Scientific Agriculture and the Agricultural State: Farmers, Capitalism, and Government in the Late Nineteenth Century

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Scientific Agriculture and the Agricultural State
Farmers, Capitalism, and Government in the Late Nineteenth Century
ARIEL RON

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In 1884, Congress created a new federal agency of unprecedented regulatory vision. Its officials soon acquired the capacity to summarily seize and destroy millions of dollars of property and thus to police the disposition of a stock of wealth worth more than the country’s total capital invested in railroads. What was this federal colossus? It was the Bureau of Animal Industry (BAI), an agency that probably few historians know much about. Yet the hotly contested creation of the BAI—three years before the better known Interstate Commerce Commission (ICC)—amounts to an epochal expansion of federal powers. Housed within the already powerful Department of Agriculture (USDA), the BAI was charged with investigating and containing potentially devastating livestock epizootics such as bovine pleuropneumonia and, later, Texas fever. Its success at doing so was little short of astounding. By 1892 it had conceived and carried out the world’s first area eradication program of an epidemic disease, in the process establishing a model for future global eradication efforts. More immediately, it bolstered an economy that, for all its industrialization, remained crucially identified with agriculture.1

The USDA soon acquired another powerful agency: the Cooperative Extension Service (CES) and its associated rural youth organization, 4-H. Longstanding desires to shape the practices of ordinary farmers quickened during the 1890s and by

the turn of the century government officials had gotten involved, leading to the creation of the CES in 1914. Under this program, which the USDA directed but the land grant universities administered locally, county agents were placed in rural communities to demonstrate the latest in scientific agriculture. Within five years total funding quadrupled from $3.6 to $14.7 million. Fully a third of these resources went to 4-H, where rural youth came into contact with representatives not only of the USDA, but of the increasingly powerful American Farm Bureau Federation. By engaging in agricultural projects that employed USDA-supplied “scorecards” for meticulous record keeping and drew on Bureau-affiliated credit networks, 4-H clubbers internalized the methods and values of modern business farming. Here a kind of “associative state” did more than regulate, it reached deep into the household to grow a new generation of farmers according to official designs.2

These examples suggest a broader historical transformation that induced the precocious rise of a governmental leviathan in, of all places, the American countryside. As one agricultural historian put it, “the farmer of 1840 was self-reliant,” but “the farmer of 1940 . . . was dependent on government to a marked degree.”3 Indeed, the development of American agriculture over this period is punctuated by landmarks of state-building legislation: the Morrill (1862), Hatch (1887), Adams (1906) and Smith-Lever Acts (1914), to name a few, as well as the creation of the Department of Agriculture (1862) and its elevation to cabinet level (1889), not to mention scores of comparable occurrences at the state level. By contrast, the history of business and labor over the same span is not so much a story of legislation as of judicial decisions tending toward constitutional limitation of government’s role in the economy: Wabash v. Illinois (1886), In re Debs (1895), Lochner v. New York (1905), and in-

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junctions too numerous to count. The contrast is a clue that farmers confronted industrial modernity in a manner markedly different from the way that workers and businessmen did.

I suspect most American historians are more familiar with the general thrust of the court cases, which constructed a national market unimpeded by state regulation and limited the capacities of organized labor to challenge employers’ prerogatives, than with the series of laws that gradually remade the country’s agricultural landscape and the federal government itself. We have a surprisingly threadbare conception of this latter trajectory and even less understanding of its relationship to the history of American capitalism writ large. Of course, any survey of the period will surely discuss the Granger Laws and, no doubt at greater length, the Populist movement. Even here, we have not paid as much attention to government policy as perhaps we ought to. Only recently, Charles Postel has recast the Populists not as the last avatars of a superseded agrarian republic but as modern small producers who called on a centralized national government to shape markets in their favor.

