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J. Russell Smith: A Crusader for Pomological Crops

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Abstract

Joseph Russell Smith (1874-1966) is recognized today as a founder of American geography, educator of many, and a crusader for the use of pomological crops to help feed the world's population and to protect erodible soils. As a prolific author of more than 180 articles and 40 textbooks, he educated school children, college students, and the American public about the genetic improvement of pomological crops, sustainable agricultural practices, and production and marketing of agricultural products to alleviate world famine. J. Russell awakened Americans to the need for planting trees and perennial cover crops on steep hillsides 26 years before the Soil Conservation Service was established. He doggedly championed agricultural causes and served as a voice for farmers via his articles in the popular press, often effecting change. Throughout his life, J. Russell promoted the planting of improved fruit cultivars and underutilized nut trees to produce food for human and animal consumption. Long before thornless blackberry cultivars were developed, he envisioned this trait and others possible for pomological crops, if more funding would be devoted to plant breeding. Recognizing the benefits of grafting, J. Russell challenged producers across America to search for budwood to produce superior nut trees, which resulted in named selections ultimately disseminated by members of the Northern Nut Growers Association and his Sunny Ridge Nursery. At the zenith of his career, Smith wrote his seminal book, *Tree Crops: A Permanent Agriculture*, which remains a source of inspiration for students and practitioners of soil conservation, sustainable agriculture, and agroforestry.

J. Russell Smith spent his academic career as a geographer with a keen interest in sustainable agricultural production methods that would feed not only those on the family farm, but also help alleviate food scarcity across several continents. Beginning in the 1900's, he was an ardent advocate for plant breeding, grafting superior cultivars, and planting pomological tree crops to conserve soil on steep, erodible land (Smith, 1929). Garnering the power of the press, J. Russell helped shaped public policy on human land use in a multitude of articles and introduced public school youth to agricultural production by geographic regions in his textbooks (Martin, 2015).

Early years and education. J. Russell was born in Lincoln, Virginia on 3 Feb.1874 and was raised in the Quaker tradition by his parents, Thomas and Ellen, on their family farm. His father raised livestock, grew row crops, and often sought new plant varieties from others for experimentation on their farm, which was a practice J. Russell adopted later in life. As was the custom, his mother took care of the family household. At an early age, J. Russell helped feed the chickens and pigs and tended the family garden, along with other chores. However, for recreation, his mother often played map games with her son, which may have sparked his interest in geography later in life (Rowley, 1964).

J. Russell attended the local Quaker schools in Lincoln until age 17 and then prepared for college at Abington Friends School in Jenkintown, PA. In 1893, he was admitted to the Wharton School of Finance and Economy at the University of Pennsylvania. J. Russell was a full-time student for only one year. To fund his education, he taught history in various high schools but returned to Wharton in 1897, where he passed all his

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Fig. 1. A photograph of J. Russell Smith before 1898. *Photo courtesy of The American Philosophical Society*.

written examinations. The following year, he received his B.A. degree and was awarded the Terry Prize for distinguished scholarship. Subsequently, J. Russell began working on an M.S. degree at Wharton under Emory R. Johnson, a well-known economist who specialized in transportation issues. During this time, he was appointed Johnson's assistant on the Isthmian Canal Commission for two years to evaluate navigation routes, determine construction costs, and estimate the potential traffic for what would later become the Panama Canal. This position marked the beginning of J. Russell's migration into the field of geography (Martin, 2015).

In 1898, J. Russell married Henrietta Stewart, who was instrumental in his career throughout her life. After J. Russell's work for the Commission ended, he and Henrietta left for the University of Leipzig on 31 July 1901 to study geography. After studying major European ports for a year, J. Russell returned to the University of Pennsylvania, where he earned a Ph.D. in Economics in 1903.

Academic career in geography. After completing his Ph.D., J. Russell stayed at the University of Pennsylvania to teach at the Wharton School and was subsequently promoted to Professor and Chair of the Department of Geography and Industry. In 1913, he published his first major textbook for college students, *Industrial and Commercial Geography*. Subsequently, J. Russell was sponsored by the University for a field trip to Europe and North Africa to study tree-crop agriculture (Orchard, 1967). Observations during this study trip profoundly influenced his passion for conservation and were often referenced in many of his later publications.

