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The Struggle for Sustainable Development in Appalachia's Mineral Rich Mountains

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The Struggle for Sustainable Development in Appalachia's Mineral Rich Mountains[*]

Alicia G. Harley and Hannah Wexner

Abstract

This teaching case examines this paradox of poverty amidst plenty. To do this, the case explores the co-evolving history of nature and society in the Central Appalachian region from the Native American period through to the present day. Over the past 200 years, coal mining and other extractive industries have been dominant drivers of nature-society interactions in Central Appalachia. Concomitantly unequal distributions of power between different groups of actors have played a significant role in the dynamics of this history. The people of Appalachian, despite their popular depiction in the media and popular culture, have not been passive recipients of exploitation and greed from outside interests. Rather the history of Appalachia is a history of inequality and maldistributions of power, but also a history of resistance and struggle. The case is thus particularly useful for examining the character of power and struggles for empowerment within nature-society systems as well as the capacities necessary to pursue sustainability even in the face of enormous social and environmental challenges.

Keywords: Appalachia, resource extraction, mining, power, social movements, sustainability science, teaching case

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Foreword: Using Cases in Teaching Sustainability Science

This document was prepared as a case study to support teaching and learning about sustainable development. It emerged from our collaboration over many years in designing, teaching and re-designing several courses in sustainability science and sustainable development. As we taught these courses to college students, graduate students, researchers, and practitioners, we learned that combining generalizable theory with specific, placed-based case studies was more effective than relying on either approach alone. We therefore found ourselves developing both a Conceptual Framework for Research in Sustainability Science and a set of cases to support our teaching efforts.[1] The cases include the City of London as it developed from a hamlet to a world mega-city, Alaska's salmon fishery as it evolved from a source of local livelihoods to a globally embedded market, and the case presented here which details the transformation of Appalachia through the discovery of its abundant natural resources and the impacts of its mineral wealth on both people and nature. In the rest of this brief foreword, we sketch our approach to teaching sustainability and how we have used cases like this one in our courses.

The idea of sustainability has a long history, accelerated but not initiated by the Brundtland Commission's publication of "Our Common Future" in 1987 and its follow up at the UN's Rio summit of 1992.[2] Early courses on the subject (including our own), tended to be either a smorgasbord of theories pulled from relevant disciplines and applied to selected problems, or single cases fleshed out with ad-hoc theories, or method-heavy hammers applied in search of sustainability nails. Over the intervening years, sustainability scholars across a wide range of research programs and disciplinary

[1] A published version of our conceptual framework is Clark, WC., & Harley, AG. (2020). Sustainability Science: Toward a Synthesis. *Annual Review of Environment and Resources*, *45*(1), 331–386. https://doi.org/10.1146/annurev-environ-012420-043621. Updated versions of the conceptual framework and teaching cases are available for comment and download on the *Sustainability Science* web site (sustainabilityscience.org) that we maintain as a collaborative community for researchers and teachers.

[2] Caradonna, J. L. (2014). *Sustainability: A History*. Oxford University Press; World Commission on Environment and Development. (1987). *Our Common Future*. United Nations. http://www.un-documents.net/wced-ocf.htm.

backgrounds have collaborated to develop approaches to teaching about sustainable development that more effectively integrate theory, cases, and methods.

Our own approach to teaching sustainability begins with the fundamental recognition that any effort to foster sustainability necessarily takes place within a complex and co-evolving nature-society system in which shocks and surprise are the name of the game.[3] Moreover, efforts to intervene in sustainability challenges must always be fit to place, sensitive to natural and social contexts, adaptive and humble. But to help students think analytically about the goals of sustainability and how to go about pursuing them in practice, we have to move beyond simply asserting this complexity and the need to take local context seriously.

The first step in our courses is to develop a common understanding of the goals of sustainable development. There are many different potential goals for sustainable development from the three-pronged approach of balancing economy, society and nature that many textbooks use, to the UN's 17 Sustainable Development Goals, to Brundtland's original articulation of sustainability as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". We find it most useful to follow scholars who have begun with the globally negotiated conceptualization of the Brundtland Commission, but have expanded the Commission's narrow concept of "needs" to a more expansive one of focused on "well-being." The most general goal of sustainability thus becomes development for which, at a minimum, human well-being both within and across generations does not decline.[4] Consistent with international development goals more generally, we put special priority on improving the well-being of the poorest and most vulnerable communities alive today, while conserving

[3] The approach we sketch here has been highly informed by our collaborations with colleagues including Arun Agrawal, Krister Andersson, Jeannine Cavender-Bares, Danny Bicknell, Ruth Defries, Christian Binz, Partha Dasgupta, Sam Elghanayan, Melissa Fiffer, Wyatt Hurt, Ann Kinzig, Lennart Kuntze, Michele Lamont, Eloi Laurent, Pamala Matson, Kira Matus, Julia Mason, Suerie Moon, Charles Perrings, Steve Polasky, Kevin Rowe, Oswaldo Sala, Afreen Siddiqi, Michaela Thompson, Bill Turner and generations of students. We are extremely grateful to all of these collaborators and many more not listed here for improving the way we have learned to teach this complex and important material.

[4] An early, concise and accessible treatment of this conceptualization of sustainability is provided by Solow, R. (1993). An almost practical step toward sustainability. *Resources Policy*, *19*(3), 162–172. https://doi.org/10.1016/0301-4207(93)90001-4. A more expansive version is Dasgupta, P. (2001). *Human Well-Being and the Natural Environment*. Oxford University Press.

the capacity of future generations to pursue their own well-being. We call this inclusive human well-being. While this general conception of sustainable development is helpful, is leaves unanswered what aspects of "inclusive well-being" will be most important to people in different places and times. This is a feature rather than a bug, stressing the importance of allowing that communities around the world as well as in future generations must be able to define for themselves what constitutes the specific elements of the good life and how exactly they want to go about pursuing them in their own places and times. Longue durée case studies provide a vehicle for exploring this "feature" of our approach, as we discuss in more detail below.

With a more precise shared definition of sustainable development on the table, our courses then move on to explore a framework that helps students take seriously the complexity of nature-society systems without getting lost in their details. This framework is not an explanatory theory and it won't predict anything at all! Rather, it is a checklist of elements and relationships that research has shown to be important in understanding and intervening in nature-society systems. This checklist begins with resources—both natural and anthropogenic—that make up the productive base on which both current and future generations must draw to provide for their well-being. While ultimately well-being requires access to goods and services such as food, energy, housing and education, both theory and experience suggest, that for measuring sustainable development over long periods it is generally easier to measure the stocks of resources that function as its determinants (means) than it is to measure the flows of goods and services that are consumed as constituents of its ultimate end.

Having linked the means of sustainable development (resources) with the goals (inclusive human well-being), we move on to situate this production-consumption system within a larger framework that includes the role of actors, institutions and power, cross-level and cross-sectoral linkages, novelty, heterogeneity and selection, and finally adaptation and transformation. This brief foreword to a case study is not the place to explicate all of these elements and relationships or to credit the scholarship that underlies them. For more details, we point you to our open access website www.sustainabilityscience.org, where we maintain a Research Guide that goes into far greater detail on the Framework for Research in Sustainability Science we use in our own

teaching and research. The site also provides more detailed daily lesson plans from our undergraduate course on sustainable development.

For several years we taught a version of the framework sketched here and asked students to apply it to their own cases, turning their interests into capstone research projects for the course. And while we still have students do their own final projects on sustainability challenges that interest them, we found these individual projects did not provide a shared understanding of sustainability challenges in context that would allow for rich classroom discussion over how the theory applied in context. This led us to the realization that unlike many other fields, sustainability science lacks common "problem" or model cases that all are familiar with and can thus be used as common platform for exploring frameworks, theories, and hypotheses (e.g., fruit flies and E. coli for geneticists, Darwin's finches for biologists, Vostok ice cores for climatologists, the French Revolution for historians, Paris for urban planners, Java for anthropologists etc.).

What would such shared cases for sustainability science look like? Though trial and error, we decided that – like the problems sustainability science aims to tackle – good candidates would need to cover multi-generational time scales. They would also need to foreground the co-evolutionary dynamics of people and nature, with changes in society impacting nature and changes in nature impacting society. Finally, the cases we were after would need to include not just humans and nature, but the other resources that people draw on to create well-being including manufactured capital, knowledge capital and social capital.

Our current set of cases build on a collaborative effort with Pamela Matson (Stanford University) and Krister Andersson (University of Colorado) to provide common reference points for the book *Pursuing Sustainability: A guide to the science and practice* (Princeton Univ. Press 2016). That book contains short cases focused on irrigation in Nepal, agriculture in Mexico's Yaqui Valley, pollution of the global ozone layer, and an early version of the London case noted earlier. An expanded version of that London case, together with the Alaska case noted earlier and the Appalachia case presented here constitute our current stock of common problems against which our students can evaluate the theory, methods and frameworks that constitute the core analytical approaches to sustainability science. The cases are thus a pedagogical tool used

to help students think about sustainable development within the context of messy, complex systems. We generally assign this Appalachia case, along with the London and Alaska cases, within the first few weeks of the semester. We then return to the cases over the course of the semester to allow our students to identify new ideas and concepts as they play out in the cases.

We have found this to be the most rich and rewarding way we have yet come up with to help students learn about sustainable development. The cases not only help students understand the sustainability challenges we face, but also provide a foundation on which to develop both the analytical perspectives and the humility needed to begin fostering sustainability in the settings where they live and work.

We hope you will find this case and the others we have developed to be useful in your own work and teaching. We would appreciate hearing from you if you use any of the material – frameworks or cases outlined in this brief foreword. It is through sharing new ideas and approaches to teaching that we will all become better students and teachers of sustainability.