Yet this is only one part of agriculture’s story. For at the very same time as the farmers tried to remake the federal government, the federal government tried to remake the farmers. What did all those legislative landmarks actually do?4

One way to address this question is to focus on the theme of “scientific agriculture.” Over the course of the nineteenth century, that term took on a kind of incantatory quality. Officials, experts, businessmen, reformers, and ordinary farmers invoked it repeatedly when addressing the future of American farming. “It is the commonest thing for the onlooker to say that farming must be more ‘scientific,’” observed Liberty Hyde Bailey, the dean of Cornell’s College of Agriculture, in 1911. “Of course this is true,” Bailey continued, “but not in the way the onlooker commonly conceives it.”5 Indeed, scientific agriculture was a protean term whose meaning changed over time and according to context. This alone makes it a promising starting point for thinking about agriculture’s transformation. But the term also encapsulates a whole pantheon of sweeping perspectives on modernity. Whereas “agriculture” suggests the parochial, particular, traditional, tangible, and organic, “science” implies the cosmopolitan, universal, systematic, abstract, and rational—in short, the modern.

The conjunction thus seems to capture something essential whether one draws on Karl Marx, Max Weber, Michel Foucault, or any number of influential social theorists. It encapsulates a kind of dialectic, or perhaps a paradox—at any rate, an intriguing historical concurrence that demands investigation.

In the nineteenth-century United States, scientific agriculture especially pertained to the reciprocal development of state and economy. The concept first achieved prominent usage to express the nationalist visions of the Early Republic’s improvement-minded gentry, who saw it as a means to both economic development and good governance. Starting in the 1830s, it became the slogan for the popular agricultural reform movement that, besides founding hundreds of state and county agricultural societies, led directly to the creation of the USDA and the land-grant universities. These institutions represented substantial policy departures for the federal government. Intended to socialize the costs of scientific research and to provide an authoritative source of information to regulate a growing market of new-fangled technologies, the USDA, the land-grant universities, and the state experiment stations that joined them starting in the 1870s gradually emerged as exemplary “agents of change.” By the early 1900s, experts nurtured in these institutions were remaking scientific agriculture into a paradigmatic expression of the high-modernist impulse toward bigness and uniformity, even as others within the same institutional milieu turned toward “low-modernist” alternatives with surprisingly global reach.6

We are therefore very much overdue for a reappraisal of how these transitions occurred in the half century or so after the Civil War. Such a reappraisal can help us move past narratives of the period that overemphasize the “labor question” and the rise of industrial corporations. These are, to be sure, extremely important, but they tend to obscure the equally important “farmer question” and the rise of government agricultural agencies. The role such agencies played in everything from the Pure Food and Drug Act to the global Green Revolution attests to their critical importance in

shaping the long-term structural economic changes that form a necessary component of any history of capitalism. Fortunately, recent research is mapping anew the terrain where agricultural practice met state action in this critical period. This work is revealing the still fuzzy contours of an agricultural state that helps account for the mutual rise of a powerful federal government and a world-beating capitalist economy.

Capitalism is never simply a free market of self-governing individuals. Like any economic system, it is framed by a set of legal principles, enforcement mechanisms, and government services. In other words, capitalism needs a state. For this reason, historians of American capitalism must engage with the insights of the literature on American Political Development (APD). Concerned with the mechanics of state formation and policymaking, APD offers to historians the prospect of developing a more realistic, comparative, and sophisticated understanding of the individual and collective agencies that produce economic change. In turn, rich historical studies of class formation, economic discourse, and the human experience can remedy APD’s blind spots and reinvigorate its increasingly fragmentary research agenda. As Hal Barron comments wryly with reference to the revival of “the state” as a pertinent analytic category, the picture becomes both more interesting and more confusing when we “bring people back in.”

One of APD’s most consistent stories explicates how the relative underdevelopment of American government institutions in the nineteenth century compromised the emergence of a robust welfare state in the twentieth. In Stephen Skowronek’s influential formulation, the 1800s brought a “state of courts and parties.” This regime was characterized by the predominance of legislative logrolling over executive administration, fostering a promotional or “distributive” mode of governance that rewarded local constituencies with things like spending on infrastructure and favorable tariff schedules. The system corresponded to a decentralized market society of semi-independent households but proved wholly inadequate to dealing with the in-

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ustrial economy that emerged during the Gilded Age. In the face of corporate elephantiasis, government had to take on regulatory and welfare functions to which the party system was ill-suited. Gradually, civil service reform, administrative expansion, and the influence of a technocratically minded middle class weakened the relative strength of the parties. The balance shifted decisively around the turn of the century, ushering in the Progressive Era. Yet the changeover was incomplete. The constitutional separation of powers and the sectional pressures endemic to federalism left American social democracy half-formed.\(^8\)

