to outcompete the Hawk strategy.¹²¹ The Dove strategy is not an ESS because there is a greater payoff for animals having the genetically-determined Hawk strategy.¹²²

In a scenario where the value of the resource is outweighed by the potential costs of injury, or $v < c$, fighting is a competitively disadvantageous strategy, and a more-complex hybrid strategy may evolve. One alternative, called the Bourgeois strategy, follows the prior-resident effect decision rule: "if owner, play Hawk; if intruder, play Dove."¹²³ If probability P that any individual is an owner remains $\frac{1}{2}$, then the payoff matrix for the Hawk-Dove-Bourgeois is as follows:¹²⁴

	H	D	B
H	$\frac{1}{2}(v-c)$	v	$\frac{1}{2}(\frac{1}{2}(v-c)) + \frac{1}{2}(v)$
D	0	$v/2$	$\frac{1}{2}(0) + \frac{1}{2}(v/2)$
B	$\frac{1}{2}(\frac{1}{2}(v-c)) + (\frac{1}{2}(0))$	$\frac{1}{2}(v) + \frac{1}{2}(v/2)$	$\frac{1}{2}(v) + \frac{1}{2}(0)$

In this scenario, the Bourgeois strategy is an ESS. This can be shown most clearly by assigning values for the variables. Assume the value of the resource is equal to 2, $v=2$, and the cost of fighting is 4, $c=4$, and the probability that any one individual is an owner is 50%, $p=\frac{1}{2}$, then the Hawk-Dove-Bourgeois game has the following payoff matrix:

121. *Id.*

122. *Id.* at 12-15.

123. *Id.* at 22.

124. *Id.*

	H	D	B
H	-1	2	0.5
D	0	1	0.5
B	-0.5	1.5	1.0

In this example, Bourgeois is the only ESS. Assuming all three strategies are equally dispersed among a population, the Bourgeois strategy nets a fitness gain of 2.0 against Hawks, Doves and other Bourgeois organisms(-0.5+1.5+1.0), while Hawks and Doves only net a 1.5 fitness gain (-1+2+0.5 and 0+1+0.5, respectively). This means that animals that exhibit the Bourgeois strategy will outcompete animals with either the aggressive Hawk strategy or the passive Dove strategy.¹²⁵ In this scenario, animals exhibiting the Bourgeois strategy will be successful and pass their genes on to subsequent generations, while animals exhibiting the other less favorable strategies will eventually be bred out of the community.¹²⁶

125. Some have suggested that the paradoxical strategy—owner always loses—is also an ESS. This strategy has been observed in Goldeye fish. *See, e.g.,* D.A. Fernet & R.J.F. Smith, *Agonistic Behavior of Captive Goldeye (Hiodon Alosoides)*, 33 J. FISHERIES RES. BOARD CAN. 695, 701 (1976). Indeed, there are very good reasons that intruders may be more desperate for resources; some animals need breeding territory to reproduce during the mating season, thus individuals may challenge these territories to at least gain temporary access to breeding grounds and the chance to reproduce successfully. John Maynard Smith believed the paradoxical solution was an unsustainable strategy because it would lead to an infinite regression; animals would be so busy challenging each other for territory that they would have little to no time to procreate. SMITH, *supra* note 105, at 96. While John Maynard Smith's game theory analysis assumed a constant value for resources, under the paradoxical strategy, possession of resources is constantly being called into question, which reduces the overall value of the resource. When game theory analysis takes into account the environmental feedback of the paradoxical strategy, this strategy is only an ESS under extreme conditions, for instance when resident-breeder mortality is high, non-resident mortality is low, costs of fighting are high, and organisms are able to assess a large number of territories quickly. *See* Kokko et al., *supra* note 82, at 904, 909.

126. SMITH, *supra* note 105, at 22-23; T. Wenseleers et al., *Territorial Marking in the Desert Ant Cataglyphis Niger: Does It Pay to Play Bourgeois?* 15 J. INSECT BEHAV. 85, 90 (2002). As resources become low, and $v > c$, the Bourgeois strategy can breakdown in nature. Desert ants mark territory by secreting hormones. When resources are plentiful, animals act in accordance with the Bourgeois strategy, and ants defer to ownership of previous owner. When significant food stress was artificially placed on ants, the value of the

V. Nature's Influence on the Common Law Conception of Ownership

While the prior-resident effect may be an evolutionary stable and competitively advantageous strategy for animals in the wild, what does this animal behavior have to do with our modern-day property system? This part analyzes how animal displays of ownership align with the common law conceptions of property that form the foundation of our property system to determine what aspects of our property system were influenced by evolution.

Under the common law, "possession lies at the root of title."¹²⁷ According to rules of first possession, in order to gain ownership of an object or territory, the possessor must display a clear act of possession and others must understand this clear act as an act of possession. Once these two conditions are satisfied, the possessor gains ownership rights, including the right to exclude others from using the object or entering the territory and the right to exclusive use of the object or the territory (including the resources on the land), until the property is abandoned.¹²⁸ Similarly, in order for ownership rights to emerge in the state of nature, animals must display clear acts of ownership that are recognized as such by other conspecifics. Once animals have demonstrated possession of the resource, other competitors will not seriously challenge their right to exclude and right to exclusive use of the resource.

The similarities between animal displays of ownership and our common law property rules indicate that evolution may have played a role in our common law conception of property. The following subparts will analyze these similarities.

resource increased and fights among ants escalated, some resulting in serious injury. *Id.*

127. Richard A. Epstein, *Possession as the Root of Title*, 13 GA. L. REV. 1221, 1223 (1979); see also 2 WILLIAM BLACKSTONE, COMMENTARIES *258 ("Occupancy is the taking of those things, which before belonged to nobody. This, as we have seen, is the true ground and foundation of all property, or of holding things in severalty, which by the law of nature, unqualified by that of society, were common to all mankind.").

128. The right to transfer also accompanies ownership right in the common law; however, they are not discussed here because they are not displayed by animals, and hence may not have an evolutionary foundation.

A. *Clear Act of Possession*

To gain ownership through possession, the common law typically requires a clear act of possession. *Pierson v. Post* is a classic example of this requirement.¹²⁹ This case involved hunting of a wild fox. Post had been hunting the wild fox on a beach, and just when he was aiming for the kill, Pierson swooped in, killed the fox, and took off with it. Post sued Pierson for the value of the dead fox. In the state of nature, the fox belonged to no one. To create a property interest in the fox, the court found possession, rather than pursuit, was necessary.¹³⁰ The court reasoned that possession—by mortally wounding and taking the wild animal—created an ownership interest because mere pursuit did not foreclose the possibility of the fox escaping.¹³¹ By killing or mortally wounding the fox, however, the hunter communicates his “unequivocal intention of appropriating the animal to his individual use.”¹³²

129. *Pierson v. Post*, 3 Cai. R. 175 (N.Y. Sup. Ct. 1805).

130. *Id.* at 176 (“To create a title to an animal *feroe naturor*, occupancy is indispensable.”) (emphasis added). The dissent thought the custom of sportsmen, rather than the opinion of jurists, should settle the dispute, arguing that the law should reward the huntsman labor and award ownership to Post who was in hot pursuit of the animal, rather than allowing a “saucy intruder” swoop in for the final kill and gain possession, as Pierson had done. *Id.* at 181-82 (Livingston, J., dissenting) (“a pursuit like the present, through waste and unoccupied lands, and which must inevitably and speedily have terminated in corporeal possession, or bodily seisin, confers such a right to the object of it, as to make any one a wrong-doer, who shall interfere and shoulder the spoil”). See also *Young v. Hitchens*, 6 Q. B. 606 (1844) (merely encircling fish with net was insufficient to demonstrate possession).

131. *Pierson*, 3 Cai. R. at 176-78. (“It is added also that this natural liberty [of the fox] may be regained even if in sight of the pursuer . . . it is laid down, that even wounding will not give a right of property in an animal that is unreclaimed.”).