Alicia G. Harley and William C. Clark
May 2022, Cambridge MA USA

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By Alicia G. Harley

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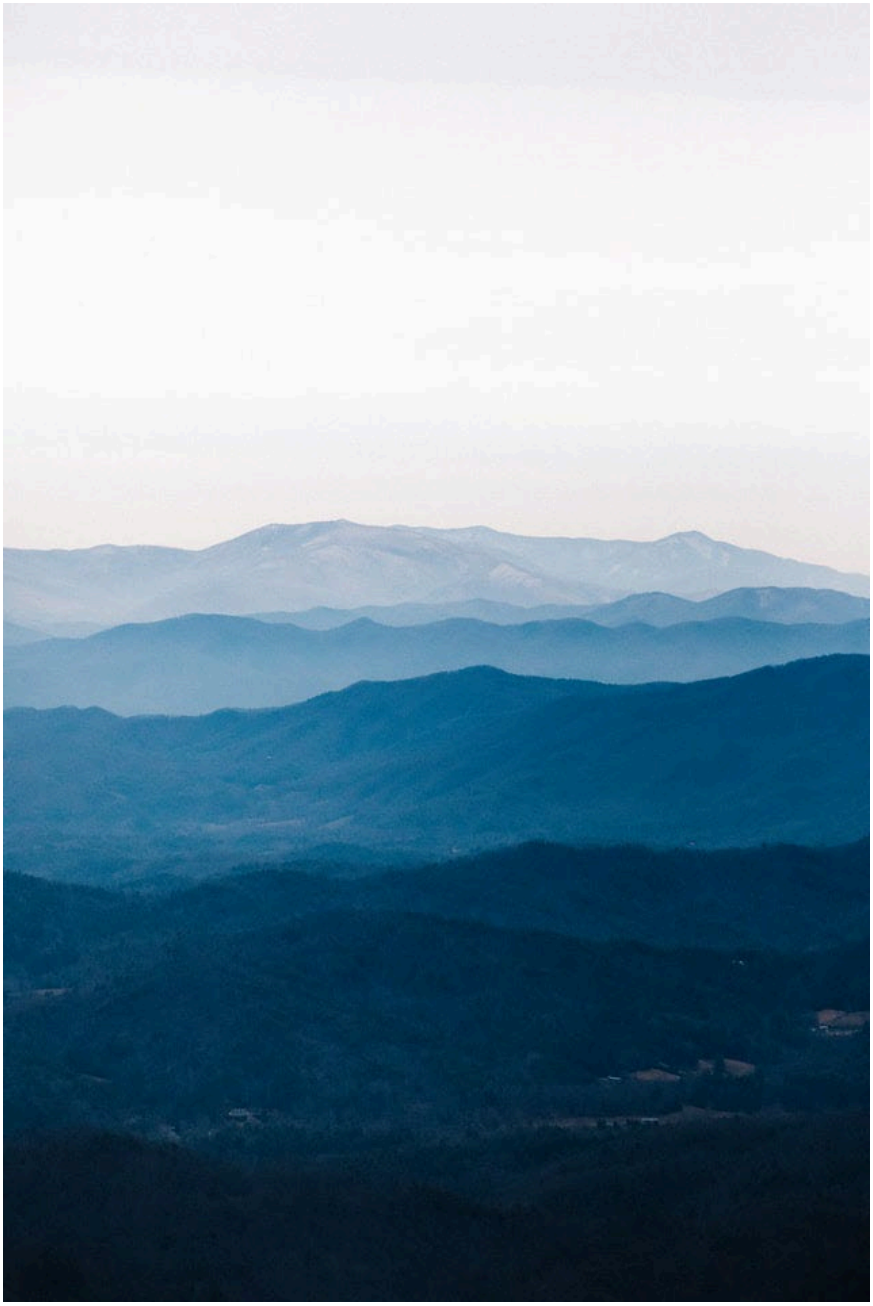

Figure 1: *The Appalachian Mountains. Photo credit: Wes Hicks via unsplash.com*

Contents

1. Introduction: The Co-evolution of Nature and Society in Central Appalachia

Stretching almost 2000 miles along the Atlantic Coast of North America, the Appalachian Mountains form a natural barrier between the eastern coastal plain and the lowland interior of the United States. The Appalachian Mountains formed 480 million years ago and once reached elevations similar to those of the Rocky Mountains, before experiencing natural erosion, blunting their sharpest peaks to an average of 3,000 feet, and turning the mountains into a vast expanse of ridges and high plateaus bifurcated by deep valleys and rivers. The Appalachian Mountains are rich in natural resources and biodiversity and have hosted human inhabitants for over 8,000 years. Throughout history the densely forested mountains of the Central Appalachia have made the region difficult for outsiders to access, leading to the development of distinctive regional identities and cultures.

Today, Central Appalachia is home to six million people, many of whom suffer from lack of health care, inadequate educational opportunities, and long-term poverty.[6] Roughly twenty percent of Central Appalachians live below the poverty line (1). Mortality from seven of the 10 leading causes of death is higher in Appalachia than anywhere else in the United States and mortality due to drug overdoses is markedly higher in Central Appalachia than in the nation as a whole (2). The low levels of human well-being in Central Appalachia stand in sharp contrast to the tremendous wealth of natural resources in the region including coal, timber, oil, and water. No other region in the United States was more richly endowed with recoverable reserves of bituminous coal at the turn of the 20th century than the Appalachian Central plateau. These resources fueled American industrialization and generated enormous profits and wealth for private companies, while exploiting Appalachia's people and nature. Coal mining alone has destroyed more than one million acres of forest and buried over one thousand miles of streams. Much of the revenue generated by resource-extractive industries quickly leaves Central Appalachia, leaving behind little tax base to fund schools, health care, and other public services.

[6] Appalachia is often divided into three regions: the southern region, which covers parts of Georgia, Alabama, Mississippi, the Carolinas, and Tennessee; the central region, which covers parts of Kentucky, southern West Virginia, northern Tennessee, and southwest Virginia; and the northern region, which includes parts of New York, Pennsylvania, northern West Virginia, Maryland, and northern and northeastern Ohio. This case focuses on Central Appalachia in an effort both to limit the scope of the case, and to concentrate on the legacy of coal mining in the region.

This teaching case examines this paradox of poverty amidst plenty. To do this, the case explores the co-evolving history of nature and society in the Central Appalachian region from the Native American period through to the present day. Over the past 200 years, coal mining and other extractive industries have been dominant drivers of nature-society interactions in Central Appalachia. Concomitantly unequal distributions of power between different groups of actors have played a significant role in the dynamics of this history. The people of Appalachian, despite their popular depiction in the media and popular culture, have not been passive recipients of exploitation and greed from outside interests. Rather the history of Appalachia is a history of inequality and maldistributions of power, but also a history of resistance and struggle. The case is thus particularly useful for examining the character of power and struggles for empowerment within nature-society systems as well as the capacities necessary to pursue sustainability even in the face of enormous social and environmental challenges.

