In Memoriam

Ning Wang*

Ronald H. Coase, December 29, 1910–September 2, 2013

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Ronald Coase was born into a working-class family in Willesden, a suburb of London. His father was a telegraph operator at the local post office where his mother also worked before their marriage. Both his parents left school at the age of 12, and their main interest was in sports. Though literate, they had too little education to be able to instruct their only child, who showed a precocious interest in scholarship and a talent in self-learning at an early age. While his parents did not offer him much guidance or encouragement in his academic pursuits, they showered him with unconditional love and left him free. The young Coase grew up with few toys, no luxuries, little pressure from his parents, but with abundant support, affection, and tolerance, an ideal home environment for his independent and curious mind to wander and explore.

In conversations we had during his last years, Coase often regretted that his parents did not understand his academic undertaking. Nonetheless, he credited his family upbringing for his character and its impact on whatever academic achievement he was able to make. Coase particularly singled out his mother for teaching him to be honest and truthful. His mother also instilled in him the old stoic virtues of thrift ("leave no food on the plate"), perseverance ("not to complain about life"), and self-reliance ("not be a bother to anyone"). Coase later rejoiced to find a similar emphasis placed on ethics in the works of Adam Smith and Frank Knight, a feature that made their economics more intuitively appealing to him.

As a young boy, Coase had a weakness in his legs, so his protective parents thought it necessary for him to wear iron braces. This caused him to attend a

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school for physical defectives, which was run by the department of the council that was also in charge of a school for mental defectives. As the two schools apparently had an overlap in curriculum, Coase was offered little formal education. Self-motivated and a voracious reader, Coase taught himself enough at the local public library to make up for what he missed at school.

In 1923, Coase took the entrance examination for the local secondary school and was awarded a scholarship to attend the Kilburn Grammar School. For the first time, Coase was exposed to formal education. He blossomed at school and enjoyed all the usual subjects. Despite his previous limited schooling, Coase performed well academically. He was seldom in the top three in his class but never missed being among the top five. He also enjoyed performing in Shakespeare's plays at school and cultivated a lifelong love of literature.

In his later years, Coase often reminisced fondly about his experiences at Kilburn, which laid a firm foundation for his academic career. Among all the teachers he had at Kilburn, Charles Thurston, who taught geography, left a lasting impact. Thurston often took students to lectures at the Royal Geographical Society, exposing his young pupils to cutting-edge research in the field. In his own teaching, Thurston lectured with excitement about Alfred Wegener's theory of continental drift long before it was subject to empirical testing. This episode, in which a scientific theory was accepted, at least by some bold minds, and taught in classrooms before any empirical evidence was provided, prepared Coase decades later to question the central argument of Milton Friedman's positive methodology, which placed prediction as the criterion of theory selection.

In 1927, Coase passed the matriculation examination, with distinction in history and chemistry. In the following two years, Coase stayed on at Kilburn studying for the intermediate examination of the University of London as an external student. This allowed him to complete all the work required for an internal student at the University during his first year of attending university. One task Coase faced was to select a major. Unlike most economists of his generation, who chose the profession to save the world or to fight poverty, Coase did not choose to become an economist. His favorite subject was history, and if he had had his way, he would have become a historian. Entering Kilburn at age 12, a year later than usual, Coase could not study Latin – the boys of his age who had chosen to study Latin had already done so for a year. No knowing Latin, Coase could not major in history, or so he was told. Chemistry was his next favorite subject; but to major in chemistry, Coase had to take calculus, a subject he did not find to his liking. As a result, Coase ended up taking commerce as his major, the only choice left for an external student of the University of London at Kilburn.

In 1929 Coase went to the London School of Economics to complete his commerce degree. He took a wide variety of courses, including accounting, industrial and commercial law, business administration, psychology, and statistics, but none in economics. Among all these subjects, Coase was most attracted to law. He followed the legal cases he read in law reviews with great interest and went to the Law Courts to observe the quick wit of the barristers. Coase was seriously considering a career in law, which would greatly please his parents, when a series of events intervened to change his path. In 1931, five months before finishing his studies, Coase was exposed for the first time to free market economics in Arnold Plant's seminar, an experience many years later Coase described as a "revelation". In the seminar, Coase first learned, and was immediately drawn to, Adam Smith's concept of "invisible hand". For Coase, who had grew up a socialist under the influence of his parents, Plant's seminar was an eye-opener. After this initiation, Coase eagerly discussed economics with Ronald Fowler, another student in commerce, and other students who specialized in economics at LSE, particularly, Abba Lerner, Vera Smith (later Vera Lutz), and Victor Edelberg.