In 1919, he was recruited by Columbia University to serve as Chair of the Division of Economic Geography in the Business School. At this university, he developed regional courses in geography and was considered unorthodox, controversial, and daring for melding two disciplines into a new field called human-economic geography (Row-

Fig. 2. J. Russell Smith, two years after he was promoted to an Assistant Professor at the Wharton School of Finance and Economy at the University of Pennsylvania in 1908. *Photo courtesy of The American Philosophical Society.*

ley,1964; Starkey,1967). J. Russell not only continued to write college-level textbooks, but also began publishing numerous other texts in 1921, which were widely adopted for use by elementary to high school students across the United States. In his textbook, *Home Folks*, written for third-grade students, J. Russell presented different types of communities by region in the United States, with chapters on people growing agricultural crops and their production practices (Smith, 1927a). In two volumes titled *Human Geography,* he introduced fourth to sixth-graders to the production of such crops as coconut, coffee, olive, grape, fig, almond, chestnut, plum, and walnut, and discussed post-harvest methods and marketing of these crops by local inhabitants in various regions of the world (Smith 1921a, 1921b).

Building upon agricultural themes, J. Russell addressed the unequal distribution of food and human populations, as well as trade barriers resulting in worldwide hunger in the aftermath of WWI in *The World's Food Resources* (Smith, 1919c). To alleviate food scarcity, he identified underdeveloped areas on nearly every continent that had untapped agricultural potential. Over a century ago, J. Russell included topics in this textbook that are relevant today. For example, J. Russell also warned readers of the dangers of overproduction of crops, such as apples in temperate growing regions, which would result in low prices worldwide. He also wrote of the unpredictability of producing stone fruits in cold climates and discussed the perishability of these fruits.

After the publication of *North America* (Smith, 1925), J. Russell spent a year traveling in Asia to strengthen his geographical knowledge of the continent. Thereafter, he returned to Columbia University, continued writing copious scholarly works (Rowley,1964), and influenced a multitude of students until his retirement in 1944. Subsequent to his university retirement, J. Russell co-authored a series of thematic social studies textbooks much like *Home Folks: A Geography for Beginners* and *World Folks*, including *Neighbors Around the World*, *Neighbors at Home*, *Neighbors in the Americas*, *Neighbors in Latin America*, *Neighbors in the United States and Canada*, and *World Folks* (Smith, 1927a, 1930; Smith and Sorenson, 1947a,1947b, 1948a, 1951b, 1951c). Although Smith's true vocation was geography, his avocation was agriculture. The publication of many textbooks financially supported his pomological activities during much of his life (Rowley, 1964).

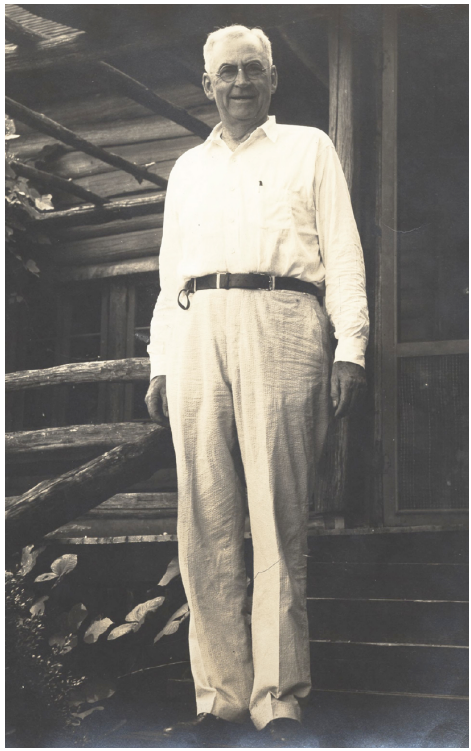

Fig. 3. J. Russell Smith at age 68, which was two years before his retirement from Columbia University in 1944. *Photo courtesy of The American Philosophical Society.*

Agricultural pursuits and passions. J. Russell had no formal schooling in agriculture. However, growing up on a farm in Virginia gave him a wealth of understanding of the challenges of crop and animal production.