132. *Id.* at 178. In *Pierson*, the actual possession rule was a simpler rule for the court to adopt, rather than the ownership by hot pursuit, which the Court feared would turn into endless bickering among hunters about what did and did not count as hot pursuit. Once Pierson gained possession of the fox, he rightfully gained ownership rights in the fox, including to exclude the rest of world for using the fox without his permission and to do whatever he liked with the fox. Note that the opposite also holds true; a lack of possession indicates a lack of ownership. See, e.g., *Treasure Salvors, Inc. v. Unidentified Wrecked & Abandoned Sailing Vessel*, 569 F.2d 330, 335 (5th Cir. 1978) (holding the United States did not have claim on a sunken ship that was located on the continental shelf outside U.S. territories).

For both the common law and evolutionary respect for ownership strategy, possession requires “a single winner in a good number of situations; it can work only if it is based on some asymmetry.”¹³³ For *Pierson*, the clear act of ownership (or asymmetry) was the act of mortally wounding the animal. Similarly, animals display clear signs of possession to signal ownership. This clear act of ownership was described in Part IV, where the speckled wood butterfly physically occupied the sunspot throughout the day. Once the butterfly left the sunspot, however, the sunspot was considered abandoned, and he was quickly replaced by another butterfly.

In addition, animals display clear acts of ownership by aggressively defending their property. As mentioned in Part IV, when a potential intruder approaches a resident dart-poison frog, the resident engages in significantly more aggressive behavior than the potential intruder, signaling that the prior-resident is ready and willing to physically defend his territory if necessary.¹³⁴ In resident-intruder conflicts in experimental settings, a majority of prior residents initiated fights with calling behavior, in which the prior-resident “orients toward his opponent, inflates his vocal pouch, and emits a staccato of harsh clicks.”¹³⁵

Chemical marking is another way that animals possess resources. Ants, like many territorial animals, are able to differentiate ants from their colony and ants from other colonies through their pheromone markings.¹³⁶ These chemicals are

133. *The Property “Instinct,”* *supra* note 105, at 1765.

134. Baugh & Forester, *supra* note 112, at 210-12. This holds true even when the frogs' roles are reversed. Whatever frog is placed in the role of “resident” displays more aggressive behavior than the frog in the role of “intruder.” *Id.*; see also Kate D. L. Umbers et al., *The Effects of Residency and Body Size on Contest Initiation and Outcome in Territorial Dragon, Ctenophorus decresii*, PLOS ONE (Oct. 15, 2012), <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0047143> (finding tawny dragon displays aggressive behavior to signal possession of territorial claim; prior residents are more likely to initiate fights than intruders, and the animal that initiated the fight was more likely to win the ultimate contest).

135. Baugh & Forester, *supra* note 112, at 210-12 (22 of the 30 bouts between resident and intruder began with calling behavior by the ultimate winner).

136. Wenseleers et al., *supra* note 126, at 86 (finding resident status rather than size gave competitive advantage in resident-intruder contests).

deposited through feces and signal ants' ownership of territory, and studies have found that ants that leave these territorial scent markers have a competitive advantage in resident-intruder encounters.¹³⁷

Like the common law, animals are required to demonstrate a clear act of possession in order to obtain ownership rights. These clear acts of possession displayed in animals can include physical possession of the property, as the Court required in *Pierson v. Post*; agonistic behavior, similar to an owner guarding his property with a shotgun or placing a "Keep Out" sign on the property; or chemical cues, parallel to an owner fencing in the boundaries of his territory.

B. *Possession Providing Notice to Non-Owners*

A clear act of possession alone is not sufficient to obtain ownership through the common law. You cannot yell in the middle of the forest that all the trees are yours and expect to have ownership over them. "Possession must be observable," meaning that act of possession must also provide notice of ownership to non-owners.¹³⁸ A claim of ownership is a claim against the rest of the world; therefore, one can only expect ownership rights to be respected after notice is given to the inhabitants of that world in an understandable way. Observable signals such as touching, grabbing, or mortally wounding prey have been used as clear signs of ownership in property law.¹³⁹

Brumagin v. Bradshaw demonstrates this requirement. This case involved a dispute over who was the first possessor of a tract of land just outside of San Francisco. The plaintiff claimed that George Treat was the first possessor of the land and demonstrated his possession through repairing a fence across a portion of the land and pasturing livestock on the land. The defendants argued that Treat's "possession" was insufficient because he failed to enclose the entire land and outsiders could

137. *Id.* at 90. See also, e.g., Baugh & Forester, *supra* note 112, at 220 (finding resident frogs marked moss on their territory with chemical cues through defecation and contact with their skin).

138. *The Property "Instinct," supra* note 105, at 1765.

139. *Id.*

still access the land.¹⁴⁰ Moreover, the land itself was not suitable for pasturing animals with the growth of San Francisco nearby. The court reasoned that, had Treat had fully enclosed the land by fence or ditch sufficient to keep cattle in, by the act of building of the enclosure “alone, and without other acts of dominion, he would have established an actual possession of the land.”¹⁴¹ When an owner relies on natural boundaries, as George Treat had done, possession must correspond with the size and appropriate use of the land:

The general principle pervading all this class of cases, where the inclosure consists wholly or partially of natural barriers, is, that the acts of dominion and ownership which establish a *possessio pedis* must correspond, in a reasonable degree, with the size of the tract, its condition and appropriate use, and must be such as usually accompany the ownership of land similarly situated.¹⁴²

Not only was Treat required to provide a clear act of ownership, but, to prevent unclear claims of ownership, he was also required to use the land in an appropriate way to give sufficient notice to the public that the land had been appropriated.¹⁴³ As Carol Rose pointed out:

If outsiders would think that a large area near a growing city was abandoned because it was vacant except for a few cows, they might enter on the land and claim some prime waterfront footage for themselves . . . Society is worst off in a world of vague claims; if no one knows whether he can

140. *Brumagim v. Bradshaw*, 39 Cal. 24, 29–30 (1870). According to the defendants’ arguments, the marsh, bay, and creeks abutting the land were insufficient enclosures. *Id.* In addition, there was a portion of land that was not enclosed at all. *Id.*

141. *Id.* at 46.

142. *Brumagim*, 39 Cal. 24 at 50.

143. *Id.* (ordering new trial; whether or not Treat possessed the land and provided sufficient notice of possession to the public through appropriate use was a question that the jury should have been allowed to decide).

safely use the land, or from whom he should buy it if it is already claimed, the land may end up being used by too many people or by none at all.¹⁴⁴

Notice to the outside world also plays a key role in many adverse possession cases. Adverse possession allows a trespasser on a property to become its rightful owner if he continuously occupies it for a significant period of time, such as twenty years. This works as a statute of limitations for the titleholder of the property by requiring that the titleholder assert his or her rightful claim to the property and eject the trespasser within the adverse possession period. If the titleholder fails to act in time, he or she will lose the title, and the trespasser will become the rightful owner of the property. In order to gain title to the property, the trespasser's possession must not only be actual, but also visible, open, notorious, and exclusive.¹⁴⁵ Visible possession of the property is required to give the owners notice that someone else is claiming dominion over their land.¹⁴⁶ In addition, the trespasser must be openly claiming someone else's land as his, meaning that he must have knowledge that his claim affects the legal rights of another. The possession must also be notorious, meaning "it is generally known and talked of by the public."¹⁴⁷ Finally, possession must be exclusive. The trespasser must exclude the owner and other hopeful trespassers from the property in order to obtain title.¹⁴⁸ These requirements, when put together, require the adverse possessor not only to possess the property exclusively, but also to do so in such a way as to provide notice to both the owner and the community that he intends to gain rightful title to the land through adverse possession.