Plant came to LSE in 1930 from Cape Town University of South Africa as Professor of Commerce and took charge of the Industrial Group, a concentration Coase chose in the same year. Plant had been a student of Edwin Cannan. A contemporary of Alfred Marshall, Cannan is best known today for his 1904 edition of the *Wealth of Nations*, the very best edition of Smith's great work. Cannan kept alive Adam Smith's commonsense approach to economic analysis and economic policy at LSE, a tradition he bequeathed to Plant, who then passed it on to Coase. It was this tradition of economics that Coase devoted himself to throughout his long career, a tradition he wished to enrich and expand.

The next year, with the support of Plant, Coase was awarded a Sir Ernest Cassel Traveling Scholarship, which allowed him to spend one year (1931–1932) abroad. Coase chose to visit the United States to investigate industrial integration. It was this scholarship and ensuing fieldtrip that sealed his fate. In the United States, Coase spent most of his time touring industrial facilities and talking to businessmen. Coase also read a wide variety of materials that he could find on industrial integration to get himself informed, from scholarly writings to trade journals. As the country was suffering "the Great Depression", Coase found American businessmen readily accessible and talkative. While traveling across the country, Coase also visited some universities, including Columbia University and the University of Chicago. While at New York City, Coase went to see Wassily Leontief. While at Chicago, he talked to Jacob Viner and listened to Frank Knight's early morning class.

It was also during this trip, in Chicago in early 1932, that Coase met Marian Hartung, who was then a music student at Northwestern University. They immediately fell in love. After two years of a long-distance relationship, strengthened by regular correspondence and mutual trust, they became engaged in the summer of 1934 during a visit Hartung made to London. After graduating from Northwestern, Hartung performed on the cello in Chicago and taught music at schools for young and adult students. Hartung and Coase got married in August 1937 at a register's office in London, with no wedding or honeymoon, as the world was heading toward WWII. With her love of music and dance, particularly ballet and opera, her sense of humor, her quick wit and adroitness, Hartung brought love, companionship, and support to Coase throughout the eight decades they were together. She passed away in October 2012, a month short of her 100th birthday.

Another outcome of his traveling year was "The Nature of the Firm", an article Coase conceptualized in the summer of 1932 after his return to London. He completed the first draft by the summer of 1934 but did not publish it until 1937. In this stunningly original article, Coase asked a deceptively simple and straightforward question that had long been overlooked by economists. If everything in a market economy is coordinated by the price mechanism, as claimed in standard economics textbooks, "Why does a firm emerge at all in a specialized exchange economy?" The answer Coase came up with was so novel and disruptive to the conventional way of thinking that economists did not recognize its significance until the 1970s.

The answer was not that the firm performed some magic that the market could not. Rather, Coase found that using the market itself was not free. The costs of using the pricing mechanism, which have become known as transaction costs, give rise to the firm. Few economists showed any interest in the article when it first appeared, including those at LSE. Neither Coase's teacher, Plant, nor his boss at LSE, Lionel Robbins, ever referred to the article. Even today, when "The Nature of the Firm" has become one of the most cited articles in modern economics, its message is not yet properly understood. Nor is its significance fully recognized. Some economists have criticized its argument as a "tautology" and faulted Coase for not making the concept of transaction costs "operational." For his purpose, the discovery of transaction costs in the working of the market economy was sufficient as a novel explanation of the firm. For Coase, transaction costs were more an empirical finding than an analytical invention. Their nature and magnitude could only be unveiled through a cumulative interplay of empirical investigations and theoretical refinement. Attempts to elaborate the concept on purely analytical ground, without systematic empirical studies, would not bring much clarity.