If much of this remains convincing, several assumptions appear increasingly uncertain. Historians have subjected the concept of a distinct “party period” to deepening criticisms. They have questioned the implicit equation of state capacity with administrative development. And they have stressed that social movements often determined the political agenda while ostensibly private civic associations implemented government policies. The upshot is a new view that American governing authority in the nineteenth century blurred conventional distinctions between state and society, yet was none the less powerful for having done so. Scholars now speak of “a government out of sight” subtly exercising “infrastructural power.” It seems that if there ever were an invisible hand over America, it belonged to the state.\(^9\)


The new historiographical landscape can be a disorienting place. The upending of received chronologies and organizing themes has flattened previously notable landmarks. Consider again the Bureau of Animal Industry. In a distributive policy regime, the BAI should not have existed. The campaign against cattle pleuropneumonia involved quarantining and destroying the property of powerful interests, rewriting state laws to allow federal exercise of local police powers, and managing sectional economic interests that often mapped onto divisive Civil War alignments. Yet despite these classic obstacles to policy innovation—federalism, sectionalism, and entrenched interests—the BAI proved a highly effective regulator. Credit for this success cannot be assigned exclusively to either of the major parties and certainly not to the courts. Where, then do we place this highly consequential agency? To what story does it belong? The existing APD literature may not provide clear guidance, but it does offer essential analytic tools for constructing new narratives that will.10

In the remainder of this essay I draw on such tools to tell one possible story about scientific agriculture. It comes in two parts, the first concerning scientific agriculture’s institutional pathways, the second its ideological expressions. Both pivot on an obscure potshot at a seemingly innocuous target: Pennsylvania Governor Robert Pattison’s attack on the State Agricultural Society in his 1885 message to the state legislature. The oddness of this attack reveals the surprising historical trajectory that only a year earlier resulted in the creation of the federal BAI and that did much to shape the history of American capitalism in the Gilded Age and Progressive Era.

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When he sat down to draft his remarks, Pattison must have been conscious that he was Pennsylvania’s first Democratic governor since the Civil War. He could not have known that he would be the last until well into the Great Depression. Fortuitously, he had stepped into a temporary breach among Republicans with a promise to rein in corporate power. His message therefore focused on “the reformation of evils” in state government, one of which, in his view, was the annual appropriation to the Pennsylvania State Agricultural Society (PSAS). Public funding in this area should be routed entirely through the state Board of Agriculture, he asserted, not through “a private corporation conducted with a view to the private profit of its stockholders.”

But Pattison’s shot at this particular corporation was poorly aimed, for as the PSAS replied in exasperation, “The Society . . . has no stock-holders! It has no stock!” The appropriation in question, moreover, was a “pitiful” $2,250 of little practical importance to either the state or the Society. According to the PSAS, the real issue was that by withdrawing public funding the legislature would effectively disavow the state’s farmers, who, not incidentally, paid most of the taxes. The PSAS admonished the governor not to forget “that it is both the policy and the pride of democratic forms of government to foster and encourage volunteer organizations which promote public prosperity.” At stake, then, was whether the Society aimed at “private profit” or “public prosperity,” and the related question of its precise connection with the state. Just what kind of corporation was it?

The seeds of this dilemma were planted a century earlier, in 1785, with the founding of the Philadelphia Society for Promoting Agriculture. One of a dozen or so similar “promoting” societies, the Philadelphia organization was initially a kind of club for patriotic gentlemen interested in the polite consideration of agricultural reform and improvement. By 1794, its members had developed bigger plans for an official state agricultural society that would both promote commercial farming and

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12 Agriculture of Pennsylvania, Containing Reports of the State Board of Agriculture, the State Agricultural Society, the State Dairy Men’s Association, the State Horticultural Association, and the State College, for 1885 (Harrisburg, PA: State Printer, 1886), 46-48.
“assist good government.” The ambitious state-building scheme went nowhere, however, because the Society was breaking up, its membership rent by partisan division and harried by the seasonal yellow fever epidemics that devastated Philadelphia starting in 1793.13