Before the Smith-Lever Act in 1914, which established the Cooperative Extension Service, J. Russell recognized the need to disseminate science-based information to farmers. At the time the Extension Service was established, about half of the U.S. population lived in rural areas and 30% of the workforce was engaged in farming (USDA, 2022). Moreover, little effort was devoted to perennial trees crops compared with annual row crops, such as corn. J. Russell also recognized the unmet potential for growing pomological crops, utilizing sustainable practices to alleviate food scarcity. Thus, in the six years before Cooperative Extension was created, he became a prominent source of information on pomological crops and a voice for agriculture in the popular press, and continued this effort throughout his lifetime.

In 1909, J. Russell published "Plows and Poverty", which was the first of a myriad of articles in the popular press and academic journals on the need for widespread adoption of soil conservation practices on hillsides prone to erosion from excessive precipitation (Smith, 1909; Rowley, 1964). Specifically, he argued against the use of plowing on steep agricultural sites and promoted replanting cornfields with more profitable apple orchards in this article. Furthermore, citing examples of sustainable perennial tree crop production he had witnessed in Europe and Asia, J. Russell advocated the planting of several fruit and nut tree cultivars with a sod ground cover to reduce soil loss on erodible sites (Smith, 1913e, 1914b). He also challenged the United States Department of Agriculture (USDA) and University Experiment Stations to "determine the limits of plowless fruit growing". Ultimately, the Soil Conservation and Domestic Allotment Act was passed by the U.S. Congress to establish the Soil Conservation Service with the mission "to provide permanently for the control and prevention of soil erosion and thereby to preserve natural resources" in 1935 (National Agricultural Law Center, n.d.).

In "Plows and Poverty", J. Russell also implored government agencies to send plant explorers to "the very ends of the earth" to bring back fruit- or nut-bearing species for improvement. Lastly, he called for "a regiment of the greatest of all wizards, the plant breeders, [to] get to work with their newfound laws of heredity and produce from all of this mass of plants, with their few isolated good qualities, a dozen or two of splendid crops for the hillside. Then, instead of the bare hillside with gaping gullies showering down destructive mud, we can have green verdure showering fruits and harvests on a land that will last forever because it is rightly used."

J. Russell explained how plant breeding could be used to select specific plant traits in his article, "Making Plants and Fruits to Order", (Smith, 1911). Furthermore, he predicted the future development of thornless plants, enhanced sweetness in fruits, and high-yielding tree crops, with more resources devoted to plant breeding. Always critical of funding for the Armed Forces and weaponry, J. Russell stated that plant breeding "merits as much government money as does the army."

In other publications, J. Russell continually advocated for a greater effort in plant breeding of minor fruit and underutilized nut crops, such as chestnut, hickory, and walnut for human consumption, and persimmon, mulberry, filberts, and other tree species for animal feed (Smith, 1910, 1914e, 1915c). He also proposed planting steep, hilly land with fruit- or nut-bearing crops and a permanent forage crop to provide nutritious feed for grazing pigs or sheep, which would eliminate high harvest costs, provide a profit to the landowner, and conserve the soil (Smith, 1914a,1914f,1915a, 1916a). In 1914, J. Russell promoted terracing to limit soil loss in orchards (Smith, 1914d, 1915g). Thus, he was an early proponent of agroforestry and popularized the utilization of sustainable practices used today (Jose et al., 2012; Molnar et al., 2013).

In other articles, J. Russell presented ex-

amples of profitable strawberry, blackberry, apple, and pear production by "master farmers" in the northeastern U.S. and introduced the concept of grower cooperatives to producers (Smith 1912a, 1912e, 1913a, 1913b, 1913c, 1913d, 1915b). He also examined the role of the railroads, land speculators, and cooperatives in the boom of apple production in the Pacific Northwest. Next, J. Russell contrasted the higher annual apple production costs in that region with the lower costs in the Eastern U.S. ($8 to 10/acre in Virginia), which was likely due to the limited use of pesticides at that time (Smith, 1912c). Later, he revealed prices paid for the same cultivars at different cities, ranging from $0.16 to $1.15/barrel, to demonstrate the value of selling at more profitable markets (Smith, 1916h).