Coase's explanation of the firm has led many to view the firm and the market as substitutes. Observing the ubiquity of firms in a market economy, Coase inferred that there must exist a cost of using the pricing mechanism. Otherwise, coordination among specialized agents could all be done through the market. From a static point of view, the firm and market present two competing mechanisms to organize business transactions, a choice later often referred to as "to make" versus "to buy" in the literature. In the real dynamic world, the firm and the market are the two main types of business organizations that make up the economy. They complement each other as well as substitute each other.

The rise of the firm in a market economy does not imply "market failure" or the triumph of "selective intervention" on the part of the firm. Selective intervention would require the firm (or its manager) to know ex ante its advantages relative to the market and to act accordingly. This information requirement is far too demanding to be met in reality even if the firm has the correct incentives to collect and act on the relevant information. Coase urged us to come to terms with the fact that no economic institution is perfect.

When economists are preoccupied with building economic models in which the market is presumed to work smoothly, they ignore transaction costs totally, at their own peril. Without recognizing transaction costs, an inevitable and ubiquitous feature of any real world economy, economic theories have limited explanatory power. When they bracket themselves in an imaginary world of zero transaction costs, economists end up doing what Coase later called "blackboard economics" – economic modeling and theorizing that can be readily put on paper or on a blackboard to impress students or funding agencies, but that sheds little light on how the real world economy operates. Coase, inspired very early on in his career by Darwin, was always meticulous with facts and deeply skeptical of building theory out of thin air.

With Plant's recommendation, Coase was offered a teaching position at the newly established Dundee School of Economics and Commerce while he was still traveling in the United States. Coase arrived in Dundee in October 1932 and taught for two years before moving to the University of Liverpool, where he stayed for one year (1934–1935). In both places, Coase was assigned heavy teaching loads. As all these subjects were new for him, Coase preoccupied himself with course preparations and giving lectures. As part of his preparations for teaching at Dundee, Coase began to read Adam Smith, Babbage, Jevons, Marshall, Wicksteed, and Knight. Coase presented the main argument of "The Nature of the Firm" as the first lecture in his course on the organization of the business unit in the fall of 1932. Influenced by his fieldtrip in the United States, Coase often took his students to visit local jute factories and talk with business people. At Dundee, Coase also formed a close bond with Duncan Black, who was hired in the same year and would later become a founder of the field of public choice. A native of Scotland, Black showed Coase around during weekends. Coase enjoyed those expeditions, including a memorable visit to Kirkcaldy, where they located the site where the very young Adam Smith was rescued from kidnapping by gypsies. Coase and Black maintained their friendship for their lifetime.

While teaching at Dundee and Liverpool, Coase spent his vacations at LSE, mainly to discuss economics with Ronald Fowler. At the time, Coase greatly admired the pioneering studies of Henry Schultz in deriving statistical demand schedules and he had a strong interest in applying quantitative methods to investigate theoretical concepts in economics. Coase tried his hand at examining the cost of capital, seeking to study how it varied across firms and industries; but this investigation did not lead to any publications. He did break new ground on the topic of producers' expectations. Investigating the pig cycle in Britain, Coase and Fowler showed that pig producers did not usually assume that current prices and costs would continue into the future, thereby refuting the assumptions made in the cobweb theorem of the pig cycle. Their statistical investigation indicated that pig producers expected prices to fall (or rise) in the future if they were usually high (or low). Decades later, this empirical study of producers' expectations was recognized as a pioneer, foreshadowing the rise of "rational expectations" that would gain dominance in the 1980s.

In 1935, Coase returned to LSE as an assistant lecturer. He was assigned two courses, one on the theory of monopoly and one on the economics of public utilities. It was the teaching of public utilities that redirected Coase's research interests, forcing him to give up the quantitative studies he had planned. There was little existing literature in economics on such public utilities as the postal service, telegraph service, water supply, electricity, and broadcasting. Coase therefore set himself the task of finding out how public utilities actually started and operated in England and how they changed over time and across regions. As an economist, Coase approached each of the subjects first as a historian, collecting as many facts as he could. He dug up their history in government and corporate archives and immersed himself in the historical materials. Concerning water supply in London, Coase probably had the best collection of materials in the world. His thoroughness in conducting research made his work long in germination, rich in insight, and profound in impact. Even though the topic had not been his choice, Coase thoroughly enjoyed every aspect of teaching the course on public utilities, including preparing for and delivering the lectures. Some of his lecture notes ended up as journal articles. Also during this period, Coase wrote a series of articles explaining the concept of cost to accountants and managers; they became part of the LSE tradition on opportunity cost. Cost would later become a unifying theme in Coase's research program and a foundational tool in his efforts to uncover the working of the economy as a complex evolving system.