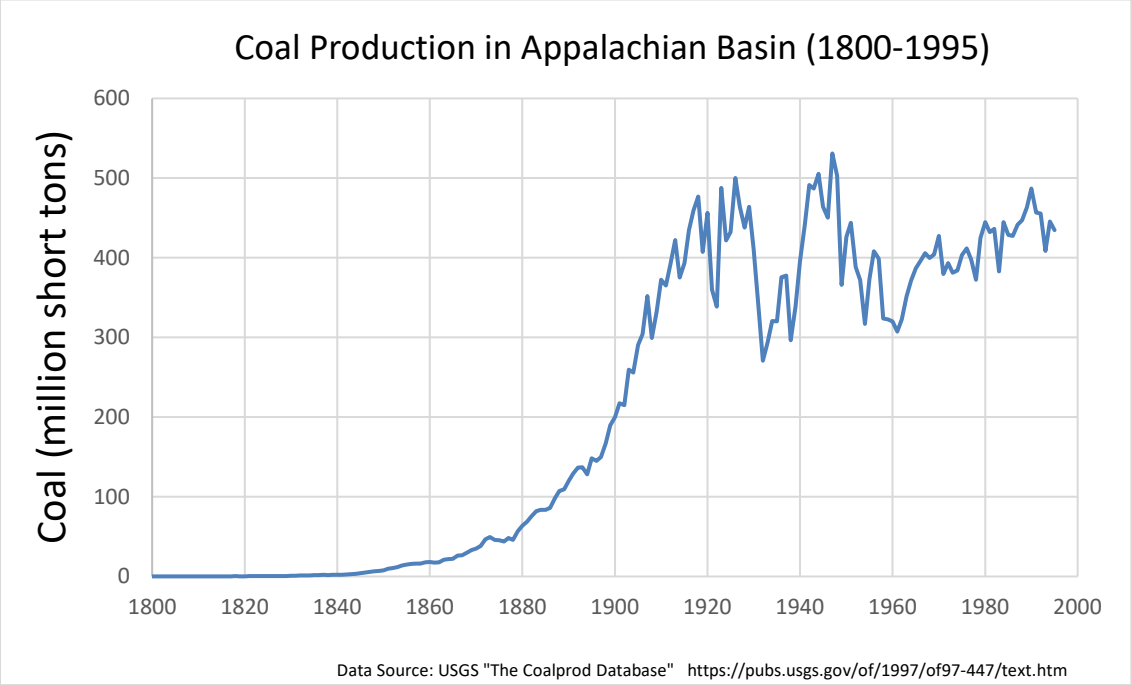

Figure 2: *Coal Production in Appalachian Basin (1800-1995)*

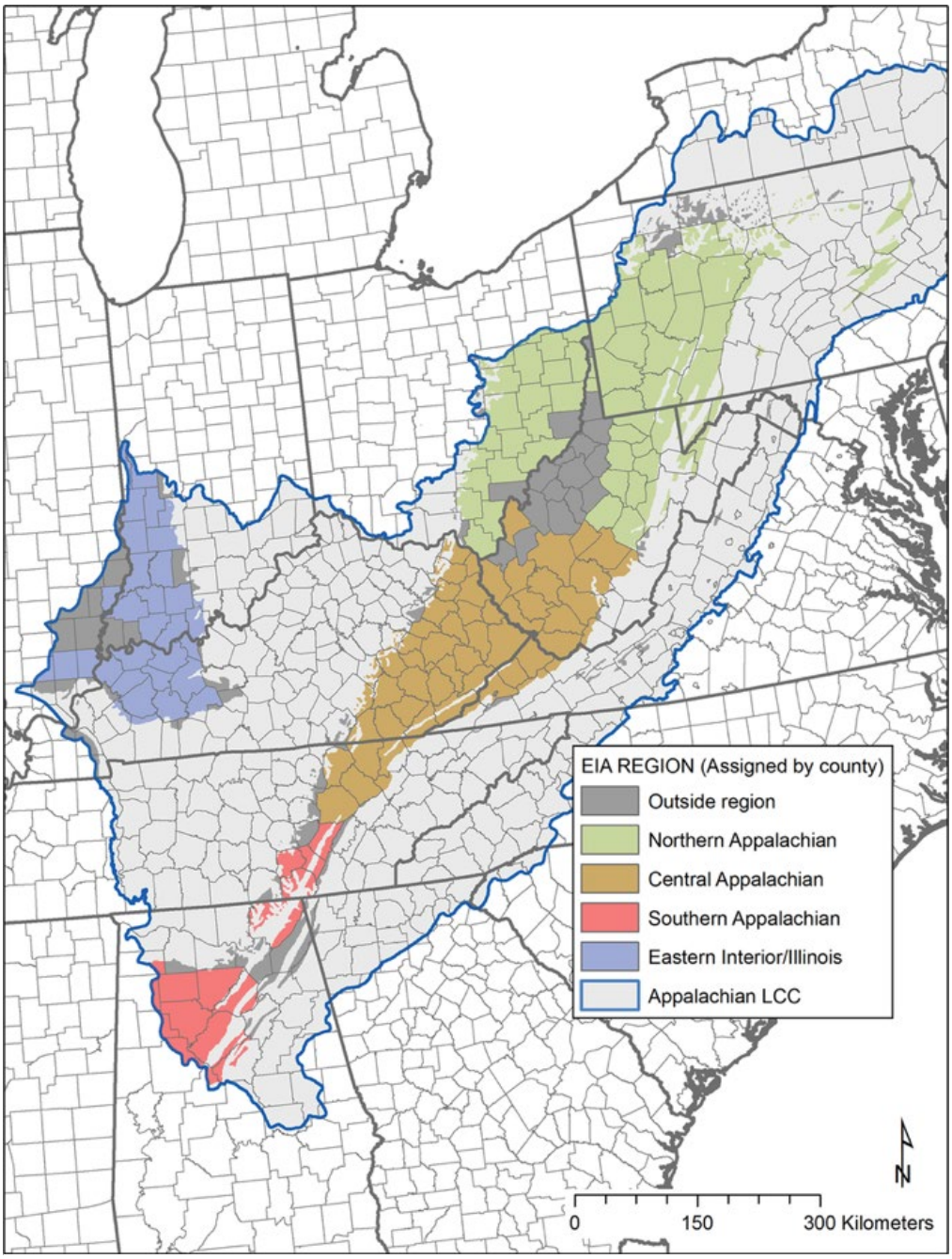

Figure 3*: Coal supply regions in Appalachia as defined by the US Energy Administration. This case focuses on the Central Appalachian region which includes parts of Kentucky, Tennessee, Virginia, and West Virginia.*

* Used under Creative Commons Attribution License 4.0. Source: Strager, M.P., Strager, J.M., Evans, J.S., Dunscomb, J.K., Kreps, B.J., Maxwell, A.E., 2015. Combining a Spatial Model and Demand Forecasts to Map Future Surface Coal Mining in Appalachia. PloS one 10, e0128813–e0128813. https://doi.org/10.1371/journal.pone.0128813

2. The Native American Period: 2000 BCE to 1650

Appalachia was first touched by humans 8,000 years ago, when descendants of people who migrated from Asia to the Americas inhabited caves in the mountains (3). In 1000 BCE, the Adena people emerged as one of the earliest identifiable groups in the region. Living in villages along rivers in clusters of roundhouses centered around conical burial mounds that reached up to seventy feet high, the Adena settled as farmers, potters, and stoneworkers. The Hopewell followed the Adena, living in a stratified society with villages held together by trade and a mutual burial cult between AD 900 and 1400. The Hopewell drew on forests and streams to support their way of life while developing an active trade system that stretched west to the Rocky Mountains and south to Florida. Alongside the Hopewell, the Cherokee emerged as the dominant culture in Southern Appalachia around AD 1000. The Cherokee developed an agrarian society in some seventy scattered towns with a total population estimated at 20,000. The Cherokee maintained a balance of power with the Choctaw, Creeks, Catawba, and Chickasaws through sporadic warfare and trade networks centered around fur (4).

The Appalachian Mountains provided a home with relative stability and prosperity for some of the most prosperous and powerful Native American nations (3). Nonetheless, Pre-Columbian native populations contended with adverse health conditions including tuberculosis, hepatitis, osteoarthritis, and anemia as a result of over-reliance on maize in their diet (5). Although data on mortality and life expectancy for Native American populations is limited, available evidence suggests that just before European arrival, native populations had life expectancies at birth of around 20-25 years and suffered from high rates of infant mortality—indicators of well-being not dissimilar to comparable European populations in the fifteenth and sixteenth centuries (6).

Native life was disrupted beginning in the sixteenth century upon contact with outsiders from Europe. As more and more Europeans arrived in North America, Appalachia was rapidly depopulated by smallpox, influenza, and venereal diseases (epidemic diseases from Europe against which Native American populations had no prior immunity), which killed 90% of the Cherokee population during the 1700s (7). Additionally, with the intrusion of the European market for fur previously shared land became contested. European colonizers fractured Native societies, and cycles of indebtedness allowed the colonizers to appropriate three-fifths of the land in Appalachia by the end of the 1700s. By 1840, nearly all traces of Native American society in

Central Appalachia were destroyed through land acquisition, disease, and ultimately forced removal (3).[7]

3. European Settlement: 1650 to 1776

The first Europeans to reach and document the Appalachian Mountains were members of the Spanish de Soto expedition (1539–1543). The expedition, noting the difficulty of the terrain as an obstacle to exploiting the abundant wealth of the region, initially avoided confrontation with Native Americans in the mountains (3). Following de Soto, English fur traders recorded expeditions into the mountains beginning in 1650, making alliances with Native American groups to establish fur as an important part of the colonial economy. The growing fur trade linked Appalachia to the global commodity market and attracted increased European activity in the mountains. By the eighteenth century, as local game that was once abundant was hunted and trapped into scarcity, fur became a less dependable source of income for European hunters and traders. But the wave of European migration had already begun and the white population in the Appalachian Mountains continued to grow as yeoman-settlers cleared small acreages for farming (3).

Although this first American frontier was often violent and unstable as a theater for conflicts with Native Americans and European colonial wars,[8] the natural barriers, and relative inaccessibility of the Appalachian Mountains provided rural life for immigrants seeking independence. Large families in small mountain homesteads were nurtured by diverse forest agriculture, and a kinship-based social organization ensured a sharing of labor and land resources with relative mutuality (8). Livestock, turned loose in the woods to feed on the forest floor, provided Homesteaders with a stable food source which was complimented by hunting wild game and modest farming. Families practiced household production of food and goods and engaged in vigorous exchange to develop a cooperative commodity-based system of trade.

[7] The Indian Removal Act of 1830 began a series of forced displacements of approximately 60,000 American Indians between 1830 and 1850. Known as the Trail of Tears, Native Americas died in the thousands from exposure, disease, and starvation during their forced relocation west of the Mississippi River.

[8] Most notably, the Seven Years' War (1754–1763) was fought throughout the Virginian and Pennsylvanian frontier. The British with Cherokee, Iroquois, and Catawba allies fought French colonists supported by the Wabanaki Confederacy. The conflict concluded with the Treaty of Paris, in which France ceded all territory east of the Mississippi to Great Britain, cementing Britain as the dominant colonial power in North America.

Settlers who arrived in the mountains moved onto land regardless of who owned it, and settlement by squatting made agrarian existence possible, ensuring an extensive ecological base and a de facto commons to support exchange without money. Although the majority of the trade was local, Appalachian families began to export whiskey, which connected these mountain farmers to distant markets (8).

The majority of Appalachia's early European settlers migrated from the United Kingdom and Germany, where they previously had been members of aggrieved classes who faced poverty, instability, and persecution in the "Old World" (3). Seeking land and religious freedom, between 1688 and 1776 over 100,000 settlers predominantly from North Briton[9] dispersed throughout the mountain valleys and hollows, bringing with them traditions of land and animal husbandry, hard drinking and whiskey making, and language particularities that would formatively influence mountain settlement culture (9). Fearing increasing French activity in the mountains, the British colonial government served as a promoter of this settlement, promising between 10,000 and 20,000 acres of land previously occupied by indigenous peoples to recruit non-French settlers into Appalachia (3).

As more settlers moved west into and over the Appalachian Mountains, tensions between Native Americans and European settlers escalated. The British colonial government attempted to limit conflict by setting the Proclamation Line of 1763, intended to discourage expansion further west by forbidding settlement west of a line drawn along the Appalachian Mountains which was delineated as an Indian Reserve. The proclamation rendered worthless land grants given by the government to British subjects who fought for the Crown against France during the Seven Years' War and fueled resentment toward the British monarchy in the years leading up to the American Revolution. Settlers, however, continued to pursue new land independently, and when war broke out, the British government paid troops in land warrants in areas beyond the line to reduce military costs. This rendered the 1763 effort to contain expansion and limit settler-Indian conflict ultimately futile (4).

With the conclusion of the Revolutionary War in 1783, British authority ended and with it any attempt to restrain land settlement by non-Native Americans in the Appalachian Mountains (4). In order to pay off war debts, the newly independent American eastern colonies

[9] The emigrants from "North Briton" were a "mixed people" including various groups bordering the Irish Sea, sometimes referred to as "Scots-Irish," "Ulster-Irish," "Northern-Irish," or "Border English.".

propagated a large speculation market for western land occupied by Native Americans. This land was given to soldiers who fought for the United States and purchased by the colonial elite and land companies. Because much of the land that was sold in the Appalachian Mountains was too steep to cultivate and far from cities with limited infrastructure and transportation to make it accessible, the formal land purchasers did not move into the mountains to settle their newly acquired lands. Instead, the mountain frontier society remained dominated by squatters with little formal or informal ties to distant landowners (10).