Questions of whether a trespasser's possession and use of the land give adequate notice to the owner and the community arise in many adverse possession cases. Is cutting the grass

144. Carol M. Rose, *Possession as the Origin of Property*, 52 U. CHI. L. REV. 73, 78 (1985).

145. See, e.g., *Marengo Cave Co. v. Ross*, 10 N.E.2d 917, 921 (Ind. 1937).

146. *Id.*

147. *Id.*

148. *Id.*

sufficient notice?¹⁴⁹ What about allowing your animals to graze on the land?¹⁵⁰ How about paying taxes on the property?¹⁵¹ Often, it is left to the jury—to the members of the community itself—to decide these questions.¹⁵²

For a clear act of possession to count, it must be clear to the rest of the world. *Marengo Cave Co. v. Ross* involved two adjoining properties. Marengo's land contained an entrance to a cave that became a tourist destination, and people would pay for admission into the cave. Unbeknownst to both parties (until a survey was completed), a portion of Marengo's cave extended underneath the Ross's adjacent property.¹⁵³ Ross brought suit to eject Marengo from that portion of cave, and Marengo claimed that it had obtained title by exclusively possessing the cave for the past twenty-one years.¹⁵⁴

The court ruled in favor of Ross. While there was no question that Marengo possessed the cave for the past twenty-one years, Marengo's subterranean possession of the cave failed to meet the requirements of adverse possession. Marengo's possession was not actual because the company never possessed the surface: "The title of the plaintiff extends from the surface to the center, but actual possession is confined to the surface. Upon the surface he must be held to know all that the most careful observation by himself and his employees could reveal . . ." ¹⁵⁵ Furthermore, Marengo's possession was neither visible nor notorious. This subterranean possession failed to give both the

149. See *Ramapo Mfg. Co. v. Mapes*, 110 N.E. 772, 776 (N.Y. 1915) (cutting the grass could potentially be an improvement on the land to constitute adverse possession; question should be submitted to jury to decide); *Wheeler v. Spinola*, 54 N.Y. 377 (1873) (entering disputed property once a year to remove a load or two of thatch does not constitute adverse possession).

150. See, e.g., *Osborn v. Deep Rock Oil Corp.*, 267 S.W.2d 781 (Tex. 1954) (holding if adverse possessor claims grazing as his adverse use, then he must show that the disputed property was fenced); *McShan v. Pitts*, 554 S.W.2d 759, 763-64 (Tex. App. 1977) (holding occasional grazing was insufficient to support a claim of adverse possession).

151. See *Slatin's Props., Inc. v. Hassler*, 291 N.E.2d 641, 644 (Ill. 1972).

152. See, e.g., *Ramapo*, 110 N.E. at 773 (ordering new trial; jury should have been able to decide whether cutting the grass was an adverse use to provide sufficient notice to the owner and the community of adverse claim).

153. *Marengo Cave Co. v. Ross*, 10 N.E.2d 917, 919 (Ind. 1937).

154. *Id.*

155. *Id.* at 921.

owner and the community at large notice that it had taken possession of a portion of Ross's land.¹⁵⁶ Finally, the possession was not open; Marengo did not even know it was trespassing on Ross's property until a survey was completed.¹⁵⁷ Thus, Marengo was a mere trespasser on Ross's property.¹⁵⁸

Like the common law, animals must provide their community with notice of their property claims. The prior-residence effect hinges on other local conspecifics recognizing the possessor as the rightful inhabitant of the property and using this as a factor to settle disputes over territory. Therefore, other animals must interpret a conspecific's act of possession—whether it be by physical occupation, aggressive behavior, or chemical marking—to mean that the individual is in possession of the resource and to signal to intruders that this is a reason not to seriously challenge the resident for the resource. In order words, in order for animals to respect ownership, they must speak the same language. The Bourgeois strategy only works if a potential intruder recognizes another as the possessor, which signals that the intruder should play dove and not attack.

The importance of providing notice of possession to other conspecifics is emphasized when confusion over ownership arises. As described in more detail in Part IV.A above, when confusion over ownership arises, such as through manipulation by scientists in experiments, an error in communication occurs where two conspecifics believe it is the rightful owner.¹⁵⁹ When

156. *Id.*

157. *Id.* at 919.

158. The way a population interprets signals of ownership can be nuanced. While touching or physical possession communicates possession in many circumstances, other times labor trumps physical touching for a signal of possession. See *Haslem v. Lockwood*, 37 Conn. 500, 506-07 (1871) (finding plaintiff who had shoveled manure into piles and left—rather than defendant who carted the manure away the next day—was the rightful owner of the manure, having provided sufficient notice to the rest of the world that he had claimed the manure as his personal property and was allotted a “reasonable time for the removal of this manure”). This nuance is mirrored in animals. Unconscious decision rules in animals are “highly context-specific and condition-dependent. That is, evolutionary processes can equip an organism with ‘if-then’ algorithms (often hierarchically ranked) such that: if encountering environmental condition A, increase the probability of behaving in way Y; but if encountering condition B, increase the probability of behaving in way Z.” Jones et al., *supra* note 90, at 108.

159. See *supra* Part IV.A.

this error in communication arises, escalated fighting ensues, which leads both animals to expend large amounts of energy and places them at risk of injury or even death.

Notice of possession to the local conspecific population is necessary for animals to respect the ownership rights of the prior resident. This mirrors the requirement that possessors provide notice to the community (and the prior owner in the case of adverse possession) in order to gain rightful ownership of land under the common law. For both the prior-residence effect and the common law, it is not sufficient that an individual possesses a resource, but that individual must also give notice of its possession to all those potentially affected by its property claim.

C. *Right to Exclude and Exclusive Use*

As discussed in Part II.C above, the right to exclude has been at the heart of many recent debates over property. Not surprisingly, the right to exclude has been central to the Anglo-American common law conception of property. William Blackstone famously described property as the “sole and despotic dominion . . . exercise[d] over external things . . . in total exclusion of the right of any other.”¹⁶⁰ The right to exclude has traditionally been protected under common law causes of action of ejectment and trespass.¹⁶¹ Indeed, the Supreme Court has recognized the right to exclude as essential to property.¹⁶² In

160. 2 WILLIAM BLACKSTONE, COMMENTARIES *2; *but see* Carol M. Rose, *Canons on Property Talk, or, Blackstone's Anxiety*, 108 YALE L.J. 601 (1998) (arguing that even Blackstone acknowledged the limitations of the right to exclude in the Commentaries). Felix Cohen famously described the right to exclude to be an extension of property ownership: “that is property to which the following label can be attached: To the world: Keep off X unless you have my permission, which I may grant or withhold. Signed: Private citizen[.] Endorsed: the state[.]” Felix S. Cohen, *Dialogue on Private Property*, 9 RUTGERS L. REV. 357, 374 (1954). Of course, in the state of nature, there is no state to endorse these rights, but as this article has argued, evolutionary strategies (decision rules) control animals’ unconscious decision to respect ownership.

161. *See* Thomas W. Merrill, *Trespass, Nuisance, and the Costs of Determining Property Rights*, 14 J. LEGAL STUD. 13, 13 (1985) (“With respect to property in land the right to exclude depends to a large extent on whether the intrusion in question is subject to the common law of trespass or of nuisance.”).

162. *See* *Lucas v. S.C. Coastal Council*, 505 U.S. 1003, 1044 (1992) (“the right to exclude others [is] ‘one of the most essential sticks in the bundle of

Loretto v. Teleprompter Manhattan CATV Corp., the Court found that permanent physical occupation of real property—however minor—constituted a taking, even if the occupation served a public purpose.¹⁶³

The right to exclude also exists in animal ownership (though in a slightly more tenuous form). For animals that display the prior-resident effect, prior possession is treated as an asymmetry that can make conspecific competitors less likely to engage in a contest over that resource. This deference to ownership arises even when the intruder is a larger and fiercer competitor than the prior resident. Thus, a right to exclude emerges among animals. Indeed, a prior possessor will vigorously defend its property claim if a competitor fails to follow the rules and attempts to intrude.