When the Society reconstituted itself more than a decade later, the landscape of agricultural reform had begun to change. New, smaller societies were appearing and gaining popularity thanks to their annual agricultural fairs. The Philadelphia Society now sought and obtained a corporate charter. The ability to make contracts and own real estate as a collective entity would be useful for putting on its own fair, which would serve the public interest by encouraging improved farming practices. Foreshadowing the PSAS remonstrance to Pattison, the act of incorporation explained that “it is the manifest interest of free governments to cherish and encourage institutions of such a nature.” Within a few years the Society and its sister organizations in other states also obtained direct government subsidies.14

Agricultural societies now had a public mandate, but they squandered it almost immediately. Their well-to-do organizers kept winning all the prizes at the fairs. Since the prizes were paid for out of state coffers, small surprise that farmers became incensed at a policy that seemed to transfer tax dollars from their pockets into the


bank accounts of wealthy gentlemen. By 1825, a general backlash against the promoting societies’ elitism caused most legislatures to abrogate agricultural funding entirely. The fall from grace was most spectacular in New York, where Martin Van Buren’s small-government Bucktail faction killed the state Board of Agriculture established six years earlier by Clintonian developmentalists. What John Lauritz Larson has called “the designs of the monied gentry” thus failed the test of democratic politics. Scientific agriculture could not succeed in America as a quasi-aristocratic project.\(^\text{15}\)

This popular repudiation—exemplary of the Early Republic’s deference-to-democracy politics—opened the way for the emergence of a mass agricultural reform movement in the antebellum period. The 1820s and 1830s saw the rise of an independent agricultural press through which a generation of younger and savvier reformers campaigned to renew public support for scientific agriculture. The importance of the farm press cannot be overstated. By 1852, agricultural journals’ total circulation may have approached 500,000, a figure much augmented by the sharing that characterized contemporary reading practices. Widely available and populist in style, the new journals made American farmers into a well-networked, self-conscious social formation open to political activation. Agricultural reformers were thus able to mobilize press coverage, petition drives, and conventions in state capitals to demand renewed subsidies for their agricultural societies. During the 1840s, these efforts bore fruit in state after state. By decade’s end, publicly supported agricultural fairs dedicated to the Baconian slogan, “knowledge is power,” had become among the country’s largest mass gatherings.\(^\text{16}\)

The Pennsylvania State Agricultural Society—the one Pattison vowed to cut off in 1885—was a product of this period. Its 1851 act of incorporation pledged only modest public funding, but as in other states, even small appropriations were sufficient to establish a permanent state-level agricultural body and to ensure the rapid growth and proliferation of agricultural fairs. Rising fair revenues then augmented organizational budgets. Other measures also promoted the cause of agricul-


tural reform. For instance, New York enacted a general incorporation law for agricultural societies in 1853. As fairs became increasingly elaborate, they required greater capital investments and so societies began raising substantial sums to purchase and improve permanent sites, making corporate status attractive. The state further aided this kind of effort by exempting agricultural fairgrounds from taxation.\textsuperscript{17}

Many local and county societies took advantage and reorganized themselves as joint stock companies. This practice was perhaps the source of Pattison’s error regarding the Pennsylvania State Agricultural Society. But while some profit-oriented fairs did exist, the vast majority remained decidedly community affairs. Stock ownership in this context meant not so much profit as support for a local institution. Thus although agricultural societies were economic institutions explicitly focused on commercial development, they were not profit-seeking bodies. Instead, they claimed a public purpose and drew increasingly close to the state. This occurred in many ways. For instance, state governments paid for the printing of huge editions of the agricultural societies’ annual reports, provided them with use of public buildings, and funded their priorities for scientific research.\textsuperscript{18}

Most importantly, states began to get serious about establishing agricultural colleges. From experience, proponents of scientific agriculture knew that state support was essential for agricultural colleges to succeed. But they made sure that the planning and day-to-day operation of such institutions would be left to them. At a time when the tradition of mixed public-private enterprise in the areas of banking and internal improvements had largely been repudiated, the legal structure of early state agricultural schools institutionalized a partnership between state and society. Maryland, for instance, chartered an agricultural college in 1856 (now the University of Maryland at College Park) as a private joint stock company, but tethered the