During WWII, Coase worked for the British government, first as head of the Statistical Division of the Forest Commission (1940–1941), and then as statistician, and later chief statistician, of the Central Statistical Office of the War Cabinet (1941–1946). He was stationed in the United States in 1946 as acting British director of Statistics and Intelligence for the Combined Production and Resources Board in Washington. What Coase learned most from his wartime experiences was an intimate knowledge of how organizations function or malfunction. For example, he learned that the internal structure of an organization is never a simple hierarchy, that people inside an organization are more interested in covering their errors than correcting them, and that information channeled to the head of an organization is always selective and biased.

When he was in charge of the statistics of weapons and ammunition for the British army, Coase noticed that some war theaters had more cannons and guns than needed, while soldiers elsewhere were inadequately equipped. He also found persistent mismatches between the number of weapons and the amount of proper ammunition. On his own initiative, Coase produced a table showing these allocation problems and his suggestions to address them, which he submitted to higher command. After a few months, Coase was asked to stop producing the table, not because the information he provided was unimportant, but because few people were eager to see their errors exposed.

Another episode during the war had a lasting impact on Coase's view of business firms. In 1945 as the British government was planning for post-war reconstruction, Coase was asked by James Meade to investigate long-term contracts to see whether they could provide any information to help estimate the impact of government expenditures on employment. After studying a sample of these contracts, Coase concluded that the contracts contained no useful information for the purpose that motivated Meade. Coase found that a typical contract was vague and severely incomplete. This led him to conclude that contracts could not possibly be the only or even the main mechanism of coordination between business firms.

After the war, Coase returned to LSE in 1946 and became responsible for the main course, "The Principles of Economics." Even though Coase had to follow convention in his teaching, as the students were required to take a standard test, his lecture notes which are now available at the Special Collection of the University of Chicago Regenstein Library revealed his distinctive ways of thinking. He criticized the assumption of rationality; he differentiated the costs of using materials from payments spent on purchase; he recognized price discrimination as common in the economy; and he rarely mentioned scarcity. At one point Coase signed a contract with a publisher who was interested in making his lecture notes into a textbook, but Coase later reneged as he could not find time to do it.

In his research, Coase continued to write on public utilities, particularly broadcasting. In 1948, Coase spend nine months in the United States on a Rockefeller Fellowship studying commercial broadcasting. A book length treatment of British broadcasting, the BBC monopoly, appeared in 1950. During the same period, Coase also published a number of articles criticizing marginal cost pricing. He argued that under many circumstances in the real world, setting price to marginal cost would often create inefficiency. Even though LSE promoted Coase to the position of Reader in 1947, his empirical studies and his way of thinking about economics were not appreciated there. Coase was also disturbed by many policies pursued by the post-war Labor government under Clement Attlee. His trips to the United States and exposure to the American way of life before and during the war and his admiration of Frank Knight, George Stigler, and American economics also influenced him. Coase was offered the only endowed chair professorship at LSE, the Tooke Professor of Economic Science, after Hayek left the chair in 1950. Never swayed by prestige, Coase decided to leave LSE for the United States of America to embrace the new world.

Coase's first employer in the United States was the University of Buffalo. Coase got to know John Sumner, an economist specialized on public utilities at Buffalo who visited LSE before the war. After Coase informed Sumner of his intention to migrate to the United States, the University of Buffalo made him an offer to fill the vacancy left by Fritz Machlup. Coase visited Buffalo in 1932 and liked the buzzing industrial town, so he quickly accepted the offer. Coase's decision baffled many of his former colleagues at LSE as well as those at Buffalo; but he was not to be disappointed. Coase enjoyed the tranquility of the small town life at Buffalo and had the freedom and support to continue his research on the political economy of broadcasting. While at Buffalo, he was offered visiting or regular positions at several prestigious universities, include Harvard and Chicago. He turned them down and buried himself in his research. At one point, he began to study oil painting, but then quickly gave it up because it took too much time away from his work. Coase's portrait of Duncan Black from that period survived and is now displayed at the Ronald Coase Center for Property Rights Research at the University of Hong Kong.