White residents in the Appalachian Mountains were relatively self-sufficient. Despite tenuous legal claims to property, these settlers established strong emotional ties to the land and the close-knit communities. Settlers saw themselves as a force of racial purification in their displacement of Native Americans and were revered as symbols of the American frontier. While settlers enjoyed limited interference from the government for a time, the commodification of land, difficulty obtaining accurate surveys and land titles, and inconsistent taxation left these inhabitants vulnerable to absentee corporations who would later recognize the resource value of the Appalachian Mountains and forcibly acquire land and mineral rights (4).

4. Appalachia between the America's Revolution and its Civil War: 1776-1870

From the Revolutionary War to the Civil War, the people who lived in the Appalachian Mountains largely organized themselves around cooperative community structures. As the population grew in the first half of the nineteenth century, new infrastructure and growing commodity markets increasingly integrated these mountain communities into national and global systems of exchange. The population in Central Appalachia was growing rapidly and would increase 15-fold from a hundred thousand to 1.5 million between 1790 and 1860. This placed a strain on the ecological base to sustain life as short-term maximization strategies to remove forest and plow land for agriculture in fragile mountain ecosystems caused irreversible alterations to soils and wildlife (7). Nonetheless, by the end of the Civil War, Appalachia was recognized and pursued as a rich resource base that would generate enormous wealth for a lucky few.

At the beginning of the nineteenth century, a distinct culture in Appalachian frontier society existed. In the early Antebellum years, the Appalachian frontier was distinguished by a

farmland economy based on open cattle and hog grazing in cleared portions of forest. Families lived on isolated farmsteads in dispersed rural areas. A small minority lived in county seat towns. Neighborhood churches served as the centers of these communities. Yet, it would be remiss to imagine even early frontier society as simple and idyllic. As the population grew, Appalachian communities quickly expanded from self-sufficiency and neighborhood informal exchange systems to wider grain and livestock markets increasingly organized by the norms of capitalism (3).

By the 1820s, the Central Appalachian economy began to diversify. Attracting attention from outside markets, the region produced and exported goods and resources to support both the Southern plantation economy and the bourgeoning Northern industrial economy. Throughout the 1820s and 1830s, tens of thousands of mountain-raised animals were exported to coastal cities, and a salt mining industry developed in mountain Virginia (3). Additionally, a market for household goods manufactured by women who made jeans, linens, cottons, butter, ginseng, and molasses developed in county seat towns (4). Prior to the construction of railroad lines, natural waterways connected Appalachia to the Atlantic coast as the mountains supplied the Southern plantation economy with food, tobacco, liquor, and livestock (7).

***Figure 4**: "A Typical Mountain Home in Kentucky" circa 1880. Credit: Wisconsin Historical Society (Image ID 72098)*

As it integrated into a global economic system through timber, livestock, and salt markets, the Appalachian economy was perhaps most famous for the production of whiskey. In 1790, with 1200 individual distillers, one-fourth of the national whiskey industry was located in only four counties in Appalachia. Along with other goods, whiskey was used as a medium of exchange. Thus, there was little cash in Appalachia, which presented a challenge to the federal government which aimed to establish a source of revenue through taxation (3). In response, Appalachian farmers who believed self-manufactured products should not be taxed initiated the Whiskey Rebellion in 1794. Afraid western counties would secede from the newly independent United States, Alexander Hamilton marched into the mountains to enforce authority of federal law and force distillers to measure and quantify their product and submit to standardized forms of value and money. Though the tax was ultimately nullified, it marked a significant shift in the Appalachian economy, emphasizing ties to the Atlantic economy and the conversion of product into taxable paper money (10).

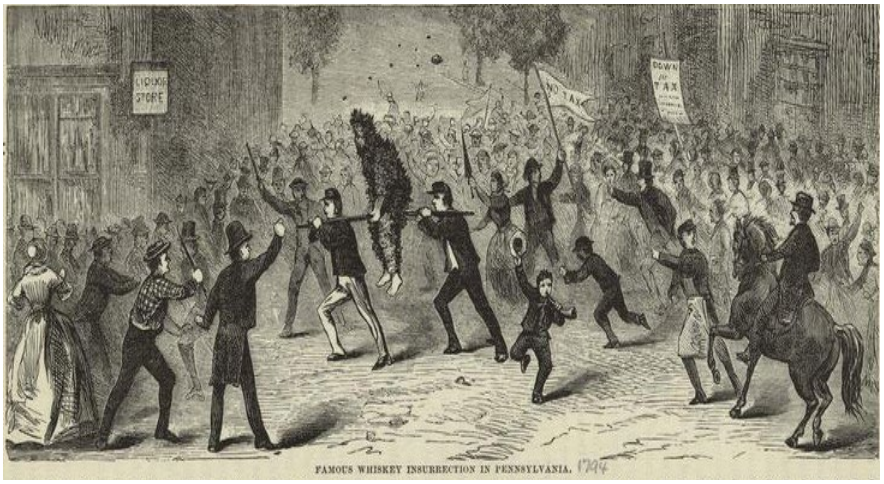

Figure 5: *An illustration of the Whiskey Rebellion in which the tarred and feathered tax collector is made to ride the rail. Credit: R. M. Devens, Springfield, Mass, 1882.*

Appalachia was further entrenched in national politics as the Civil War divided communities and families within the Appalachian Mountains (10). Because geographic and economic conditions prevented large-scale commercial agriculture from developing in Appalachia, slavery was relatively absent from mountain areas. Thus, generally Northern Appalachian communities supported the pro-abolitionist Republican Party while the majority of southern Appalachian communities ambivalent about slavery supported the sentiment of the Union preservationists (3). Many of these Southern Appalachians however, were "conditional Unionists" who opposed violence to prevent secession and ultimately supported the Confederacy (4). Appalachia was geographically strategic in the Civil War as a breadbasket for the plantation South and housed strategic rail centers for the Confederacy. Divided loyalties manifested in a

"hidden Civil War" in which guerillas, deserters, and marauders terrorized the local population. Intense cultural divisions manifested in the separation West Virginia from Virginia, the only enduring boundary change resulting from the Civil War (10). [10]

In the years after the civil war, wood remained the main source of fuel in the United States. By 1860, Appalachian households had consumed nearly one quarter of the region's forest for heating and cooking, which further exacerbated ongoing deforestation. Increasing land scarcity and competition for forest products drove Appalachian communities further into the mountains onto more and more ecologically vulnerable terrain (4).

Although coal had been discovered in eastern North America by English settlers in the mid-seventeenth century, it was not until the Civil War when coal prices increased by nearly 50% that geological surveyors and later investors began to seriously explore Appalachia's coal resources.[11] During the Civil War, coal prices increased by nearly 50% as demand increased. At the same time, military cartographers noticed outcroppings of coal in the mountains, and both sides began collecting geographical and geological information about the area (10). Perhaps most notably Jedidiah Hotchkiss, a cartographer responsible for mapping Shenandoah Valley to mark points of offense and defense for the Confederacy, recognized the value of the coal in the Appalachian Mountains. Hotchkiss produced large volumes of unprecedently detailed maps of the region to direct troop movements from 1862 to 1864. Following the war, Hotchkiss devoted his time to furthering the development of natural resources, particularly in areas in which he had identified coal during the war. From 1880 to 1885, Hotchkiss published the monthly magazine *The Virginias: A Mining, Industrial and Scientific Journal Devoted to the Development of Virginia and West Virginia* in close association with railroad owners (11). The cartographers were quickly followed by industrial promoters and entrepreneurs who secured title to mineral rights and large tracts of mountain land in the 1870s (3).

The Civil War utterly disrupted the social structure in Appalachia. During the War, schools were closed, trade was interrupted, agriculture was devastated, neighbors feuded, and

[10] The state of West Virginia was founded in 1863 due to both Unionist convictions and dissatisfaction with Virginia's banking and railroad policies which alienated many in the mountain areas.

[11] English settlers in Virginia first identified coal in the United States in 1673. However, commercial coal mining did not begin until the 1740s when slaves were used in the Richmond Basin coalfields to mine coal. Even then, due to limited demand for coal and poor transportation networks in the plantation South, the scope of coal mining was relatively constrained. As the start of the 1800s, Pittsburgh became the center of the American coal market and Pennsylvania anthracite coalfields provided iron and fuel to most of the growing eastern cities and railroads. Appalachian coalfields were not utilized until the end of the nineteenth century.

guerilla warfare ran rampant (3). Cycles of violence and feuding resulted in homicide rates after 1865 between two to five times greater than they had been before 1860. Farmers moved deeper into the mountains as the livestock and food supply dwindled and agriculture and commodity markets disintegrated (4). The Civil War wiped out farm animals and with them a substantial part of the economic security of rural Appalachians. After the war, cattle husbandry shifted dramatically westward while Appalachian farmers were unable to adapt to the changed ecological, social, and economic landscape. Many farmers previously engaged in Appalachian stock growing before the war migrated westward as the "collapse of authority in the mountains coupled with the thinness of the soil…added to Appalachia's declining agricultural status"(3). As such, impoverished and socially unstable, the region was particularly vulnerable to the exploitative forces that soon arrived.

5. The Triumph of a New Industry: 1870 to 1920

In the aftermath of the Civil War, speculators and mining firms flooded into Appalachia seeking the deep reserves of minerals, timber, and labor to support the industrializing nation. As coal and timbering companies expanded operations in the Appalachian Mountains, previously agrarian livelihoods benefitting from close kinship bonds were disrupted as thousands of families moved from their rural homes into company towns surrounding coal mines. Millions more moved from outside Appalachia into coal towns to supply the growing need for labor, including black miners from northern Alabama and the Deep South and European immigrants from Wales, Italy, Poland, and Hungary (3). Between 1880 and 1920 the population of Central Appalachia grew from around 2.5 million to just over 4 million. Population growth created a pool of labor that fueled Appalachian coal production, allowing the United States to become a leading global supplier of coal, just over half of which came from the mines of Central Appalachia (12). By the 1920s, coal provided 63% of all United States energy and powered American manufacturing of steel, cotton, and steam-powered ships.