In addition to the right to exclude, once an individual obtains possession of a territory and announces it to those potentially affected by this ownership, then, under the common law, he gains not only the right to exclusive use of the land, but also of the resources on the land, including underground resources such as oil and gas. The right to resources, however, is limited to the resources physically located on the property at that point in time.

For example, although landowners may undergo significant expenses in drilling for underground resources, the owner only has a right to the oil and gas beneath their land while they are physically on the land. In concluding that the defendant had the right to use an oil pump, even though it adversely affected the amount of oil the plaintiff could draw from his well, one court stated:

Plaintiff assumes that there is a certain fixed amount of oil and gas under his farm in which he has an absolute property. True they belong to him while they are part of his land, but when they

rights that are commonly characterized as property”) (quoting *Kaiser Aetna v. United States*, 444 U.S. 164, 176 (1979)).

163. *Loretto v. Teleprompter Manhattan CATV Corp.*, 458 U.S. 419, 427 (1982) (holding New York statute allowing cable company to install cables on top of apartment building constituted a taking, entitling the owner to just compensation).

migrate to the lands of his neighbor or become under his control, they belong to the neighbor.¹⁶⁴

This rule holds true even when the neighboring owner uses superior inventions—such as a gas pump—to more effectively divert the resources into his own land.¹⁶⁵ “Possession of the land, therefore, is not necessarily possession of the gas [oil, or water].”¹⁶⁶

Like the common law, after an animal obtains possession and provides notice of that possession to the relevant community, the resident obtains exclusive access to the resources located on that property. Under a game theory analysis, the resources on the territory represent the value of the territory and directly impact how hard a resident will fight to defend the property and an intruder will fight to gain control of the territory. These resources can include necessities, such as food and shelter.¹⁶⁷ For example, wagtails can be territorial and gain much of their food from their territories, spending approximately 90% of their time feeding on resources in their territory.¹⁶⁸ Once these birds gain possession and provide notice of possession—through noisy and conspicuous calling behavior—they have gained exclusive access to the resources on their

164. *Jones v. Forest Oil Co.*, 44 A. 1074, 1075 (Pa. 1900); *see also* *Westmoreland & Cambria Nat. Gas Co. v. De Witt*, 18 A. 724, 725 (Pa. 1889) (likening oil and gas resources to wild animal, which all have the “power and tendency to escape without the volition of the owner. They [the oil and gas] belong to the owner of the land, and are part of it, so long as they are on or in it, and are subject to his control; but when they escape, and go into other land, or come under another’s control, the title of the former owner is gone.”).

165. *Jones*, 44 A. at 1075 (“The plaintiff, if he has a right to use anything in nature, has a right to exercise that user by all the skill and invention of which a man is capable . . .”).

166. *Id.* (“If an adjoining or even distant owner drills his own land and taps your gas, so that it comes into his well and under his control, it is no longer yours, but his.”).

167. *See, e.g.*, N.B. Davies, *Food, Flocking and Territorial Behaviour of the Pied Wagtail (Motacilla alba yarrellii Gould) in Winter*, 45 J. ANIMAL ECOLOGY 235, 240 (1976) [hereinafter *Food, Flocking and Territorial Behaviour*] (finding territorial wagtails had exclusive access to food in their territory); Moya-Larano et al., *supra* note 117, at 357 (territory control in wolf spiders gives access to burrows in which they live).

168. *Food, Flocking and Territorial Behaviour*, *supra* note 167, at 238.

property.¹⁶⁹

Often times, residency status gives owners access to other wild animals, namely mating partners, on their property and this positively impacts their reproductive fitness.¹⁷⁰ Similar to the court's holding in *Pierson v. Post*, these possessors of territory only have a right to exclusive access to these other animals while they are physically in the owner's territory. Once an animal escapes and leaves the territory, the resident loses possession and exclusive access to the potential mate.

For example, possession of a burrow greatly increases a male fiddler crab's likelihood of mating success in a given season.¹⁷¹ Females select male partners based on the quality of his breeding burrow that will be used both for mating and for brooding fertilized eggs.¹⁷² Therefore, ownership of a burrow gives a male exclusive access to the burrow, allowing him to control how it is used. In addition, if a male obtains possession of a burrow particularly one of a high quality—he is likely to enjoy a higher reproductive fitness than competitors who do not hold a burrow or hold an inferior burrow.¹⁷³ Like the oil and gas

169. *Id.* at 242-43. Often the flocking wagtails had more access to food resources than those available on the territorial bird's property. Even when this happened, the territorial bird did not abandon its property, but simply left for a period of time to eat with the flocking birds, making sure to return to its territory for at least 10% of the day and display its territorial ownership of the property. *Id.* Interestingly, when neighboring wagtails trespassed onto another's property, they did so silently and often when the owner was away. This type of behavior indicates that these intruders knew that they were entering another's property. *Id.* at 243.

170. See, e.g., George F. Turner, *The Fighting Tactics of Male Mouthbrooding Cichlids: The Effects of Size and Residency*, 47 ANIMAL BEHAV. 655, 656 (1992) (noting that male fish display territoriality when defending spawning pits during breeding season; the prior resident would retain or win disputes over ownership, except where intruder outweighed prior resident by significant amount).

171. Pratt et al., *supra* note 111, at 946 (finding resident fiddler crab males won fights against intruders, however resident males were also generally competitively superior than intruders, with larger body size and claws).

172. *Id.*

173. *Id.*; see also Michael P. Haley, *Resource-Holding Power Asymmetries, the Prior Residence Effect, and Reproductive Payoffs in Male Northern Elephant Seal Fights*, 34 BEHAV. ECOLOGY SOCIOBIOLOGY 427, 428 (1994) (noting that male seal elephants enjoy the right to exclusive courtship of up to 50 females as long as he maintains possession of them).

cases discussed above, a resident only has exclusive access to resources while they remain on his territory.

Animal property claims share several key features with our common law property rules. In order to gain ownership through possession, both animals and humans are required not only to demonstrate a clear act of ownership, but this clear act must also provide notice to the community that will be affected by the property claim. In addition, once a property claim is established, ownership comes with the right to exclude and the right to exclusive use. While humans have developed laws such as trespass and conversion in order to prevent outsiders from violating property owners' rights, animals follow genetically determined behavioral rules that tell them not to seriously challenge ownership of resources already held by another conspecific.

D. *Arguments Against the Evolutionary Foundation of Property Rights*

In a 2011 essay, Ben Barros raised several arguments against the evolutionary foundation of our property system. First, Barros argues that scholarship has not provided "any actual evidence that respect for possession is an evolved trait."¹⁷⁴ Second, Barros argues that evolution can only account for respect for *current* possession, whereas our modern-day property system protects rights of *prior* possessors.¹⁷⁵ This part will address both of these concerns.

Barros' first argument presents a common, yet mistaken, understanding of how evolution works. Barros argues "[t]he evolutionary lines of humans and any of these species diverged so long ago that it is preposterous to suggest that present behaviors are a shared heritage received from a common ancestor."¹⁷⁶ To support the hypothesis that there is an evolutionary foundation to our property rights, however, it need not be shown that respect for ownership evolved from some

174. D. Benjamin Barros, *The Biology of Possession*, 20 WIDENER L.J. 291, 305 (2011).

175. *Id.* at 308.

176. *Id.* at 307.

singular shared ancestor of butterflies, frogs, and humans. Most animals, including humans, share similar “tool kits” of genes that control how the body is built. These tool kits contain genes that mark off the front and back of the body, left and right, and head and tail. They also contain genes that control the development of organs, such as the eyes and limbs. In some cases, these tool kits are so similar that you can donate a gene from one animal and have it function in an entirely different animal. For example, you can donate the gene for making an eye in a mouse to a fly, and the mouse’s gene will function to help form the fly’s eye.¹⁷⁷

In addition, evolutionary traits can independently evolve multiple times and need not be traced back to a common ancestor. For example, the gene responsible for the development of the eye (*Pax 6*) exists in a wide range of organisms. While a vast array of species share similar structures of the eye, this trait did not develop from a singular common ancestors. Indeed, scientists have been able to pinpoint at least forty times this gene has been responsible for the eye independently evolving (in various stages of complexity).¹⁷⁸ Therefore, shared evolutionary traits—whether it be the structure of the eye or respect for possession—need not be traced back to a singular common evolutionary ancestor in order for there to be an evolutionary basis for their development.