In 1912, J. Russell joined the Northern Nut Grower's Association (NNGA) at their third annual meeting, which marked the beginning of a fruitful relationship with the membership until the early 1950's (Rowley, 1964). At the first NNGA meeting he attended, J. Russell learned to graft walnuts, which inspired him to publish several instructive articles on propagating nut trees, including the use of a novel double-bladed knife (developed by J.F. Jones) for bud-patch grafting that greatly improved the success of union formation (Smith,1913k,1914c,1915f,1916d). Also at this meeting, he motivated the membership to send letters to the U.S. Secretary of Agriculture, authorities in the Bureau of Plant Industry, and presidents of agricultural colleges and their experiment station directors to advocate for greater resources directed toward breeding and experimentation with minor fruit and nut crops, using soil conservation practices in various production systems (Smith, 1912b). In 1916, he became President of NNGA and presented and published 14 articles in the NNGA Annual Reports (1912b, 1913e, 1915e, 1924b, 1926, 1927b, 1928, 1932, 1935, 1939, 1940, 1942, 1949, 1951a).

Throughout his lifetime, J. Russell enjoyed the comradery among NNGA members, who served as a source of inspiration for his work and fueled his interest in growing pomological crops. The spirit of his enthusiasm was evident when he wrote, "Any man who has both leisure and some land may become interested in grafting things, such as fruit trees, nut trees, flowering trees—there is no limit. I find this no end of fun… It is play that gets us ready for real work. It stimulates the creative instinct; and the creative instinct drives us on to undertake the things most worthwhile for ourselves and others. It is the source of most of the real joy that we get out of life" (Smith, 1932).

After attending the 1914 NNGA annual meeting in Indiana, J. Russell called upon the American public to search for northern pecan germplasm after seeing nuts of 'Butterick', 'Indiana', and 'Posey' (Smith, 1915d). In his article, "Neglected Northern Pecans" he implored readers to send samples of superior northern pecans to NNGA Secretary, W.C. Deming, along with nut yield records. Additionally, J. Russell advised others to plant improved pecan cultivars in the Eastern U.S. at a density of 7.4 trees/ha (i.e., three trees/acre).

With the largesse of NNGA members, J. Russell acquired superior selections of scionwood and rootstock of several nut species to conduct his own trials on his farm near Purcellville and Round Hill, VA. Additionally, J. Russell obtained persimmon, pawpaw, mulberry, which he grew in his Sunny Ridge Nursery on his Virginia farm and sold trees via his mail-order business in Swarthmore, PA to help defray the expense of his experimental work until 1951. Over the years, he grew and marketed mostly grafted trees including, 'Ohio', 'Stabler', 'Thomas', and 'Tasterite' Eastern black walnut; 'Wilz' (i.e., 'Wiltz'), 'Mayette', 'Broadview', and 'Franquette' Persian walnut on Eastern black walnut rootstock (Smith, 1938). He also sold 'Busserson', 'Posey', 'Greenriver', 'Major', 'Indiana', and 'Kentucky' northern pecan; 'Burlington', 'Des Moines', 'Gerardi', and

'Bixby' hybrid pecan x hickory hybrids (i.e., hican); shagbark and 'Stratford' and 'Fairbanks' hybrid hickories. Other specialty nut cultivars from his nursery included 'Carr', 'Connecticut Yankee', 'Hobson', and 'Zimmerman' Chinese chestnut; 'Austin' Japanese chestnut; 'Barcelona' and 'Du Chilly' (pollinator) European hazelnut; and 'Winkler' American hazelnut. The fruit trees J. Russell marketed were 'Early Golden', 'Killen', and 'Kansas' American persimmon; 'Great Wall', Peiping', and 'Emperor' Japanese persimmon; and 'Everbearing' and 'Hicks' mulberry, which he promoted for cold climates. Along with tree sales, J. Russell also authored and sold instructional guides, including "The Planting, Fertilization and Care of Nut Trees" and "How to Graft Nut Trees" for 25 cents each.