The timber and coal extracted from Appalachia were essential to the growth and expansion of American cities and industry between 1880 and 1920. As investment opportunities in metropolitan centers dwindled in the second half of the nineteenth century, capitalist financial institutions looked for new opportunities in new regions (8). Between 1860 and 1873, state-private partnerships laid down seven times as much railroad track than in the previous three

decades, making Appalachia more accessible than ever before. A switch from wood to coal-fired railroads during this period facilitated a massive boom in the coal industry (13). Railroads also expediated demographic shifts. The location of rail centers determined the spatial organization of burgeoning coal towns in Appalachia and brought in workmen and entrepreneurs alike (4).

Companies established coal towns around mines which housed workmen and their families and maximized productive efficiency while minimizing cost to the companies that owned the mines. As such, Appalachia had the highest concentration of company-owned towns of any region in the United States. The company towns subjected Appalachians (both long-term residents and new migrant-laborers) to a form of "corporate feudalism," by which mine managers used the leverage of the company store, company-financed churches and schools, and company housing to strengthen control over workers (3). Coal companies manufactured dependent workforces by importing labor from other states. They used these immigrants to overwhelm any situational advantage of mountain-born miners, keeping thousands of surplus laborers on hand to underbid anyone who pushed for improved wages (10). Coal towns also strategically hired miners from different racial and ethnic backgrounds to thwart community ties among miners that might accelerate mobilization. As part this strategy, coal operators hired agents to recruit emancipated slaves from southern states into Central Appalachia. The agents were instructed to "pick workers with strong backs and weak minds, as they give the least trouble" (14).

To attract investors to the area, state governments supported by local elites hired geological surveyors to promote the mineral wealth of the mountains (15). Residents who recognized the value of the land consolidated land titles into blocks of mineral rights, purchased from less informed farmers. Kentucky politician John C. Mayo[12] conceptualized the "broad form deed," a mechanism by which the owner of mineral rights gained privilege of mining rights on land leased from farmers.[13] Coal and land companies arranged to purchase mineral rights

[12] Mayo created of the broad form deed as a way for attracting corporate interest in Appalachia. Mayo used his schoolteacher salary and knowledge found in deed books to begin purchasing land and mineral rights and, in turn, sold this land to steel and coal companies with the promise maximizing the profitability of the land they bought through these deeds. Mayo used his accumulated wealth to support gubernatorial and congressional campaigns for candidates who would support the broad form deed and protect mining interests.

[13] Broad form deeds are legal documents which sever a property into surface and mineral rights. This allows other individuals or companies other than the landowner to purchase or lease rights to resources. Although the selling of mineral rights began before the creation of the broad form deed, these became common practice beginning in the 1880s.

from landowners with the assurance that deep mining would not disturb aboveground farming activities (3). Once coal operators began mining, however, they claimed the mineral rights took precedence over surface rights and refused to acquire consent from farmers or pay for often extensive damages to the land caused by mining (16).

Coal production in Central Appalachia increased from 4% of the American total in 1880 to 40% by 1930. At the same time, having increasingly lost control of land and resources, Appalachian families left their farms for new industrial camps, drawn by the promise of wage income and a better life (17). Between two-thirds and four-fifths of miners lived in coal towns, consolidating the power of coal operators who owned homes, streets, schools, medical facilities, and company stores. A debt-labor regime of accumulation was common practice of companies that deducted from miners' pay checks the cost of rent, medical bills, funeral expenses, and goods. Due to low wages and the high cost of goods from company owned stores (prices were sometimes twice as high as the cost of comparable goods in non-coal towns), miners and their families were forced to take loans from the company. The direness of indebtedness was so extreme that the wives of miners were sometimes forced to sleep with managers to pay off loans (18).

Education in company towns was also controlled by companies, and schools underperformed compared to national averaged. In 1900 the national average illiteracy rate was 11.3%, but in Kentucky, Tennessee, and Virginia illiteracy rates hovered around 20%. Control over the educational system allowed mining companies to form the narratives around labor and coal that children were exposed to from an early age and thus to increase their influence over the social life of miners and their families. This control was further enhanced by the relative isolation of miners and their families; with 88% of coal towns over five miles from other resources of community life, miners lived in isolation and struggled to migrate elsewhere (8).

The key to controlling the workplace was creating dependency on jobs, and miners faced threats of violence, discharge, and blacklisting for noncompliance. Law enforcement officers in company towns reported to the county Sheriff, but their salaries as well as the salaries of private mine guards who oversaw miners and protected company interests were paid by coal companies, creating a kind of private police force beholden as much to the coal companies as anyone else (19).

Coal Town: Middlesboro, Kentucky

Figure 6: *Alexander A. Arthur at the age of 34 and with his family on the lawn of the family home. Source: Digital Library of Appalachia*

One such company town was Middlesboro, Kentucky.* Middlesboro was established in 1887 by the American Association, Ltd., a British iron and coal company headed by Alexander A. Arthur (1846–1912). Arthur was a British investor who, like many others, who took an interest in American land and industry. Persuaded by a 1887 report conducted by the State of Kentucky's Inspector of Mines to attract investment touting the "phenomenally rich" coal stores of the "best quality," Arthur began acquiring large swaths of land from local residents. As residents were uninformed about the resource value of their land, Arthur was able to purchase property for as little as 50 cents per acre at auction (8). With a $20 million investment over 2 years, the American Association, Ltd. accumulated over 100,000 acres of land, built a town that housed 5,000 people, and constructed a railroad line to export iron and coke.

The local elite welcomed the influx of money and supported development and took lucrative leadership positions in the American Association, while also shaping local laws and taxation policies to suit the interests of the foreign company. In 1888, the Kentucky State legislature even passed an "Act for the Benefit of the Company," which granted special consideration and rights to the American Association to purchase land, railroad lines, and mines (8). Locals generally supported such policies with the expectation that Middlesboro would become the next great industrial center, glorifying industrialization and capitalism over agrarian mountain culture. The American Association further encouraged the mindset that industrialization and capitalism were superior to the older more agrarian and communal social order by way of opening company-controlled schools and churches which influenced residents' beliefs and values. The Working class of miners, in turn, subscribed to a belief in a "common purpose" of growth, thereby allowing "coercion to shape consensus" as the American Association and local elites distorted information to exaggerate the benefits of industrialism (8).

* The history of Middlesboro was richly chronicled by John Gaventa in his 1980 study of inequality, power and coercion "Power and Powerlessness: Quiescence and Rebellion in an Appalachian Valley".

Mining was incredibly dangerous work, yet miners were unable to improve their situation due to dependency created by companies and a lack of alternatives. In the early twentieth century, mining fatality rates exceeded 3 per 1000 per year. This meant that a miner with a 25-year career had an almost 1 in 100 chance of dying on the job (20). Working conditions were horrific as miners worked ten- to fourteen-hour days and mines were prone to flooding, methane explosions, fires, and cave-ins. Children, known as 'breaker boys', were often employed in mines to sift through impurities in the coal and to access spaces too small for a grown men to enter. These children lost fingers, limbs and too often their lives as cheap, expendable labor in the service of coal operators (21). The coal dust underground miners inhaled – adults and children alike – contributed to a terrible disease that would come to be called "Black Lung." At the same time, coal companies did not compensate for the life-crippling injuries suffered by their employees (18). Furthermore, although early mining techniques were a craft skill that required years to learn, as time went on increased mechanization meant mining was de-skilled, and thus miners were relatively interchangeable and dispensable from the perspective of their employers (18). Wages were based on piece-rates (the more coal a miner mined, the more money he made). This incentive structure caused miners to take higher risks to increase their income and resulted in Appalachian coal workers earning some of the lowest wages in the nation while also suffering from the highest injury and death rates.

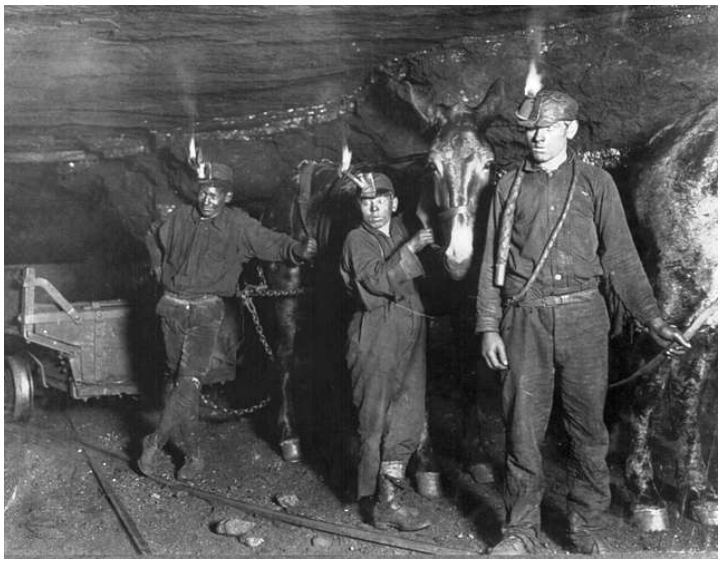

Figure 7: *Child coal miners in West Virginian coal mine 1908. Source: Library of Congress https://www.loc.gov/item/2018673711/*

Throughout the early industrialization, Central Appalachian coal companies wielded their power to maintain an economic advantage over northern competitors, creating a new social and political dynamic in the mountains. The structure and spatial landscape of communities in Central Appalachia was dictated by coal mines and railroad lines, which served as social and economic hubs. While Central Appalachian coal fueled American prosperity in growing cities

along the Atlantic Seaboard, little of the wealth generated by Central Appalachian coal mines stayed in Appalachia, and the well-being of the mountain people lagged behind the rest of the country. Central Appalachian miners and their families remained poor with per capita income barely half that of the US national average in 1920.

6. The Dawn of the Labor Movement: 1920 to 1930

Although coal mines outside Appalachia were among the first work places in America to organize—as early as 1847 in Shenandoah, Pennsylvania—Central Appalachian mine workers struggled to organize well into the 20th century. Throughout the first two decades of the 20th century, coal companies in Appalachia strategically blocked unionization to keep wages low and raise profits in order to corner the global coal market (8). Coal companies used a multitude of tactics from their control over education and social life to violence and intimidation to prevent Appalachian miners from organizing. Coal companies dominated local politics by gaining unilateral control over the sheriff's office, county judges, tax assessors, highway departments, even the company doctor who delivered miner's babies and the company owned cemetery where the dead miners were buried (3). State and county courts consistently ruled in favor of operators by granting coal companies blanket injunctions against union organizers, some of which made it illegal to so much as mention a strike (4). When miners did attempt to organize, the juggernaut of powerful interests in Central Appalachia who benefited from the status quo were able to quickly subdue the organizers. In the wake of World War I, Appalachian miners saw a strategic opening and with the support of the national union, the United Mine Workers of America (UMWA), began to agitate and organize against the oppressive tactics and dangerous conditions of the mining industry.[14] By 1921, national newspapers were reporting on the "wars" raging in the coalfields of Appalachia.