Barros’ second argument—that evolution can only provide an argument for an evolutionary basis for current possessor’s rights, whereas our property law system protects rights of prior possessors—is also unpersuasive. Barros argues that in order to show an evolutionary foundation for our property system, scientific students would have to show a scenario where “animal *A* possesses some territory and leaves for some reason; animal *B* arrives and possesses the territory; and animal *A* then returns, and animal *B* departs”¹⁷⁹

First, the difference between prior possession and current possession may not be as fundamental of a distinction as Barros argues. As Stake has pointed out: “Caring about possession

177. ZIMMER, *supra* note 89, at 137.

178. See MAYR, *supra* note 87, at 205.

179. Barros, *supra* note 174, at 308.

means caring about current possession, but it also means caring about what was current possession in the past The law protects what was current possession at the time a wrong occurred.”¹⁸⁰ Humans have a higher capacity for memory compared to animals and have created complex social and moral norms; therefore, humans have the capacity to develop laws to protect a current owner’s property rights from wrongs, such as stealing and trespassing:

If the current possessor gained possession by a voluntary transfer from the previous possessor, the current possessor’s possession deserves the protection of society via the law. But if the current possessor gained possession by violating the norm of respect for possession, then the current possessor does not deserve society’s protection of possession. Protecting prior possession is often the only way for the law to protect the bourgeois norm of respect for possession.¹⁸¹

Thus, current possession and prior possession may not be as distinct as Barros tries to argue. Many animals may simply lack the capacity—whether it be due to lesser memory capacity, lack of norms, or inability to communicate prior possession—to respect prior possession in the way that Barros would find compelling. It has been shown, however, when animals have the tools to communicate prior ownership that ownership can be respected precisely in the way Barros described above. This gets us to the second and more important response to Barros’ argument.

As discussed in Part V.A above, in order for respect for ownership to work there must be a clear act of possession that is communicated to surrounding non-owners. For some animals, like the speckled wood butterfly, physical possession may be the only way they are capable of communicating ownership to other conspecifics. Other animals have the capability of

180. Jeffrey Stake, *The Biology of Possession: A Brief Response to Barros* (Maurer School of Law, Research Paper #177, 2010).

181. *Id.*

communicating ownership through other means, such as their behavior or chemical marking, and have the potential to display behavior consistent with the scenario set forth by Barros. Territorial pied wagtails, for example, establish clear territory boundaries through displays of agonistic behavior directed toward neighboring conspecific territory owners.¹⁸² After territory boundaries are defined, a wagtail can leave its territory in search for food (*animal A possesses some territory, and leaves for some reason*). While neighboring birds may sneak onto the property while the owner is away (*animal B arrives and possesses the territory*), once the prior owner returns, all conspecifics respect the territorial lines previous set (*animal A then returns, and animal B departs*).¹⁸³ Therefore, when animals have the communication tools and memory capacity, the prior resident effect can protect interests of prior possession.

VI. Implications for Property Law

Given the similarities between animal displays of ownership and common law default rules, it is likely that our common law conception of property emerged through evolution. A broad range of animals developed to have an evolutionary strategy (or unconscious decision rule) that causes animals to respect ownership rights of prior possessors, including the right to exclude and exclusive use of resources. This evolutionary solution may have evolved prior to the point where humans branched off from other animals or it may be a solution that independently evolved multiple times. The similarities between the prior-resident effect displayed in animals and our common law property rules offer additional support that these rules are

182. *Food, Flocking and Territorial Behaviour*, *supra* note 167, at 237.

183. *Id.* at 242. Both flocking and territorial wagtails typically spend 90% of their day eating; therefore, the territorial birds' decision to spend at least 10% of their time communicating their ownership rights, even when there was little food in the territory, demonstrates the importance of this communication, as it took away time and energy from their feeding. *Id.* "Even on days when little food was obtained in their territories, the owners kept returning for short periods throughout the day, often for 5-10 minutes only, before flying back to feed with the flock This must have been an important activity for the territorial birds since they only once spent less than 10% of the day on their territories even though the potential feeding conditions in the flock were always better than on their own territories." *Id.*

remnants of our own species' evolutionary history. This part explores what this evolutionary origin could mean for our property system and how this may change the way we view the default rights that typically accompany ownership.

While much of our common law conception of property may have evolutionary origins, this does not mean that this conception of property is necessarily the best for our modern society. Evolution does not promise ideal solutions. Despite the "survival of the fittest" adage, evolution is an imperfect process.¹⁸⁴ The fact that a certain trait—such as deference to possessors—survived through the process of natural selection does not mean that it is necessarily the best solution for our current environment.¹⁸⁵ It turns out that the standard for survival is not the best, but rather just a "good enough" solution.¹⁸⁶ Evolution is not "inevitably an onward and upward process," but evolutionary solutions survive because they were good enough for yesterday's environment, not necessarily today's.¹⁸⁷

[E]volution refers to a dynamic process observed when a characteristic or attribute increases or decreases the probabilities of reproduction or replication, and that trait is passed on with a greater or lesser probability through the production process. When certain factors exist within a system, the trait or characteristic will be selected and greater proportion of the agents within that system will take on that characteristic until that population reaches some ceiling based

184. STANFORD ENCYCLOPEDIA OF PHILOSOPHY, *available at* <http://plato.stanford.edu/entries/spencer/> (last visited Feb. 3, 2015). Contrary to popular misconception, the phrase "survival of the fittest" came from Herbert Spencer, not Charles Darwin. *Id.*

185. E. Donald Elliott, *Law and Biology: The New Synthesis?*, 41 ST. LOUIS L. J. 595, 599 (1997).

186. *Id.* Herbert Simon calls this idea of evolutionary solutions being good enough: "satisficing." *Id.*

187. Mark J. Roe, *Chaos and Evolution in Law and Economics*, 109 HARV. L. REV. 641, 642-43 (1996) (arguing law and economics model should be modified to account for modern understandings of biological evolution, chaos theory and path dependence).

on the external environment.¹⁸⁸

The evolutionary process has been analogized to an individual standing on one of many hills in the pitch black of midnight. The individual's goal is to get to the top of the hill, and she can only feel which direction she is going by the angle of her feet. Natural selection prevents the individual from descending down the hill. When her feet level off, she can tell she has reached the top of this hill, but she has no way of knowing whether she is on a foothill or the tallest mountain. Without more information—without turning on the lights—the individual cannot justify pursuing another strategy because there is no way to compare the current strategy with an alternative strategy.¹⁸⁹

By making the right to exclude central to our understanding of property, we may be clinging to a strategy that, while satisfactory when it emerged, is not necessarily ideal for our modern society. While in most environments the deference to prior possessor strategy is more favorable than a no respect strategy, these are not the only options. The deference to possessor strategy likely emerged ages ago. This strategy evolved prior to the rise in technology, prior to the formation of cities, and prior even to the evolution of human intelligence.¹⁹⁰ The environment and human societal needs have massively changed since the evolution of that decision rule, so it cannot be assumed that this strategy is the best option for our modern society. Because humans are capable of engaging in critical thinking, we need not rely on rules based on unconscious evolutionary strategies as the underpinnings of our property system.¹⁹¹

188. Daniel M. Katz et al., *Social Architecture, Judicial Peer Effects and the Evolution of the Law: Toward a Positive Theory of Judicial Social Structure*, 24 GA. ST. U. L. REV. 977, 982 (2008) (applying complex adaptive system modeling to judicial decision-making).