In the 1940's, J. Russell became enamored with highbush blueberry. In his Sunny Ridge nursery catalog, he enticed consumers to purchase plants stating, " I have fun picking high bush blueberries….Perhaps it's the primeval hunting instinct. Some men get a thrill out of catching fish, some from shooting a bird, some must stalk big game. But really now, did you ever see a blueberry bush standing up in front of you, as tall as you are or perhaps a little taller, and with great clusters of blueberries as big as small marbles, the ripe ones covered with that delicate sky blue bloom that you may have seen on some grapes? And then have you tickled those bunches with your finger tips and had these luscious morsels roll into the palm of your hand? If you haven't done that you have something coming to you…. Trout fishing costs money. Gunning costs money, so do most sports, but a blueberry bush soon pays for itself and then does it over and over again" (Smith, 1948b). J. Russell offered his trademarked "Blueberry King's Packet", consisting of 6 to 36 bushes of three cultivars with the promise of including one popular 'Jersey' plant if at least 24 plants were purchased. Moreover, he lauded the invaluable work of Frederick V. Coville in the breeding and improvement of blueberry.

J. Russell incessantly espoused the virtues of planting more land with grafted nut trees to conserve the soil and increase the food supply for man and domestic animals in lieu of continually planting grain crops on highly-erodible land, in popular magazine articles (Smith 1913f, 1913g, 1913h, 1913i, 1915h, 1916b, 1916f, 1917b). In 1929, he presented these ideas in his seminal book, *Tree Crops: A Permanent Agriculture* (Molnar et al., 2013; Smith, 1929). In this book, he further articulated his concept of "two-story agriculture", whereby tree crops (including nut trees), a forage crop planted for ground cover, and grazing animals are integrated into a sustainable production system to prevent soil loss on land ill-suited for agronomic crops. Over the years, *Tree Crops* has been reprinted at least eight times and reproduced electronically. While he was schooled in economics, and passionate about sustainability, J. Russell never actually analyzed the costs or potential profitability of his permaculture system. Despite this shortcoming, *Tree Crops* is considered foundational reading for Agroforestry and Sustainable Agriculture students worldwide (M.A. Gold, personal communication).

J. Russell was instrumental in publicizing the devastation of American chestnut trees from chestnut blight in the U.S. and estimated a $400 million loss from this disease in Pennsylvania alone (Smith, 1912d). He challenged authorities to stop the shipment of chestnut nursery stock between states, called for state surveys to quantify the number of infected trees, promoted the immediate eradication of blight-infected trees, and advocated testing of plant tissue for confirmation of the disease by USDA.

Throughout his lifetime, J. Russell wrote with moral conviction about poverty and famine (1917c). In an early article, he stated, "We can build battle-ships for a war that may never come, but we cannot take a tithe of the price of a battleship to breed new crops, to utilize kingdoms that are idle now, and to fill stomachs that daily call for

food" (Smith,1913j). Troubled by the worldwide food shortage due to WWI, he penned impassioned articles, stating it was the patriotic duty of all Americans to plant gardens, as well as fruit and nut orchards, to alleviate hunger (Smith 1917a, 1917d, 1919b). In 1919, J. Russell traveled with Herbert Hoover's delegation to determine ways that the American Relief Administration could alleviate post-war famine in Russia (Starkey, 1967). Later that year, J. Russell admonished the Woodrow Wilson administration for its failure to contract and guarantee fair prices for agricultural commodities for U.S. farmers, instead of doing this for armaments in his article, "Quit Fooling and Talk Sense" (Smith, 1919a). He also called for grade standards, inspection, and funding for better transportation routes for agricultural commodities.