For coal operators, the bituminous coal in Appalachia was particularly desirable for its high carbon yields, high amounts of heat per unit weight, close proximity to steel manufacturing centers, and low costs of labor (4). Throughout the early 1900s, Appalachian operators watched as Midwest coal producers struggled to compete when unions forced companies to better

[14] The UMWA was established in 1890 with the purpose of, "educating all mine workers in America to realize the necessity of unity of action and purpose, in demanding and securing by lawful means the just fruits of our toil"(20).

compensate their workforce and adopt safer labor practices (18).[15] Fearful they would lose productive efficiency like unionized Midwest mines, Appalachian coal operators thwarted union efforts via political power and a monopoly over communication and information that allowed them to discourage strikes. When all else failed, local governments arrested strikers, hired thugs, and used dynamite and machine guns to prevent strikes. With their control over schools, churches, and news media, mine operators successfully shaped perceptions of miners while proliferating a culture of "powerlessness and quiescence," effectively stifling rebellion (8).

Figure 8: *World War I propaganda poster from the United States Fuel Administration encourages men to work in coal mines to support the war efforts.*

Source: Library of Congress, Prints & Photographs Division. https://www.loc.gov/resource/cph.3g07924/

By 1910, UMWA had gained roughly 250,000 members in the Midwest and West, yet struggled to gain a foothold in Central Appalachia (22). To keep unions from coming to Central Appalachian coal mines, operators ratcheted up antiunion sentiment using every means at their disposal to exert power over coal miners and their families. It was not until the demand for coal increased during World War I that UMWA would begin to lay the groundwork for a successful labor movement in Appalachia (23).[16] During the war, increased demand for coal created a labor shortage, allowing the union to negotiate from a position of strength. The UMWA was therefore able to achieve several regulatory wins without resorting to strikes (4). Indeed, in a strategic 'patriotic gesture' of goodwill, the UMWA garnered public support by agreeing not to organize strikes during the war. Over the course of the war,

[15] By 1930 nonunion coal mines provided 80% of the national coal production,—validating the worries of coal operators about the potential impacts of unionization on their bottom line.

[16] Conflict in Europe provided significant impetus for American industry as the demand for manufactured goods, food, and labor increased. Additionally, as European immigration halted during the war years and prices rose, laborers called for higher wages.

UMWA slowly grew their membership in Appalachia and prepared to reinvigorate the labor movement in Central Appalachia after the war's end (22).

Following World War I, the UWMA called the first large strike in Appalachia in West Virginia. The strike mobilized miners grievances over stagnant wages despite the rising price of coal and post-war labor shortages.[17] The strike pitted aggrieved miners against coal companies and the local elites and political institutions, which benefited from, and were controlled by mining interests, and resulted in one of the most dramatic chapters in American labor history with multiple armed conflicts over the course of 1920-21. The violence began on May 19, 1920 in a shoot-out in the town of Matewan ("The Matewan Massacre") which killed eleven people including the mayor of the town and several 'detectives' or militiamen who had been hired by coal operators to suppress the striking miners (4). The violence culminated on the last day of August 1921 in the Battle of Blair Mountain. The battle pitted miners against a private army assembled by the Logan County sheriff, Don Chafin, and backed by the money and power of the coal industry. The battle raged for five days and was the largest armed conflict on American soil since the Civil War. Twelve hundred state police, militia, and sheriff's deputies sought to quell three thousand marching miners. Both sides were heavily armed and organized, and for the first time on American soil, aircraft hired by Chafin's 'army' dropped bombs and tear gas on the miners. The battle ended only with the arrival of Federal troops on September 4th (3).

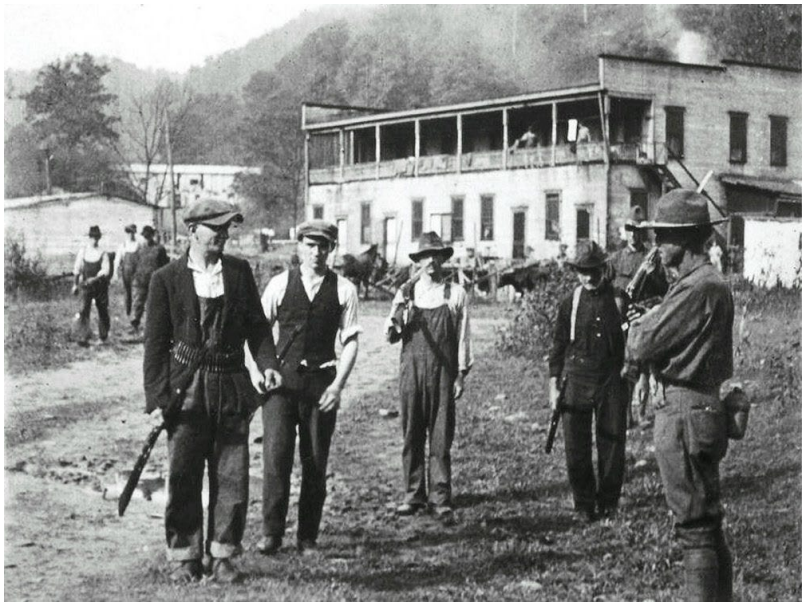

Figure 9: *Striking miners surrender their rifles to federal troops after the Battle of Blair Mountain September, 1921. Source: Wikicommons under Public Domain*

[17] While there is little to no research available on the relationship between the 1918 influenza pandemic and the labor movement in Appalachia, it is plausible that the ongoing effects of the global pandemic acerbated the conditions that led to the strike as the pandemic both sickened and killed miners and led to a drastic reduction in coal production as miners fell ill and mines closed. In one Kentucky coal town, nurses reported that up to 50% of 2,500 residents were sickened with influenza, many with fevers reaching 105 degrees Fahrenheit (24).

While the miners attempted to frame the intervention of the federal government as a win, and media attention did in fact put the national spotlight favorably on the plight of miners, the ultimate victors remained the coal operators who in the final analysis were still able to prevent unionization. After the battle ended, coal companies fired and evicted from their company-owned homes 6,000 union members. Almost 1,000 miners were indicted for murder, conspiracy to commit murder, accessory to murder, and treason against the state of West Virginia. Though none of the miners were convicted on the charge of treason, many were convicted on lesser charges and many were imprisoned for years. Operators called striking coal miners "un-American" and unpatriotic and insisted that unions were pawns of their Northern and Midwest competitors which, they claimed, were conspiring to put Appalachian operators out of business (4). This rhetoric convinced nervous citizens across the country that labor unrest was the product of radical ideologies that threatened post-war American freedom and for the most part successfully turned public sentiment against the labor movement.

Despite providing the raw materials to fuel American industrialization and the war effort, the struggle to organize labor and keep more of the wealth generated from Appalachia's natural resources for the Appalachian people was unsuccessful at overcoming the entrenched power of the coal industry. The ability of Appalachian coal operators to suppress post-war unionization created such a significant wage differential between northern 'union' mines and 'nonunion' mines in Appalachia that additional mines in Appalachia were opened despite the waning demand for coal following the war (25).

7. A New Deal for Miners in an Era of Economic Depression: 1930 to 1945

The Great Depression, extending from 1929 to 1939, marked the longest and most severe economic downturn yet experienced by the industrialized Western world. Across the nation, unemployment and acute deflation crippled American industry, as output dropped by 47%. The Great Depression brought intense change to the American labor landscape and, subsequently, to the livelihoods of thousands of Appalachian workers. During the Great Depression, national unemployment rates reached as high as 20%. The situation was even worse in Central Appalachia where many counties experienced unemployment rates over 80%. The disproportionate impact of the Depression on Appalachian workers was due in no small part to

the structure of the coal and timber industries in the region, which in the years leading up to the Great Depression were already plagued by overproduction, low wages, and rising unemployment. Thus, mountain residents felt the deleterious impacts of fifty years of industrial abuse even before the stock market crashed in 1929.

***Figure 10**: Pumping water by hand in 1942 in Wilder, Tennessee. The Tennessee Valley Authority, one of the New Deal Programs of the 1930s, aimed to build infrastructure and supply electricity to this impoverished region of the United States. Source: FDR Library*

By 1930, the Appalachian coal industry was sliding towards bankruptcy as the national economy caved and manufacturing collapsed in the wake of global economic downturn, drastically reducing the demand for coal. Coal production fell from over 343 million short tons in 1920 to 241 million short tons by 1930 (17). With reduced production, mining jobs were also reduced from almost 800,000 in 1920 to 650,000 in 1930 and just above 500,000 by 1940 (26). As factories shut down and few opportunities for work existed, many families attempted to return to an agrarian lifestyle in spite of the scarcity of suitable agricultural land (27). While the number of new farms increased 51% between 1929 and 1934, there was no increase in area of farm land, causing a dire subsistence crisis as overcrowded homesteads were unable to sustain the new population (10). In 1929, Appalachia contained 52 out of 64 counties in the United States with per capita annual farm incomes of less than $100 (4). The woes of farmers were exacerbated by a massive drought in the summer of 1930 as 2,622 forest fires damaged 350,000 acres of woodland. Farmers struggled to purchase seed, fertilizer, and food for their families. West Virginia had the highest infant mortality rate in the country and the state Board of Children's Guardians reported that more parents had deserted their children in 1930 than any year on record (25).

Coal companies continued to exercise their power over coal mining communities using their control over both law enforcement and the judiciary to punish anyone who tried to organize

against them. A journalist at the *Courier-Journal* newspaper in Louisville Kentucky writing a decade later described the control of coal companies over coalfield citizens at the start of the Great Depression thus:

> In 1931, for all practical purposes, the only law for the miners of Harlan County was the mining companies' law as interpreted by deputies sheriff selected and paid directly by the companies… The system was simply law enforcement stripped of any pretense of impartiality, and it is difficult to imagine a more effective device for promoting violence and engendering resentful hatred among the people bred in the free air of the Kentucky hills—a people at that time made wretched and sometimes hopeless by the deepening of depression in the mine fields (28).