Coase's quiet life at Buffalo came to a close when he was persuaded by Warren Nutter to join the University of Virginia which, under the leadership of James Buchanan, was trying to build a distinctive economics program. While Coase had had a happy time at Buffalo, he did not think Buffalo had either the ambition or manpower to change economics. A determined reformer of economics, Coase moved to Virginia with much hope and excitement. Before taking up his position there, Coase spent one year 1958–1959 as a Fellow at the Center for Advanced Studies in Behavioral Sciences at Stanford University. At the Center, Coase interacted with David Cavers, a legal scholar from Harvard, Cora Dubois, a cultural anthropologist, also from Harvard, and many other fellows. Among them, Coase interacted most with Thomas Kuhn. He found Kuhn's view of measurement in the development of theoretical physics to be of direct interest to his own thinking on the role of theory versus empirical studies in economics. Coase spent most of his time at the Center writing an article on the Federal Communication Commission, which grew out of his study of broadcasting. Coase submitted it to a new journal, the *Journal of Law and Economics*, started by Aaron Director at the University of Chicago Law School. While Director liked the paper and decided to publish it as the lead article in the second issue, he and a group of Chicago economists found an ostensible error in Coase's paper, or so they thought. Director wrote to Coase and asked him to remove the passage that contained the error. Coase disagreed and wanted to keep the passage in. As communication by correspondence was slow before the age of e-mail, Coase was invited to come to Chicago to explain his views in the spring of 1960.

Coase first presented his views at George Stigler's workshop. In the evening, he was invited to Director's house on Blackstone Avenue at Hyde Park for dinner. What happened after dinner at Director's house has become a legend in modern economics. The others present included Martin Bailey, Milton Friedman, Arnold Harberger, Reuben Kessel, Gregg Lewis, John McGree, Lloyd Mints, and George Stigler. The point under debate was Pigou's analysis of externalities, which had been accepted as the foundation of welfare economics. Coase thought Pigou's analysis was wrong. During the course of two hours, Coase, with the help of Friedman, who was the first to be convinced by Coase's arguments, persuaded all his opponents to come to his side. After the debate, Coase was asked to write it up. Coase did most of the writing while spending the summer of 1960 at LSE. "The Problem of Social Cost" appeared as the lead article in the third issue of the *Journal of Law and Economics*; it is now the most widely cited law review article of all time.

The following example illustrates the problem that gave rise to "The Problem of Social Cost". Suppose that a fertilizer plant pollutes the water in a nearby river that is used by a fish farm downstream. When choosing its scale of operation, the fertilizer producer ignores the damages it imposes on the fish farm, whose existence it may not be aware of at all, thus driving a wedge between private and social costs. Undercounting its full cost of operation, the fertilizer plant tends to overproduce and fertilizers tend to be underpriced.

Egregious resource misallocation follows or so it seems. This calls for the government to impose a tax on the fertilizer producer to make it bear the full cost of production. This correction is known as the Pigovian tax. On the surface, the logic appears straightforward and simple: selective state intervention equalizes private and social costs, eliminating externalities in the economy.

It took an independent, courageous, and imaginative mind to challenge and overthrow the strong intellectual consensus supporting Pigou's view. Coase proposed an alternative viewpoint, in the light of which the wrongs that Pigou sought to redress appear differently. The root cause of the problem, Coase argued, is not that one party (the fertilizer plant) is harming the other (the fish farm) and thus state intervention is needed, but rather that two parties are competing for the use of resources (water in the river). From this perspective, what many viewed as the villain and as the victim in a crime scene emerge as rival users of scarce resources. Coase not only recast the problem but he also opened a new vista in the search for a solution. What is called for is no longer state intervention to punish the wrongdoer, but instead the proper institutions to facilitate market transactions. Which institutions help and which ones hinder the operation of the market, and how and under what circumstances can only be discovered through empirical investigations. One institution Coase singled out in "The Problem of Social Cost" is property rights. When property rights are well defined, by law and custom, and readily transferable, competition tends to move resources to the highest use as determined by the market. Market competition in securing resources may present itself as a conflict among rival employers (the fertilizer plant versus the fish farm); but it is ultimately determined by the relative purchasing power of consumers of respective products (fertilizer versus fish buyers). Smith's "invisible hand" turns out far more resilient than was understood by Pigou and accepted by his followers.