\textsuperscript{18} Ron, “Summoning the State.”
school to the state through public subsidies, specific mandates, and the structure of its board of trustees.\textsuperscript{19}

The 1855 charter for what would be called the Pennsylvania Agricultural College (now the flagship campus of Pennsylvania State University) went further toward intertwining state and society. Control of the board of trustees was vested in the state’s official agricultural organizations, many of which were joint-stock companies. Moreover, the college was required to submit an annual financial report to the state agricultural society for inclusion in the society’s own legally mandated annual report to the legislature. Since the county societies were bound by a similar reporting requirement, the college charter helped establish an interconnected system of semi-public agricultural institutions under the direct control of a self-selected group of scientific agriculturists but formally supervised by elected officials. The college’s public mission was further reinforced when the legislature coupled funding with new mandates, similar to the ones imposed by Maryland, to chemically test citizens’ soil and fertilizer samples without charge. These provisions justified the founders’ assertion that “this is not a mere private enterprise or speculation, intended to benefit corporators or stockholders,” but rather “a \textit{State Institution}.”\textsuperscript{20}

After the Civil War, all-purpose agricultural societies such as the PSAS gradually gave way to three distinct organizational streams. The first comprised an expanding group of crop-specific organizations, such as the Western New York Dairymen’s Association and the National Wool Growers’ Association, which often pursued technical scientific problems and narrow special interests. The second was made up of general farmers’ social organizations such as the Grange which occasionally

\begin{figure}
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\caption{Grounds of the Pennsylvania State Agricultural Society (\textit{c. 1884})}
\end{figure}


engaged in sweeping efforts to reform American political economy. The third was the government itself, as the USDA, the land-grant universities, the experiments stations, and the extension service successively expanded the scope of federal involvement in the day-to-day practices of ordinary farmers, and as analogous agencies did likewise at the state level. Though distinct in important ways, these organizational streams crisscrossed repeatedly and might also be said to belong to a single river system. The Grange, for instance, was founded in the offices of the USDA.

By 1876, the proliferating sprawl of the scientific agricultural project led Pennsylvania to establish a state Board of Agriculture. Though seemingly an unequivocally governmental body, as Pattison implied in his speech to the legislature, the Board was in fact largely constituted by representatives of the county agricultural societies, much like the trustees of the Pennsylvania Agricultural College. But the creation of the Board left the State Society in an awkward position. Officially, the Board considered it a brother-in-arms and attempted to demarcate functional boundaries that would preserve space for everyone. The Society’s main purpose would continue to be management of the annual fair, while the Board would form a “nucleus” for information on scientific research, market conditions, and other agricultural concerns. The Board now took over the job of publishing the annual agricultural report.
but continued to include the Society’s offerings in its volumes. Indeed, the Society’s riposte to Governor Pattison appeared in the Board’s official publication.21 Pattison’s remarks, therefore—insofar as they depicted the Society as a purely private organization—were misinformed. But they were not entirely unwarranted. The Society’s state appropriation certainly did look “pitiful” beside suspicious-looking railroad-company donations amounting to tens of thousands of dollars. More to the point, tensions had developed between the Society and the Board. These were exacerbated in the 1880s by the Society’s disastrous decision to build spectacular new fairgrounds on the outskirts of Philadelphia, leading to a crushing debt from which it never recovered (Figure 1). By the end of the decade, what had once been Pennsylvania’s prime mover in the creation of an institutional apparatus for scientific agriculture had faded into insignificance, entirely superseded by the state agencies it had spawned. When the Board was effectively replaced by a new State Department of Agriculture in 1895, the governmentalization of Pennsylvania farming first envisioned a century earlier by the gentlemen improvers of the Philadelphia Society for Promoting Agriculture was, if not complete, thoroughly underway.22

Historians usually think of corporations in the nineteenth century as tracing an arc from the commonwealth tradition of public benefit to the liberal tradition of private gain. Agricultural societies, however, illuminate a different trajectory of corporate history, one in which public purposes grew stronger and the state took increasing control. The outcome in the first case was the business conglomerate, in the other, the governmental bureaucracy. At the intersection of these arcs in the early twentieth century Herbert Hoover and Franklin Delano Roosevelt attempted to construct alternate visions of an American corporatist political economy. Each sought to establish new protocols and authorities to manage relationships among the massive entities that American corporate law and democratic politics had brought into existence.