Yet in the face of this oppressive system of coercion and control, or perhaps because of it, efforts to organize labor continued in Appalachia despite the significant setbacks to the union movement in the aftermath of the Battle of Blair Mountain in 1921 (29). The violence of the 1920s labor movement continued into the 1930s with ongoing bloody skirmishes between mine operators and labor in many parts of Central Appalachia. But for the first time in the history of this movement, outside political forces would begin to shift albeit fleetingly the balance of power in favor of the miners and union organizers.

The election of President Roosevelt in 1932 brought with it the New Deal and experimental emergency measures for banking reform, industrial regulation, unemployment benefits, and relief for the agricultural industry. The New Deal represented a revolutionary reordering of values in the United States and addressed poverty and inequality via reforms and laws that would restructure the labor landscape. The National Industrial Recovery Act (NRA) of 1933, established public works programs, stipulated minimum wages and maximum weekly labor hours, and guaranteed collective bargaining for organized labor. The NRA touted many short-term successes in building public facilities and providing Social Security for many workers. The persistence of patronage politics in Appalachia nonetheless compromised the ability of state governments in the region to adequately fund welfare agencies, limiting the long term impact of the act (25).

The welfare programs of the New Deal may have failed to make a significant dent in the pernicious poverty of Central Appalachia. But new federal regulations supporting labor rights would have a more significant impact. Prior to the Depression, most efforts in organizing labor had failed in Appalachia. Under the provisions of NRA that affirmed laborers' rights to unionize, however, UMWA was able to successfully organize campaigns and strikes to consolidate these rights in the mountains. In September 1933, after months of debate between coal operators and union representatives, President Roosevelt signed the Bituminous Coal Code, mandating reduced wage differentials, instituting a maximum eight-hour workday, and establishing grievance procedures for miners (25). UMWA touted the signing of this code as "the greatest victory ever won by organized labor" (25). This victory was followed by the Wagner Act in 1935, which legally prevented coal operators from firing or discriminating against workers who organized, and barred companies from refusing to bargain with organized unions. Finally, the Fair Labor Standards Act passed in 1938 outlawed child labor and created a right to overtime pay after 40 hours of weekly work (3).

Figure 11: *President Franklin Roosevelt signs the Wagner Act on July 5, 1935. U.S. Secretary of Labor Frances Perkins (right) and Rep. Theodore A. Peyser (D-NY, left) look on. Source: FDR Library*

With the implementation of New Deal programs, UMWA membership jumped from 100,000 in 1932 to 541,000 by 1935 (8). The New Deal led to improvements in employment conditions and wages that lasted until the 1950s. But the power of unions was soon eroded as the coal industry, facing ever-changing consumption patterns and competition from other energy sources, sought more efficient technologies in order to reduce labor costs and remain competitive (25). And although miners saw immediate gains in their pay and thousands of distressed families received relief, the labor victories did not solve the more systematic issues that plagued Appalachia nor the dependence of the region on a single, highly volatile, market as a source of revenue and employment.

Coal Wars: Harlan County, Kentucky

Harlan County, Kentucky was the site of some of the more violent and long-lasting efforts in the 1930s of coal miners and union organizers to assert their right to organize in Central Appalachia. Miners began to organize in Harlan County in February 1931 after the coal operators' association cut wages by 10% to stave of operating losses during the Great Depression. Using a well-honed playbook of discharge, eviction and blacklisting, coal operators promptly punished miners known to be involved in union activity. This time, however, the playbook backfired and before long most of the remaining workforce went on strike out of sympathy for the evicted miners (19).

The scale of the strike in Harlan County was something not previously seen in Central Appalachia. At its peak, 5,800 miners were idle and only 900 strikebreakers were working. Armed company deputies roamed Harlan County, terrorizing striking miners and their families, and looking for union leaders to beat, jail, or kill. The ongoing violence inspired Florence Reece, wife one of the union leaders, to compose "*Which Side Are You On?"* a protest song sung by protestors and activists around the world to this day. As the song puts it:

If you don't want your husband to
die in the coal mine,
I'll see you in the morning out on
the picket line.

Which side are you on boys?
Which side are you on?
Which side are you on boys?
Which side are you on?

They say in Harlan County
There are no neutrals there.
You'll either be a union man
Or a thug for J. H. Blair.

Which side are you on boys?
Which side are you on?
Which side are you on boys?
Which side are you on?

The first wave of violence in ended with the arrival of the Kentucky National Guard, after a particularly violent episode on May 5, 1931 left three company men and one striker dead. The miners anticipated protection from the arriving troops, but the National Guard for the most part supported the coal operators and broke the picket line, ending the strike without a better deal for miners. In spite of their losses, Harlan miners agitated for higher wages and better working conditions throughout the 1930s. Continued violence including shootings and bombings brought national guard troops to Harlan County a total of six times over the course of the decade. Yet, the coal operators refused to negotiate with striking miners—even when the 1935 Wagner Act mandated that they do. Only after the widespread publication of a report by the National Committee for the Defense of Political Prisoners exposed the extent of violence perpetrated by the private mine-guard system and led to a congressional investigation chaired by Senator Robert La Follette Jr, was Kentucky's Governor forced to intercede, ending the private mine guard system and protecting the rights of coal miners to unionize and negotiate with their employer (29).

A more equitable balance of power for Harlan miners would survive only for a generation. Harlan County again became the site of a violent labor struggle in the 1970s as miners and their families agitated against the Duke Power Company in a labor movement famously chronicled by Barbara Kopple in her award winning documentary, Harlan County, USA.

Figure 12: National Guard troops used to "keep order" in a 1939 Harlan County coal miners' strike.
Source: University of Kentucky Special Collections Research Center.

Accompanying the NRA and labor reform, Appalachia received federal intervention targeting the needs of struggling farmers. The federal government improved rural access to electricity and offered farm loans, but small farmers had difficulty qualifying for these programs and thus received few of the benefits (3). One prominent example of an agency developed to help Appalachian communities was the Tennessee Valley Authority (TVA). The TVA was authorized by Congress to preserve water and other natural resources, integrate electricity generation, flood control, and economic development. Yet, the TVA transferred over one million acres of land from private land to federal ownership, effectively displacing nearly 7000 small farmers in the process (3). Other policies focused on curbing environmental destruction by providing cash payments to farmers in return for limiting agriculture on land vulnerable to erosion and soil degradation (4). While this policy protected the environment, it furthered the long-term decline of agriculture in Appalachia which exacerbated the region's reliance on a single industry—coal—as a source of employment and security (3, 30). Additionally, as the federal government increasingly left social support programs to be managed by state and county legislatures, allowing local elites to consolidate their power by controlling the flow of welfare payments (3).

The New Deal brought relief amidst the tribulation of the Great Depression to many Americans nationally, yet Appalachia continued to face poverty, unemployment, and environmental degradation even as the rest of the country recovered. During industrialization, mountain families traded relatively self-sufficient agrarian lives for dependency on coal mining jobs and income. When those jobs began to disappear, this dependency shifted from relying on private companies to relying on state and federal government welfare payments (17). Throughout the 1930s, federal recognition of the poverty in Appalachia brought attention to the woes of the Appalachian people and spurred the federal government into action. Welfare, however, was overseen by local politicians who controlled its distribution. They often directed it towards political allies and their own coffers rather than towards the needs of the poorest Appalachians—rendering many of these programs ineffective at ameliorating poverty. Although poverty and hardship remained, this period did mark a significant transition in the political landscape in Appalachia as a strong, albeit fleeting, liberal ethos gave unions unprecedented influence in Central Appalachia. Unfortunately, the promise of the unions would soon be frustrated by the

incompetency of UMWA to leverage its influence, as well as by local elites who clung to power through their control over the allocation and distribution of welfare.

8. Continued Poverty in an Era of Technological Progress: 1945 to 1960

Poverty, unemployment, and lack of opportunity drove millions of Appalachians to out-migrate to nearby cities and industrial centers in the years after the Great Depression. Those who stayed in Appalachia contended with a continuing financial crisis, a shrinking welfare state, crumbling infrastructure, environmental degradation, poor public schools and health care, and a substance abuse crisis (16). The New Deal had succeeded in limiting the power of coal companies in the everyday fabric of Appalachian life. In its aftermath, the locus of power in Appalachia was seized by a handful of local families. Local elites used federal relief programs to ensure control over county politics as the expansion of welfare in the 1950s reinforced a patronage system in which a select few could decide who received food and income and dictated which mine operators received assistance. This class of power-wielding elites was comprised of land developers, coal operators, and lawyers, who purchased tax-delinquent properties at rock-bottom prices from coal operators who were unable to weather declining demand for coal following War World II (17).

As the Great Depression receded in the rest of the country, new technologies brought unprecedented changes to the mining industry in Appalachia. Larger and more sophisticated diesel-powered earth moving equipment and more powerful explosives became available to the mining industry as a consequence of technological innovation spurred by the need for American technological supremacy during World War II. By the 1950s, these new technologies made it possible to extract large quantities of coal by moving huge amounts of earth, without the requirement and complexity of digging underground tunnels. This new approach to mining, called strip mining or surface mining, upended the mining industry. While in 1940, 87% of coal was extracted with relatively primitive tools and extensive human labor from underground mines, by 1950 69% of coal was extracted from surface mines with the help of heavy machinery and much less human labor (17).

The advent of strip mining breathed fresh life into the Appalachian coal industry. Appalachian coal production rose from 284 million short tons in 1950 to 362 million short tons

in 1960 and reached 403 million short tons by 1980. At the same time, the energy development policies of the TVA accelerated this rapid technological transition by spurring demand for coal just as surface mining became technologically feasible. The TVA constructed seven of the world's largest coal-fired power plants in Appalachia between 1949 and 1953, creating a market for cheap, locally produced coal (17). [18] The TVA thus hastened investment in heavy machinery by the large coal companies who had increasingly consolidated the coal industry in Appalachia after smaller coal operators were unable to weather the Great Depression. While this cheaper form of electricity benefited many Americans, surface mining created enormous environmental costs in Appalachia including large tracts of clear cut forests, eroded soils, polluted streams, and decline of mountain wildlife populations (18).