189. *Id.*; Roe, *supra* note 187, at 642-43; NOWAK, *supra* note 88.

190. It is estimated that humans began developing the capacity for language and critical thinking approximately 100,000 years ago. See Johnathan Haidt, *The New Synthesis in Moral Psychology*, 312 SCI. 998 (2007); Krier, *supra* note 9, at 157 (citing EDWARD O. WILSON, *SOCIOBIOLOGY: THE NEW SYNTHESIS* 564-69 (2000)).

191. See Owen D. Jones & Timothy H. Goldsmith, *Law and Behavioral*

Furthermore, evolution does not provide moral solutions. The fact that the right to exclude and the right to exclusive use are likely products of our evolutionary history does not mean we can make any normative assessment about these aspects of our conception of property. To make the jump from an evolutionary factual outcome to a normative judgment would be a naturalistic fallacy.¹⁹² The lone existence of scientific facts cannot tell us anything about our normative judgments. Scientific facts cannot show us what ought-to-be anymore than what “ought-to-be” can create scientific facts.¹⁹³ To put it succinctly: property is “natural and not Natural law.”¹⁹⁴

While we cannot ascribe normative assessments to evolutionary outcomes, we also cannot divorce ourselves from evolution either. In some ways, our evolutionary history is neurologically hardwired within us. The brain, like the rest of us, is a product of evolution and subject to the same imperfections that come along with the evolutionary process. Research shows that when a monkey reaches for an item, a certain group of neurons fire. When that monkey views a human or other monkey grasp an object, the same group of neurons fire. Therefore, our brains may have evolved to become hardwired that when an object is in our possession and there is no previous owner to recognize, we perceive at least a simplistic sense of ownership.

We may be programmed to recognize when we have a certain proximate relationship to a physical object and, by mirroring, to recognize when others have a similar relationship to an object Certain combinations of information – “it is in my grasp” plus “there is no previous owner” – may throw a biological switch making us more willing to be assertive in preventing others

Biology, 105 COLUM. L. REV. 405, 435 (2005) (“(1) evolutionary processes tend to predispose organisms to behave in ways that increased reproductive success, on average in ancestral environments, and (2) the effects of that predisposition can be, and often are, wholly independent of consciously perceived ‘motives’ for behaviors.”).

192. Jones & Goldsmith, *supra* note 191, at 485.

193. *Id.*

194. A.G. Keller, *Law in Evolution*, 28 YALE L.J. 769, 783 (1919).

from taking the thing.¹⁹⁵

This is not to say that human beings are the same as animals; however, with our common evolutionary origin, we may be hardwired similarly. Humans, however, are set apart even from our closest ancestors in our problem-solving capabilities. Our “large brains and well-developed capacities for culture and language cause us to use adaptive strategies that can often be seen only in simple, more rudimentary parallels among other primates.”¹⁹⁶

In our modern world, societal forces play a large role in shaping our property laws. These societal forces can include cultural, social, and political forces. Both evolutionary and societal forces co-exist and create feedback systems:

[C]ulture and cultural change are the products of minds, but minds are themselves biological entities that have both developmental and evolutionary histories . . . minds therefore create cultural features that reflect this evolutionary heritage [and] . . . cultural change can also feed back on biological evolution.¹⁹⁷

Societal change can lead to biological change and vice versa. For example, the evolutionary expansion of the cortical motor system in species prepares them to be able to develop and use tools to better adapt to their environment.¹⁹⁸ Then, for species,

195. Jeffery Evans Stake, *Pushing Evolutionary Analysis of Law*, 53 FLA. L. REV. 875, 887 (2001) (citing Giacomo Rizzolatti et al., *Premotor Cortex and the Recognition of Motor Actions*, 3 COGNITIVE BRAIN RES. 131, 134-36 (1996)). Indeed, this may be why physical touching is so central to our idea of possession and ownership in both animal behavior and the common law. *The Property “Instinct,” supra* note 105, at 1765.

196. E. Donald Elliott, *The Tragi-Comedy of the Commons: Evolutionary Biology, Economics and Environmental Law*, 20 VA. ENVTL. L.J. 17, 20 (2001) (arguing evolutionary biology, rather than economics, provides a better lens for understanding environmental law).

197. Jones & Goldsmith, *supra* note 191, at 481.

198. See PHILIP LIEBERMAN, *HUMAN LANGUAGE AND OUR REPTILIAN BRAIN: THE SUBCORTICAL BASES OF SPEECH, SYNTAX, AND THOUGHT* 36-62 (2d ed. 2002); Vittorio Gallese et al., *Action Recognition in the Premotor Cortex*, 119 Brain 593-609 (1996); Alex Martin, *The Representation of Object Concepts in the*

including humans, that have used this biological advancement to develop tools to better adapt to environmental conditions, scientists have observed the biological development of neural regions that participate in tool making, use, and recognition.¹⁹⁹ The ability to develop and recognize tools then changes how individuals interact culturally. The feedback system created through cultural and evolutionary forces has positively contributed to the development of humans. “[H]uman beings have evolved biologically in the way that they have over the last ten thousand years in part because of the development of culture, learning and other tools.”²⁰⁰

Societal forces can and should influence and change our property laws. Because no normative assessment can be placed on property default rules that have emerged through evolution, it is only through societal forces that we can place any moral value on our property rules. Indeed, the absolute nature of property rights, rooted in more primitive forms of ownership displayed in the animal kingdom, at times, must give way to societal pressures:

[A]n owner must expect to find the absoluteness of his property rights curtailed by the organs of society, for the promotion of the best interests of others for whom these organs also operate as protective agencies. The necessity for such curtailments is greater in a modern industrialized and urbanized society than it was in the relatively simple American society of fifty, 100, or 200 years ago. The current balance between individualism and dominance of the social interest depends not only upon political and social ideologies, but also upon the physical and social facts of the time and

Brain, 58 ANN. REV. PSYCHOL. 25-45 (2007); Michael T. Ullman, *Contributions of Memory Circuits to Languages: The Declarative/ Procedural Model*, 92 COGNITION 231 (2004).

199. See TOOLS, LANGUAGE AND COGNITION IN HUMAN EVOLUTION (Kathleen R. Gibson and Tim Ingold, eds.1993); Scott H. Johnson-Frey, *The Neural Bases of Complex Tool Use in Humans*, 8 TRENDS IN COGNITIVE SCI. 71 (2004); Martin, *supra* note 198.

200. Elliott, *supra* note 185, at 607.

place under discussion.²⁰¹

While our property system routinely upholds the evolutionary strategy, protecting the near-absolute right to exclude and right to exclusive use, these rights can give way—and, indeed, have in some cases given way—to societal demands. A number of cases cited by Gregory Alexander in *The Social-Obligation Norm* demonstrate this. While Alexander argues that these examples help demonstrate an underlying and under-theorized norm in American property law,²⁰² these examples may also be understood as a piecemeal departure from the evolutionary strategy.

In the *Social-Obligation Norm*, Alexander uses historic preservation regulations as an example of rules restricting owner's right to exclusive use of their property and argues that this is an example of the underlying social-obligation norm in American property law. Historic preservation laws limit an owner's ability to transform the appearance of his or her property to ensure the property retains its historic character. For example, in *State ex rel. Stoyanoff v. Berkeley*, the court upheld one of these historic preservation laws, upholding a city's decision to deny a building permit to a property owner who wanted to build a "highly modernistic" home in a neighborhood filled with traditional homes.²⁰³ Alexander argues these types of cases highlight our interdependence and homeowners' obligations to each other and the community to preserve the historic character of a neighborhood.²⁰⁴ Surely, Alexander is

201. 5 RICHARD R. POWELL, REAL PROPERTY § 745 (1970).