One element of Coase's analysis was later distilled by George Stigler into what he called the Coase Theorem: under perfect competition, private and social costs will be equal." Even though the Coase Theorem has spawned an immense amount of literature, Coase never liked it and was disappointed that his main message was falling largely on deaf ears. Coase did not like the Coase Theorem (and the assumption of perfect competition) because it is a proposition about an imaginary world of zero transaction costs. Coase's main message was that when economists evaluate alternative social arrangements, they should compare the total product yielded by different arrangements. The comparison of the private and social product of any single arrangement is simply neither here nor there.

Coase finished his term at Palo Alto in July 1959 and moved to Virginia. His main teaching responsibility at the University of Virginia was the principles of economics, and he planned to develop his lecture notes into a textbook. Coase also taught and greatly enjoyed a course on the history of economic thought, in which he lavished his time on Smith and Marshall. The instant success of "The Problem of Social Cost" made Coase a greatly sought-after speaker; but his service at Virginia only received lukewarm appreciation. At the same time, Buchanan's efforts to create a strong economics program encountered strong oppositions on campus and were derailed by the university administration. Coase left Virginia in 1964 to take on a new opportunity. He was asked by Director to take over the editorship of the *Journal of Law and Economics*. Coase joined the Chicago of Chicago with an initial joint appointment at the Law School and the Business School, and later, a full appointment at the Law School. Coase's main goal stayed constant: to use the *Journal of Law and Economics* to influence economics. Coase was an active and devoted editor for 18 years until his retirement in 1982.

As editor, Coase did not wait passively for manuscript submissions. Instead, he sought out articles that he was interested in publishing. He attended workshops, seminars, and conferences to talk to authors whose articles he found promising. On many occasions, he suggested specific research questions to colleagues and friends. He communicated intensively with authors and gave them detailed comments and suggestions on their papers. He used peer review rarely, and then mainly for technical matters. Under his editorship, the *Journal* played a key role in making law and economics into a new field of study.

Coase's devotion to the *Journal* puzzled many, including his close friends. How, during his prime years, could he commit himself to professional service at the expense of his own research? But Coase did not view his editorship as professional service. He was not serving as editor out of public spiritedness. What motivated him was his conviction that the progress of economics had been arrested by its obsessive formalism, its static nature, and its separation from the real world and that economics had to change by reengaging economic reality and embracing diversity. Coase aimed to keep the market for economics ideas open. As he knew well, the market for ideas, not unlike other markets, was not free. Coase practiced what he professed. In this case, as in many others, the pursuit of self-interest leads to public good, if self-interest is broadly and properly understood in the Smithian sense.

In the first five or so years after assuming the editorship, Coase was totally preoccupied with the *Journal*. After 1970, Coase was able to resume his own studies on several fronts. In 1972 to celebrate the 50th anniversary of the National Bureau of Economic Research, Coase presented a paper, "Industrial Organization: A Research Proposal", criticizing the prevailing view that denigrated the economics of industrial organization as a mere application of price theory. As an alternative, Coase proposed a "direct" approach and asked economists to investigate the actual organization of industry, including its variations in the economy and evolution over time. In 1972, Coase also published an article, “Durability and Monopoly”. Seven-page long with no references, it contained what would become known as the “Coase conjecture”: a durable good monopolist has to behave as if he is in a competitive market. In December 1973, at the American Economic Association meeting at New York City, Coase gave a paper, “The Market for Goods and the Market for Ideas”, in which he urged economists to come to terms with the parity of the two markets. What puzzled Coase was the striking inconsistency in attitude and behavior manifested by many economists, who while defending vehemently the free market for ideas, often believed in and advocated government regulation in the market for goods. In 1974, Coase published “The Lighthouse in Economics”, in which he criticized able economists, past and present, for taking the lighthouse as an example of public good without ever investigating the history of lighthouse operations. His final empirical study of broadcasting, “Payola in Radio and Television Broadcasting,” appeared in 1979. In it, Coase showed that the ban on payola criminalized a pricing mechanism but failed to stop people from securing a valuable service by other means. Also during this period, Coase began to move into the history of economic thought and to write on Smith and Marshall, his two favorite economists.