From 1924 to 1951, J. Russell wrote mostly about growing nut trees sustainably in the eastern U.S., when he wasn't publishing textbooks (Smith, 1924a, 1927b, 1928, 1935, 1939, 1940, 1949, 1951a). Mostly, he prescribed methods for nut production, beginning with the use grafted or top-worked trees, rather than seedlings, and planting improved cultivars in orchards with a permanent ground cover. He also advocated the unconventional practice of installing "water pockets" dug into the hillside above orchard rows to contain rainfall and provide moisture to trees (Smith, 1916e, 1924, 1928). Although he recommended some dubious practices for nut production, he proffered sage advice, "start in an experimental way, for in this, as in everything else, people *grow* into big successes rather than *go* into them" (Smith, 1924).

Failure and Success. Throughout his lifetime, J. Russell remained a humble steward of agriculture. Before the NNGA membership, he admitted (and published) his mistakes as he began growing nuts on his property in Virginia (Smith, 1932). His first confession was planting cold-intolerant Persian walnut seeds that winter-killed as an inexperience grower. Next, he planted European and American chestnut trees that were obliterated by blight, resulting in considerable financial loss. Then J. Russell planted grafted Persian walnut trees on a hardy Eastern black walnut rootstock that were annihilated by a twig borer. However, such failures fueled his ambition to publicize the need for more research-based information on often-neglected crops at land-grant institutions.

Although J. Russell contributed many articles to his geography profession (Martin, 2015), he published only one article on Persian walnut in the *Journal of Heredity* (Smith, 1916g). However, his widely publicized ideas published in the popular press prompted others to action. A crusader of many causes, he was never shy about criticizing the shortcomings of universities or government agencies and their policies, especially with respect to the American farmer. Another major cause he undertook was the lack of federal funding for agricultural education in American public schools (Smith, 1913a). J. Russell chastised his readers, "Every mountain school should be teaching children the important facts about crop-yielding trees, and they should be taught how to propagate them with their own hands….Does not the hope of the future lie with the children?" (Smith, 1916c). Finally, after the work of J. Russell and several others, the U.S. Congress passed the Smith-Hughes Act in 1917, which allotted federal funding to states for agricultural education in public schools (Moore, 2019).

J. Russell received several honors for his work. His first formal award was the Terry Prize from the Wharton School of Business at the University of Pennsylvania in 1898. J. Russell was awarded the Harmon Prize for his 1927 article, "Plan or Perish", for "stimulating constructive public opinion" regarding the need to build reservoirs to prevent flooding and to provide a source for electric power (Smith, 1927c; Starkey 1967). In 1929, he received an honorary Doctorate of Science from Columbia University and another for Economic Science from the University of Pennsylvania in 1957. J. Russell was also

honored with the prestigious Cullum Geographical Medal for outstanding work in human-economic, regional, and educational geography; conservation; and college course development in 1956. Despite these recognitions, he was perhaps most gratified by his election as President of the Association of American Geographers in 1942 (Martin, 2015).

Epilogue. Today J. Russell Smith is considered one of the founders of American geography (Martin, 2015; Starkey, 1967). As a pioneer in the subdiscipline of human-economic geography, he studied agricultural and commercial activities by geographic regions, often relating the need for genetic improvement of plants, sustainable production practices, and conservation of natural resources. Although J. Russell wrote more than 40 books and 180 articles, *Tree Crops: A Permanent Agriculture*, was undoubtedly his greatest achievement in agriculture (Martin, 2015). Along with many others, George Gravatt, Senior Plant Pathologist of Fruit and Nut Crops at Beltsville, MD, regarded this book as "a monumental work" (Molnar et al., 2013; Rowley,1964). Not only has *Tree Crops* influenced multiple generations of disciples of sustainable agriculture, it has also served as an enduring source of inspiration for Eastern nut producers in the United States.

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About The Cover:

Low tunnels are becoming popular for vegetable and strawberry production to extend the growing season. Low tunnels are being used to extend the harvest season five months for day-neutral strawberries, while also protecting crops from some diseases, insects and weeds in the Northeastern and upper Midwestern U.S. Here strawberries are being grown under low tunnels with raised beds covered with white plastic.