In a sense, the reason for both of these corporate histories was the same: the need to tap resources. Only the state could satisfy the growing scale of agricultural reformers’ ambitions for long-term scientific research, farmer education, and more. But the interests, mechanics, and social foundations differed here from those involved

21 First Annual Report of the State Board of Agriculture for the Year 1877 (Harrisburg, PA: State Printer, 1878), 12.
22 Fletcher, Pennsylvania Agriculture, 1840-1940, 379-411.
in the emergence of the business corporation. Agriculture followed the governmentalizing path in large part because the socioeconomic structure of its relatively small-holding, highly educated, middle-class rural constituency demanded it. These farmers read, formed organizations, sought the gains of modern science, but lacked huge pools of private capital. Modest public funding and limited liability obtained through democratic politics allowed them to put on fairs that served some of their goals directly, but, more importantly, allowed them to build a broad agricultural reform movement that could then be leveraged for further state aid, leading to another cycle of civic organizing and state building. Reformers continued to shimmy upward, pushing with one foot on the opinion-forming power of civil society, with the other on the resource-providing power of government.23

The same logic led from the state to the federal level. When state legislatures provided inadequate or unsteady support, agricultural reformers turned to the national government. In 1862, a decade-long campaign for a national commitment to scientific agriculture resulted in the creation of the US Department of Agriculture and the Morrill Land Grant Act, which provided essential funding for state agricultural colleges. This concerted campaign, which included formation of a national agricultural society and multiple state legislative resolutions orchestrated by local agricultural organizations, offered an early example of the federated advocacy structure that Elisabeth Clemens has identified as so crucial to the Progressive Era.24 Here, too, the corporate privileges that institutionalized agricultural societies as semi-public agencies provided critical bases of resources and legitimacy for demanding wholly novel expansions of government functions. This was an alternative corporate history that led not away from the state, but directly into it.

One important outcome was a new class of scientific experts. Taking up the mantle of early-national landed improvers, some of them now put forward a reconstructed vision of the tutelary state. But that vision hardly went unchallenged, even

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24 Clemens, The People’s Lobby.
within the government. The story outlined here reflects the powerful structural effects of what David E. Hamilton calls American agriculture’s “corporatist” or “associational imperative.” Farmers’ status as small-scale owners of productive capital within a relatively democratic polity meant that their adjustment to industrialization would occur through some kind of coordination, whether that was a broad-gauged movement seeking social-democratic provision of state services to farmers of all stripes, an array of crop-specific associations working hand-in-glove with government experts, or a set of producers’ cooperatives able to exert independent market power thanks to favorable legal construction. Struggle among farmers, industrialists, bankers, consumers, and bureaucrats therefore took the form of struggle over the particular legal and institutional forms of alternative associative structures. By the turn of the twentieth century, American agriculture was thoroughly capitalist and thoroughly enmeshed in a complicated matrix of law and policy. It has remained in such a confusing double bind ever since.25

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Governor Pattison was also confused by what was emerging. But did he really misunderstand the legal nature of the Pennsylvania State Agricultural Society, or did he have another reason for attacking an organization which had a venerable claim to serve the public interest? Perhaps the Society’s avowal of strict nonpartisanship was not quite as it appeared. The history of its leadership, which included two USDA commissioners appointed by Republican presidents for their political loyalties as much as for their agricultural credentials, indicated a clear ideological tilt.26 These partisan leanings reflected the sectional crisis over slavery within which scientific

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agriculture came to be embraced in the North and institutionalized in the federal government. The PSAS therefore promoted a worldview favorable to the Republicans, much as labor unions in the early twentieth century practiced a politics that redounded to the Democrats’ advantage long before they formalized a durable political alliance. It seems that for this reason Pattison regarded the PSAS as unfriendly.

Ideology’s protean nature means that it is always a shape-shifting patchwork. Hence, in other contexts, the association between the Republicans and scientific agriculture did not hold. This is clearest in the case of the “New South,” where improvement-minded former Whigs took up leadership positions in Democratic redeemer governments. Moreover, by the early twentieth century, farmer organizations were represented in Congress by a truly nonpartisan “Farm Bloc.” The ideological links between parties and agricultural organizations were therefore contingent rather
than necessary and must be traced with due attention to the circumstances. Nevertheless, as the perennial ideological aggregators of American politics, the parties must be taken into account.