After stepping down from his editorship, Coase was able to pull together many threads of thoughts on method that he had ruminated about for decades. The result was first delivered in November 1981 as the third G. Warren Nutter Lecture in Political Economy, “How Should Economists Choose?” It appeared as a polemic against the most influential article on methodology in modern economics, “The Methodology of Positive Economics” by Milton Friedman. But Coase’s main message was constructive. He argued that theory mainly serves to organize thinking and guide empirical research and it is what Marshall called “the engine of analysis”, a term favored by Friedman himself. Coase urged economists to be careful in making assumptions while building theoretical models. He argued that empirical studies are always guided by theory and the role they perform is more like a passionate advocacy than like an indifferent judge. Even on those occasions when empirical findings serve as judge, it is when competing theories are involved. Coase believed that theory advances through competition, not by surviving the test of prediction. In the end, Coase urged economists to take the market (for ideas) seriously.

In his later years, Coase continued his own research and increasingly offered support, advice, and guidance to younger scholars. In 1987, Coase attended a conference organized at Yale University to celebrate the 50th anniversary of “The Nature of the Firm” and gave three lectures on the origin, meaning and influence of his original article. Later in the same year, Coase delivered the McCorkle Lecture at the University of Virginia Law School, "Blackmail." He published two collected volumes, *The Firm, the Market and the Law* in 1988 and *Essays on Economics and Economists* in 1994. His last solely authored paper, "The Conduct of Economics: The Example of Fisher Body and General Motors," appeared in 2006. In this paper he analyzed an example commonly used in the field of industrial organization in order to illustrate the miscarriage of economics. Seeking to encourage economists to make more use of business contracts in their study of the organization of industry, Coase organized a conference on Contracts and Activities of the Firm in 1990 in Chicago. Later he helped to establish a research center to collect business contracts and make them available to researchers, first at the University of Pittsburgh, and later at the University of Missouri. He was a long-time supporter of the University of Buckingham, the only independent university in Britain. In 1997, Coase was the founding president of the International Society of the New Institutional Economics. Subsequently he lent his name and gave generous support to the Ronald Coase Institute, an organization devoted to assisting young scholars in the social sciences around the world to investigate important economic problems in their own countries.

Even though he never visited China, Coase had a long interest in China. As a boy he read Marco Polo and was fascinated by early Chinese civilization. He was also puzzled by China's fall and stagnation in modern times. After China started opening up in the late 1970s, Coase encouraged Steven Cheung to return to Hong Kong to observe and study China's economic reform. In 2008, Coase organized a conference on China's market transformation, held in Chicago. After the conference, Coase and I joined together to write an account of China's extraordinary market transformation. *How China Became Capitalist* was published in 2012. What Coase found particularly interesting was that China returned to its cultural roots via capitalism. That the Chinese market economy stood firm on its long and rich traditions led Coase to conclude that capitalism would not only stay in China but also forge its own path. In China Coase helped to establish two research centers, one at Zhejiang University (The Ronald Coase Center for the Study of the Economy) and one at the University of Hong Kong (The Ronald Coase Center for Property Rights Research). He hoped that as Chinese scholars began to trace how the Chinese market economy worked and evolved in its characteristic ways, they would contribute to the development of economics in the twenty-first century.

Coase's curiosity never left him. Even in his last years, he regularly watched NOVA, his favorite TV program. Nor did he ever cease working or thinking in his own way to push economics forward. A perennial question always in Coase's mind since the start of his long career was the following. Modern physics has made so much progress since Newton that students today no longer learn physics from *Principia*. Similarly, modern biology has long moved beyond Darwin, despite the fact that evolution still stands as its very foundation, so that students no longer learn biology by reading *On the Origins of Species*. In economics, however, students still learn much from Adam Smith by reading *The Wealth of Nations*. What accounts for the lack of progress through time in economics?