202. *The Social-Obligation Norm*, *supra* note 16, at 774 ("The point is not that current American property law, public and private, has already internalized the idea that property owners owe thick responsibilities to the communities to which they belong. It has not. But American property law has partially internalized social obligations, albeit indirectly and confusingly.").

203. *State ex rel Stoyanoff v. Berkley*, 458 S.W.2d 305, 310 (Mo. 1970). The realtors argued that characterizing the "proposed residence as 'unusual in design' is the understatement of the year. It is in fact a monstrosity of grotesque design, which would seriously impair the value of property in the neighborhood." *Id.*

204. *The Social-Obligation Norm*, *supra* note 16, at 791-92 ("Given the unique character of the neighborhood property owners in historic districts are in relationships of interdependency that confer on each of them particular obligations that urban landowners otherwise do not have.").

right in that zoning regulations develop almost necessarily through a sense of interdependence. There is no need for such regulation if man lives in isolation and what he does with his property has no impact on others. The impetus for the proliferation of property-use regulations, including historic preservation regulations, however, may better be explained by changing social pressures, rather than an underlying social obligation tradition in American property law.

Zoning regulations emerged in the late-nineteenth century in response to increasing industrialization and urbanization.²⁰⁵ People were steadily moving into cities, and by the turn of the century, 40% of the population lived in cities.²⁰⁶ While early zoning cases show a court's willingness to abide by space requirements, such as frontage area, courts seemed hesitant to allow regulations to dictate the aesthetics of the structure.²⁰⁷ In *Byrne v. Maryland Realty Company*, the court overturned an ordinance requiring that all structures being built in a certain area of Baltimore be free-standing, made of brick or stone, and stand twenty-five feet apart from other buildings.²⁰⁸ Defendant sought to construct brick duplexes. While the appellant argued the proposed structures were a "cheap, two-story development of congested dwellings" and would be "very detrimental and undesirable,"²⁰⁹ the court found that these structures did not threaten public health and "to prohibit their construction upon this ground would be carrying the police power to an extent that

205. Kenneth A. Stahl, *Neighborhood Empowerment and the Future of the City*, 161 U. PA. L. REV. 939, 957 (2013).

206. *Id.*

207. *See, e.g.*, *Wood v. Bldg. Comm'r*, 152 N.E. 63, 64 (Mass. 1926) (ordering revocation of permit for owner to build home that violated yard space requirements); *Norcross v. Bd. of Appeal*, 150 N.E. 887, 890 (Mass. 1926) (upholding board's denial of variance to exceed building height limitations; power to grant variations should be "sparingly exercised" in "rare instances and under exceptional circumstances"). Indeed, some courts were unwilling to uphold even frontage or yard-space zoning requirements. *See, e.g.*, *Hedgcock v. People*, 13 P.2d 264, 265 (Colo. 1932) (denial of building permit because building failed to comply with frontage requirement was arbitrary and capricious use of police power that did not benefit public welfare); *State ex rel Rudensey v. Senior*, 133 A. 777 (N.J. Sup. 1926) (ordinance requiring 25 foot setback held invalid).

208. *Byrne v. Md. Realty Co.*, 98 A. 547, 547 (Md. 1916).

209. *Id.* at 548.

would alarm the public.”²¹⁰ The Court found the ordinance to go beyond the police power and to be unconstitutional.

Society began to change rapidly and dramatically with the onset of the industrial revolution. The United States switched from having a primarily agrarian society to a predominantly urban one. These changes were unprecedented in human history and occurred at a pace much more rapid than evolution. During the twentieth-century, people continued to move into cities, increasing the effect of one property owner’s decision on the rest of the community. By the 1960s almost 70% of the population lived in cities, 80% in the Northeast. Thus, with the changing societal and environmental pressures, courts began upholding aesthetic regulations, preventing property owners from constructing buildings that severely departed from the character of the neighborhood.²¹¹

By the end of the twentieth-century, as urbanization continued (80% of the population was now living in cities), aesthetic regulations became even more exacting.²¹² No longer were they only prohibiting the bizarre modernistic house planned in a traditional neighborhood, but more and more courts began to regulate the details of proposed structures, controlling

210. *Id.* at 549.

211. *See, e.g.*, *Marr v. Back Bay Architectural Comm’n*, 505 N.E.2d 534 (Mass. Ct. App. 1987) (upholding denial of building permit to build garage and driveway that did not conform to aesthetic character of neighborhood); *Reid v. Architectural Bd. of Review*, 192 N.E.2d 74, 77 (Ohio App. 1963) (upholding denial of permit to construct single-story u-shaped structure in multi-story residential suburban neighborhood; “ordinance designed to protect values and to maintain a high character of community development is in the public interest and contributes to the general welfare”).

212. While it is unconstitutional to regulate property-use based on aesthetics alone, when a proposed property strays from the aesthetic character of the neighborhood, a property owner can be restricted from building such a structure based on concerns of public interest and general welfare.

for size,²¹³ skylights,²¹⁴ and building material.²¹⁵ Urbanization, rather than a social-obligation norm, may better explain why the law has imposed increasing exception on property owner's right to use their property. As more and more people live in more densely populated neighborhoods, one property owner has the ability to negatively impact a large number of surrounding homeowners. Societal pressures of urbanization have caused the right to exclusive use to weaken and allow the government in some situations to prevent a property owner from doing something with his property that will be detrimental to the public interest or general welfare of the neighborhood.

Similarly, Alexander's arguments for a social-obligation norm underlying environmental regulations can also be explained through changes in societal pressures.²¹⁶ Alexander uses wetland regulations as an example:

The contribution of wetlands to maintaining the well-being of fragile and complex ecosystems is enormous. Wetlands perform a remarkable

213. See, e.g., *Breneric Assocs. v. City of Del Mar*, 81 Cal. Rptr. 2d 324, 332-33 (Cal. Ct. App. 1998) (upholding board's denial of permit for homeowner to build two-story addition; where most buildings in neighborhood were one-story and proposed glass paneled roof deck did not conform with architectural character of the city); *Ryan v. Adirondack Park Agency*, 589 N.Y.S.2d 121, 123 (App. Div. 1992) (upholding denial of permit to allow petitioner to build three-story building with 5,000 square feet of living when petitioners original permit only allowed a 1,500 square foot single-story building, where building would be highly visible from Lake George); *Guinnane v. S.F. City Planning Comm'n*, 257 Cal. Rptr. 742, 749 (Cal. Ct. App. 1989) (upholding city's exercise of discretion to deny permit for plaintiff to build a 6,000 square foot house that would "have an adverse visual effect in that the large size of the proposed dwelling was incompatible with the character of the neighborhood").

214. *In re Quechee Lakes Corp.*, 580 A.2d 957, 962-63 (Vt. 1990) (upholding Environmental Board requiring condominium owner to remove skylights and larger sliding glass door that was built prior to obtaining permits, where such changes had an adverse aesthetic impact).

215. *Coscan Washington, Inc. v. Md.-Nat'l Capital Park & Planning Comm'n*, 590 A.2d 1080, 1090-91 (Md. Ct. Spec. App. 1991) (upholding planning board requiring certain material—wood, brick, stucco, or stone, rather than siding—to be used on exterior of development to improve the quality of housing and preserve area).

216. See Rosser, *supra* note 17, at 117 (arguing that *Shack*, *Matthews*, and *Raleigh* are mere exceptions to a long line of cases upholding property owners' strong right to exclude).

variety of valuable functions, ranging from filtering storing waters to providing fish and wildlife habitats. At the same time, prior to the 1970s, wetlands were disappearing at an alarming rate, as population increase and urban development created greater pressure to fill in wetlands, making their available to commercial and residential development. Since then, wetlands have been widely regulated at both federal and state levels.²¹⁷

The propagation of environmental protections for wetlands can just as easily be explained by changing social conditions. In the 1970s, not only were cities filling up with people, threatening to develop over wetlands, but also there was an increased social awareness about the environment. March 21, 1970, marked the inauguration of Earth Day. And the wetlands were something to care about; they are ecologically important and dwindling. Thus, this is possibly another example of the court allowing the law to change to better-fit modern societal needs.