The lasting legacy of the connections that northern agricultural societies forged with Republicans during the 1850s is apparent in the imagery adorning the “diploma” that the PSAS awarded to premium winners at its state fair in 1885 (Figure 2), the same year that it came under fire from Pattison. At bottom left, the diploma depicts a scene of ancient Egypt in which an apparently white overseer looks on as dark-skinned workers use sickles to harvest wheat. At bottom right, a single white farmer harvests a similar wheat field with the aid of a mechanical reaper. The lesson seems clear: slavery denies not only freedom, but technological progress. Slavery here acts as a foil against which the world-historical meaning of capitalism’s technological revolution can be grasped. The diploma’s invocation of slavery thus subtly waves the bloody shirt for the Republicans. It seems to say, “We delivered the nation from the Slave Power, and now through industrial progress we shall deliver it from nature, the oldest of slave powers.” That triumph is presented primarily via visually striking machinery, but we ought to remain cognizant of equally striking advances in chemical fertilizers, food processing, pest and parasite control, and “biological innovation” in plant and animal breeds.27

One could trace these ideological currents at least as far back as Francis Bacon. But the more immediate background is the political-economic thought of midcentury northerners, who could envision a free-labor future precisely because they simultaneously envisioned a labor-free technological utopia. This is putting the point too aphoristically, but it captures something essential in the northern social imagination. Take Ralph Waldo Emerson’s 1858 essay, “Wealth.” The lyric epigraph tells a story

of human progress through “Heaven’s enormous year,” the “deep time” recently discovered by geologists. It begins with a lengthy set of speculations about what we might now call the Earth’s biogeochemical processes before turning to human history on the cusp of technological emancipation. At this point Emerson writes:

New slaves fulfilled the poet’s dream,
Galvanic wire, strong-shouldered steam.
Then docks were built, and crops were stored,
And ingots added to the hoard.

The power of this imagery derives from its juxtaposition of, on the one side, slavery and nature, on the other, science and technology. The harnessing of natural processes will realize “the poet’s dream” by creating “new slaves” to replace the existing human slaves suffering and toiling at this very moment. In the words of George Perkins Marsh, whose writings informed the Progressives’ utilitarian approach to natural resource management, “man” is “the rightful lord, and Nature the lawful, though unwilling slave.” 28

But if Emerson and Marsh harnessed technological development to an anti-slavery agenda, the PSAS diploma reveals a more ambiguous stance reflective of the years following the end of Reconstruction. In the historical transformation that the diploma evokes, enslaved people of color have not so much been emancipated as effaced. They simply disappear from view on the right-side image, where a single white man and his machine stand in for all of American agriculture. By this time, of course, white northern commitment to black civil rights was in full retreat, clearing the ground for the imposition of Jim Crow in the 1890s.

The turn of the century brought another rotation of meanings—indeed, almost a reversal. In 1898 Midwestern farmers, industrialists and land-grant university scientists launched the American beet-sugar business. Worried about competition from cane-sugar producers, they lobbied for tariff protection against newly acquired tropical dependencies in the Caribbean and Pacific. To make their case, they deployed a racist gloss on the ideas invoked by Emerson and the PSAS diploma. USDA chemist H.W. Wiley testified before Congress that sugarcane, “the great natural source of sugar,” was “an industry of a less advanced and less developed race.” Beet sugar, on

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the other hand, demonstrated “what human intelligence, science and agricultural skill can do” and was “an industry of the advanced and most developed human race.” In other words, beet sugar was a product of science which belonged to whites, while cane sugar was a product of nature associated with a nebulous category of dark-skinned tropical people. What disappeared from view in this portrayal was not the slave but the slaveholder. Whereas in the PSAS diploma, technological backwardness remains associated with a particular form of labor exploitation, in Wiley’s account it became a property of racial inferiority. Not coincidentally, Wiley expressed his views at a time when a new class of exploited migrant labor was being created and subordinated in part through racist classification.29