Coase thought it necessary to find out how scientists worked and how scientific discovery was made. He was particularly interested in biology, from which he believed economists had much to learn, since the subject matter for biology and that for economics are both complex and evolving. For this purpose, Coase was a loyal subscriber to *Scientific America*. In his later years, Coase also subscribed to *Science* and *Nature*. Darwin and Crick were Coase's favorite biologists. In the summer of 2012, Coase and I read *Quantum: Einstein, Bohr, and the Great Debate about the Nature of Reality*, the last science book we discussed together. He gleaned from his amateur excursions into the natural sciences that they all had a subject matter, nature for physicists and life for biologists, and that the natural sciences were all empirically oriented. At the end, Coase did not offer an answer, but he was convinced where to look for one. Coase deplored that economists' focus on choice had deflected their attention away from production. He urged economists to investigate "the structure of production" to find out how the market economy operates and evolves. Toward the very end of his life, Coase determined to launch a new journal, *Man and the Economy*. His experience with the *Journal of Law and Economics* convinced him that a journal, if properly run, can create a community of scholars and bring forth a thriving market for ideas.

I had the great luck to enter Coase's life in May 1998, initially as his research assistant while I was a Ph.D. student at Chicago. Eighty-seven years old at that time, Coase showed little sign of aging and maintained an active research agenda. The first books he asked me to check out were *What Mad Pursuit* and *The Eighth Day of Creation*. When I asked him to suggest a reading list on economics, Coase told me to start with Adam Smith and Marshall. Even though I was hired as his research assistant, it turned out that I spent more time learning economics from him than assisting him in research. We met monthly over lunch at the Italian Village in downtown Chicago, half way between his Astor apartment and Hyde Park where I lived. After I moved away from Chicago in 2005, we continued to meet at least once a month. Whenever I went to visit him at the Hallmark, a retirement community on Lake Shore Drive close to the Lincoln Park Zoo, I always stayed in the guest room there. We normally spent more than eight hours together each day, from lunch at 11:30 am until late in the night. Coase often took a long nap in the afternoon. When the weather cooperated, I occasionally went out with him to stroll along Lake Michigan. By then, he had to rely on a wheelchair when outdoors, but still walked around inside his apartment. Over the last 15 years of his life, his physical stamina gradually weakened, but his mind was always clear and sharp, and economics was always the subject of our conversations. In the final couple of years, Coase often referred to himself as "an extinct volcano", and expressed sorrow that he was no longer himself.

During his long career, Coase never went after fame or status. He always sought to understand how the market economy works and to discover what can be done to improve it. He found the basic economic concepts a powerful tool and stayed away from various fashions and trends in high theory that had swayed modern economics. As a single-minded economist, Coase was embarrassed about the disappointing state of economics. This created in him a unique character that combined humility and stubbornness. Coase was a stubborn scholar; his fearless self-confidence was only softened by his profound sense of humility. Always soft-spoken, Coase could be, and sometimes was, an outspoken critic. He dared to take issues with any authority, friend or foe, whose views he thought erroneous and inimical to the development of economics.

Having lived through the troubled times of the twentieth century, Coase remained an optimist. He encountered in human affairs too much stupidity to believe that people are rational. People behave more rationally, Coase admitted, when they have to pay a higher price for being irrational. Coase was a tolerant humanist; he excused human fallibility and frailty on the ground that human beings are a young species. He only hoped that people are wise enough not to denounce ideas and destroy institutions that help to sustain human cooperation and stimulate cumulative collective learning.

Some of Coase's ideas took decades to be understood; some still remained misunderstood at the end of his long life. This did not dampen Coase's belief in the market for ideas. He often referred to a saying of Edwin Cannan that error may win the day, but over the long run truth prevails. I once asked him, "Given how your work has been treated or mistreated, why do you still have confidence in Cannan?" Coase's answer was full of his character: "Error must have its weakness."

I was fortunate to have Coase as a mentor, a co-author, and a dear friend. To know him intimately allowed me to dwell in his mental world, at least intermittently, to be inspired by his vision of economics, to be awed by his devotion to scholarship, and to form a sympathetic understanding of his economics, including his way of looking at economic problems and his conception of the nature of the subject. G. K. Chesterton made a distinction between two kinds of great men. “There is a great man who makes every man feel small. But the real great man is the man who makes every man feel great.” Coase will be remembered as a real great man.

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