Alexander also cites cases in which owners' right to exclude is curtailed. In *State v. Shack*, for example, migrant farm workers were housed a camp located on their employer's property.²¹⁸ Medical and legal service providers were charged with trespass when they entered onto the employer's land to remove 28 sutures from one worker and provide legal advice to two workers.²¹⁹

The New Jersey Supreme Court found the trespass convictions could not stand because "the ownership of real property does not include the right [to] bar access to government services available to migrant workers"²²⁰ The employer's property rights must give way to societal needs.

Property rights serve human values. They are recognized to that end and are limited by it. Title

217. *The Social-Obligation Norm*, *supra* note 16, at 796.

218. *State v. Shack*, 277 A.2d 369, 370 (N.J. 1971).

219. *Id.* at 370.

220. *Id.* at 371-72.

to real property cannot include dominion over the destiny of persons the owner permits to come upon the premises. Their well-being must remain the paramount concern of a system of law.²²¹

While this excerpt comes close to acknowledging explicitly that property law places social obligations on owners, societal pressures can also explain this decision.

In the 1960s and 1970s, more and more migrant farmworker accepted seasonal jobs. “We are told that every year farmworkers and their families numbering more than one million leave their home areas to fill the seasonal demand for farm labor in the United States.”²²² Indeed, Congress passed the Economic Opportunity Act of 1964 to try to help with this growing population’s immediate needs of childcare, education, and health and legal services, as well as their long-term needs of developing work skills to become self-sustaining members of the community.²²³ While, in *Shack*, the court declined to extend all rights that come with tenancy, the court held the employer’s right to exclude could not extend to deny workers the opportunity to receive aid from governmental or charitable organizations or from receiving their own visitors.²²⁴ Although the Court unquestionably limited the right to exclude and explicitly stated that “property rights serve human values,” the court limited its holding to the scope of federal law and refused to extend full tenancy rights to these workers. In this case, the court carved out a limited exception to the right to exclude in response to societal changes, including changes in federal law.

Similarly, in *Matthews v. Bay Head Improvement Association* and *Raleigh Avenue Beach Association v. Atlantis Beach Club, Inc.*, the court limited private property owner’s right of exclusion based on changing societal demands. In these cases, the court expanded the public trust doctrine to allow the public onto privately-owned dry sand beaches for recreational purposes.²²⁵ The public trust doctrine originally protected the

221. *Id.* at 372.

222. *Id.*

223. *Id.* (citing 42 U.S.C. 2701 *et seq.*).

224. *Id.* at 374.

225. *See Matthews v. Bay Head Improvement Ass’n*, 471 A.2d 355 (N.J.

public's access to the wet beach area extending from the high and low water marks of the tide for the primary purpose of allowing people access to fishing.²²⁶ The doctrine was extended to include a public's right to engage in recreational activities, such as bathing and swimming, on municipally-owned beaches in the 1970s with the increase in urbanization.²²⁷

Again, the societal pressure of urbanization may have been responsible for this decision. Society had changed significantly since the public trust doctrine was established. A rise in industry brought more people into cities and architectural innovations of high rises made it possible for more people than ever to occupy a given area of land. This increase in population density leads to an increase in demand for desirable property, including beachfront property. Properties along the beachfront were packaged up and bought and sold for top dollar, leaving the city in only possession of a limited number of municipal beaches. Cities, however, are not only home to the rich who are willing to pay top dollar to live there. Political developments, including the construction of public housing and funding of subsidized housing, allowed the extremely poor to live in the same cities as the extremely wealthy (albeit in completely separate neighborhoods). Alexander elaborated on the societal pressures at play in *Matthews* and *Raleigh*:

Imagine you are single parent living in a public housing project in Camden, New Jersey. It is August, and your non-air-conditioned apartment is sweltering. You and your five-year-old

1984); *Raleigh Avenue Beach Ass'n v. Atlantis Beach Club, Inc.*, 851 A.2d 19 (N.J. Super. Ct. App. Div. 2004). While *Matthews* involved a "quasi-public" property owner, the expansion of the public trust doctrine was held to apply to privately-owned beaches as well in *Raleigh*. *Raleigh*, 851 A.2d at 20 (holding private beach club could not limit public's access to dry sand portions of beach for "intermittent recreational purposes connected with the ocean and wet sand . . .").

226. *Matthews*, 471 A.2d at 360. This principle originated from Roman jurisprudence, which held that "the air, running water, the sea, and consequently the shores of the sea . . . were common to mankind" by the laws of nature. *Id.* (quoting JUSTINIAN, INSTITUTES 2.1.1. (T. Sandars trans. 1st Am. ed. 1876)).

227. See *Borough of Neptune City v. Borough of Avon-By-The-Sea*, 294 A.2d 47 (N.J. 1972).

daughter would very much like to spend the day at the beach. You take the bus (you have no car) on the long ride to the stop on the New Jersey shore nearest your home. The beach there is privately owned, and the nearest public beach is several miles away, inaccessible by public transportation. The beach in front of you is beautiful. It is also empty because the owner works in New York City and visits his beach home only sporadically. You might try to trespass and perhaps get away with it, but reluctantly, (and much to the chagrin of your hot and cranky daughter) you choose to obey the law and take the long bus ride back to Camden.²²⁸

Society changed. With the rise in urbanization, the availability of public lands, particularly beaches, grew more and more limited. As a response to these societal changes, the court chiseled away at the right to exclude. These cases are but a few examples of the default right to exclude and right to exclusive use conforming to changes in environmental and social conditions to produce a property law better fit for our current society.

The right to exclude and the right to exclusive use have become default rules in our property system. These rules are products of evolution to which we can assign no normative value. Evolution, however, merely produces “good enough” results. With the development of the human intellect and the growth of society, we can do better than merely rely on these default property rules. Indeed, the environment in which we live today is vastly different from environment in which the deference-to-possessor evolutionary strategy was unconsciously developed in the state of nature. As information theorists argue, property rules perform an important function of communicating information to duty-holders; however, this need not be property’s only function.²²⁹ We currently live in a country where there is a

228. *The Social-Obligation Norm*, *supra* note 16, at 805.

229. There are path dependency concerns with having property law radically shift over a short period of time. Given that our society is structured around a traditional conception of property, the cost of such a shift may

great chasm between the rich and the poor, where the average C.E.O. makes 340 times that of an average worker, and where a full-time worker making minimum wage cannot afford a two-bedroom apartment in any city. The evolutionary default property rules may no longer be ideal for the complexities in our modern society, thus property law cannot remain a static set of rules, but must respond to societal pressures. Understanding the evolutionary origins of our property rules should empower lawmakers and legal scholars to re-imagine and redesign property rules to better fit our current society. To what end depends on what it is we value as a society.

VII. Conclusion

Ownership—at least in its primitive form—is a concept that likely emerged as an unconscious, evolutionarily advantageous strategy. Animals that evolved to respect ownership fared better in evolutionary terms than those that did not. Animal displays of ownership include strong rights to exclude and exclusive use, two rights that are still foundational to our American property system. Given the scientific recognition of the role of evolution in human behavior and the similarities between animal displays of ownership and the default rules of our property system, evolutionary forces have likely shaped human behavior.

Evolution does not promise optimal solutions, but merely good enough results based on historic environmental conditions. Displays of ownership likely emerged in our evolutionary ancestors eons ago, when the world was vastly different than it is today. Our current property system favors a small proportion of people in our society at the expense of the majority. In order to achieve a system of property law that is better tailored to our modern society, the law should be allowed to respond more effectively to our current needs.

outweigh the benefits. This article does not argue against the piecemeal change that has historically occurred in the law. This article argues that these piecemeal changes should be embraced by society because they help mold the antiquated evolutionary understanding of property into a system that better fits our modern-day needs.