These shifts in the meaning of scientific agriculture paralleled another ideological shift. In the second half of the nineteenth century it was commonly thought that small rather than large farms were most conducive to scientific agriculture. From the perspective of northern middle-class farmers for whom the southern plantation formed the most conspicuous contemporary example of large-scale agriculture, only owner-operators and their families possessed the incentives to strive for improvement and to reap the benefits of labor-saving technologies. Hence one Union Leaguer in Mississippi declared that, under Radical Reconstruction, “large landed estates shall melt away into small divisions” and “agriculture become scientific.”30

But small farms required assistance to “become scientific.” This was not a time for Jeffersonian self-reliance, but for deep and abiding state action. Farmers needed government to pool resources for agricultural education and research, to administer fertilizer inspection laws and control epizootic outbreaks, to ensure reasonable terms of credit and eventually to provide buffers against commodity price volatility. “The chief obstacle of Agricultural Progress,” Horace Greeley wrote in the 1850s, was “the mistaken consciousness of self-sufficiency.” Sixty years later, Liberty Hyde Bailey concurred that “individualism conduces to isolation of ideas.” Like Greeley, he had no trouble casting individualism as an impediment to, rather than the source of, “enterprise that gets things done.” But Bailey also realized that at the turn

30 Eric Foner, A Short History of Reconstruction, 1863-1877 (New York: Perennial Library, 1990), 140.
of the twentieth century the ideal of even the *inter*-dependent small farm was coming under intolerable pressure. “The little-farm-well-tilled idea” was no longer enough, he thought, and so some kind of “process of reorganization” was inevitable. Even as Bailey pressed government agencies to support a meaningful measure of small-farmer autonomy, an alternative vision of large-scale, state-backed commercial agriculture gained steam.31

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By the early twentieth century, then, scientific agriculture meant a number of things. It could ground an ideal of small farmers seeking “industrial democracy” against the sovereignty of wealth; it could define a white, heteronormative “family farm” with tendencies toward isolationism, xenophobia, and government-sponsored labor exploitation; and it could signify a high-modernist vision of big, industrial agriculture serviced by tax-supported scientific expertise. “Scientific agriculture” was therefore contested ground.32 Notably, none of the contestants resembled the Jeffersonian myth of yeoman independence, while, on the other hand, all of them prominently featured the state.

The shape and outcome of the contest among these and other rural visions would determine a great deal about the history of American capitalism in the periods we conventionally call the Gilded Age and Progressive Era. We have begun to investigate this contest thanks to recent monographic studies that bring fresh, sophisticated, and theoretically informed perspectives to a topic—a topic of agricultural history—that was once a mainstay of the profession but has fallen out of our dominant narratives. A few notable recent syntheses have also suggested the broader significance of American scientific agriculture. Monica Prasad’s highly original *Land of Too Much*, for instance, argues that the power of commercial farmers to demand redistributive income taxes and institutionalized access to cheap credit configured a uniquely American type of welfare state.33

But we still do not know as much as we should about the enormous variety and complexity of agricultural changes in this formative period. For instance, the

31 “Horace Greeley on Agricultural Addresses, Choice of Speakers, Etc.,” *Cincinnatus* 3 (Oct 1858): 465; Bailey, *The State and the Farmer*, 1, 47, 72, and passim.
32 This point especially stressed in Summers, “Putting Populism Back in.”
Ariel Ron

mining, shipment, processing, regulation, distribution, and application of fertilizers are rarely central to the way we tell the history of capitalism, but they should be because they are at the very foundation of post-Malthusian abundance. Similarly, few historians would identify the Haber-Bosch process developed in 1910 as one of the signal technological events of the modern era. Yet without the ability to fix atmospheric nitrogen, twentieth-century increases in population and food production are difficult to imagine.  

A better understanding of such developments will help us answer important questions whose inflection points came in the Gilded Age and Progressive Era. How exactly did agriculture—once almost identical with the American economy itself—become only a sector of that economy, yet one that dominated global markets? How did farmers—once almost identical with American society itself—dwindle as a segment of the population, yet grow into a powerful special interest deeply embedded in the American state? Historians of capitalism rightly direct much of their attention toward industrial labor and business. But at a time when the political economy of food has come back sharply into focus—when something as arcane as the Farm Bill sends activists into the streets—they must pay more attention to the braided histories of American governance and agriculture.