The rise of surface mining also had significant impacts on the well-being of the Appalachian people as more and more jobs were lost to the onslaught of mechanization. In the wake of this technological transition, mining employment continued its decline of the previous era, decreasing dramatically from around four hundred thousand jobs in 1950 to one hundred and twenty five thousand jobs by 1960. The dramatic decline in employment in Central Appalachia during the 1950s led to an out-migration from the region on an unprecedented scale. Between 1950 and 1970,

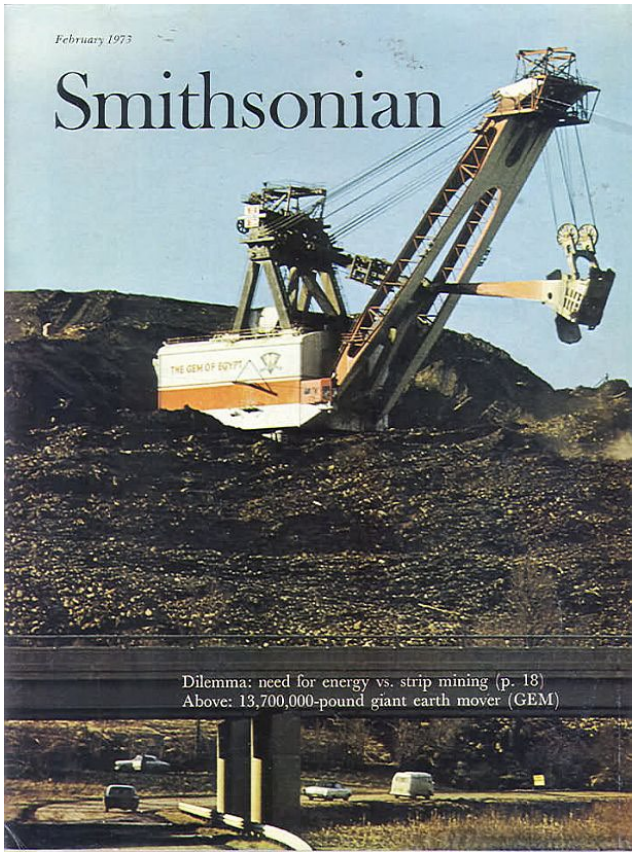

Figure 13: *The development of diesel-powered earth moving equipment during World War II led to a new approach to mining in the decades that followed. Strip mining and later Mountaintop Removal mining (both variants of surface mining) led to significantly greater environmental impacts that older underground mining techniques. By the 1970s strip mining was already controversial as illustrated by this February 1973 Smithsonian Magazine cover. IMAGE USED UNDER FAIR USE SECTION 107 OF THE COPYRIGHT ACT.*

[18] The TVA moved away from initial efforts of flood control, reforestation, and economic development after World War II in favor of a policy that concentrated on the generation of electric power for domestic use and industrial expansion.

3.3 million people—one-eighth of the population—left Appalachia (31).

The unions struggled to maintain power in the face of declining employment in the coal industry, with membership numbers dropping from 454,000 in 1940 to 170,00 by 1960. Negotiating from a position of weakness, the UMWA President John L. Lewis signed the National Bituminous Coal Wage Agreement (NBCWA) in 1950, which cemented a national contract between the union and industry (32). This agreement established the principle of high wages and health benefits for miners. In return, however, the union agreed not to oppose the introduction of any level of technology that management brought into mines or to go on strike when increased mechanization led to job losses (3). While the 1950 NBCWA helped miners who retained their jobs, together with the contemporaneous energy policies of the TVA it accelerated the adoption of mechanized mining and set the stage for massive unemployment as mechanization combined with higher labor costs drove mining companies to invest in labor-saving technologies. To make matters worse, as membership fell due to dropping employment, it was impossible for UMWA to sustain health and retirement benefits for miners, further diminishing faith in and support for the union (17). UMWA's power eroded further when John Lewis retired in 1960 and the organization experienced unstable and corrupt leadership for the next two decades (33).

Without effective support from unions or the federal government, living conditions in Central Appalachia were among the worst in the nation. By the close of the 1950s, the annual per capita income in Appalachia was $1,400, compared to the national average of $6,691. Only one in three Appalachian residents had running water and indoor plumbing, 7.5% of homes were in "such dilapidated condition that they endangered the health and safety" of those who lived there (17). The median value of housing was 27.7% below the national average. Staggeringly, 60% of families in Appalachian Kentucky, 42% in Virginia, and 39% in Tennessee fell below the poverty line. Additionally, 47% of Appalachian residents had less than an eighth-grade education. Per pupil expenditures in schools were half that of the rest of the country. Teachers were often uncertified, facilities were dilapidated, and books were scarce. At the same time, 86% of coal was owned by absentee interests and thus returned little in property taxes, leaving minimal money for states and counties to improve public services (3). Cash-strapped local governments were further strained by the coal industry's move to sell off massive amounts of company-owned property, allowing miners to acquire homes but forcing cash-strapped local

governments to assume responsibility for services previously provided by company towns. For those who retained their jobs, mining remained incredibly dangerous and death rates of coal miners remained several percentage points above the national average (34).

9. Federal Regulation and Industry Defiance: 1960 to 1980

By the turn of the 1960s, Appalachia had been exploited by outside industrial interests for almost a century, yet the hardships faced by residents were almost always explained by perceived deficiencies of the Appalachian people themselves (17).[19] To explain the stagnant economy and high poverty rate in Appalachia, the majority of the American public attributed Appalachia's endemic problems to a 'culture of poverty' that perpetuated 'obsolete' customs, values, and lifestyles on the part of the Appalachian people (35). As concern over poverty and welfare dependency in Appalachia grew, social scientists began to theorize the reasons for Appalachia's problems. While some agreed with the conventional wisdom of the time and proposed that Appalachia maintained a subculture of poverty, others recognized the economic development in Appalachia which had been stunted by a form of internal colonialism in which dominant industrial interests controlled the region and its resources (36).[20]

Presidential candidate John F. Kennedy traveled to West Virginia in the months before his election of 1960. He found families living in rundown cabins with no running water or indoor toilets, communities with minimal public infrastructure, and a landscape degraded by years coal mining and deforestation. Kennedy pledged to assist the region, and once he assumed office, authorized programs to create jobs (17). Following Kennedy's election, Congress passed the Area Redevelopment Act 1961 and established the Area Redevelopment Administration (ARA)

[19] It was not until 1959 that a standardized poverty measure made comparative data on the extent of poverty across the U.S. available. This newly available data put a spotlight on poverty in the United States and particularly in Appalachia and led to a decade in which both government programs and NGOs initiatives focused on the amelioration of poverty in the United States.

[20] The popular 2016 book by D.J. Vance, "Hillbilly Elegy: A Memoir of a Family and Culture in Crisis" was controversial because it emphasized the subculture of poverty argument to explain the current challenges facing Appalachia without critically examining the centuries of exploitation by outside interests. Indeed, many scholars of Appalachia argue that the perpetuation of the subculture of poverty 'hypothesis' is a culturally abusive. By emphasizing the 'backwardness' and stereotypical poverty of Appalachia in the popular imagination, the subculture of poverty argument makes acceptable the colonization of resources by outsiders who 'can make better use of them' (30). More recently, Vance seems to have recanted his initial position and, as a political candidate, blames "elites and the ruling (liberal) class for robbing us blind."

to build public facilities and improve business. Like the development programs of the 1930's, the ARA, suffered from design flaws that allowed the local elite to reap the majority of the benefits from the funding without addressing the needs of the poorest Appalachians. In particular, the ARA required matching funds from local governments. This policy allowed local politicians to redirect the bulk of funds to private corporations rather than public services, thereby rendering it ineffective at ameliorating poverty (17).

Following Kennedy's assassination, President Lyndon B. Johnson, took up the anti-poverty mantel, declaring in his inaugural State of the Union address that "Our aim is not only to relieve the symptom of poverty, but to cure it and, above all, to prevent it." In the spring of 1964 Johnson dramatized his goal of eradicating poverty in a visit to the home an Appalachian coal miner in eastern Kentucky. He signed the Appalachian Regional Development Act (ARDA) in 1965 as part of a broader set of policy measures collectively dubbed the 'War on Poverty'. The ARDA aimed to bring Appalachia into economic parity with the rest of the nation and created a unique federal-state cooperative structure called the Appalachian Regional Commission (ARC). [21] The mission of ARC was to expand the economic opportunities in the Appalachia by increasing job opportunities, human capital, and transportation.

***Figure 14**: President Lyndon B. Johnson on his 1964 'poverty tour' of Appalachia shakes the hand of a Kentucky coal miner. Credit: LBJ Library photo by Cecil Stoughton*

The foundational logic of ARC was that built infrastructure including transportation, healthcare and educational facilities were necessary before significant development in Appalachia could take place. But, like Kennedy's ARA and the New Deal policies of the 1930s, the program was poorly designed to achieve its stated purpose of ameliorating poverty. By implanting the program in partnership with state governments the program was left vulnerable to

[21] The ARC remains an important agency for economic development in Appalachia today. Between 1965 and 2009, ARC programs have spent about $23.5 billion on projects and programs Appalachia with around $12.7 billion coming from federal funds and $10.8 billion from state and local funds.

elite capture. Moreover, to accommodate a large and diverse region under a single program, the ARC chose to concentrate its efforts on urban 'growth centers' in Northern and Southern Appalachia. This decision left many of the truly problem-prone areas of Central Appalachia without substantial assistance (3).

Johnson's War on Poverty also recognized the importance of improving human and social capital in economically depressed regions of the country. The 1964 Economic Opportunity Act established many nation-wide "human" programs including Head Start, providing access to Kindergarten for low income students, VITSA, a domestic peace corps, and of particular significance in the history of 1960s Appalachia, Community Action Programs (CAPs). The text of the Economic Opportunity Act establishing the CAPs program included a hastily written clause that would nonetheless have significant impact on social movements in Appalachia. The text of the Economic Opportunity Act required that CAPs be "developed, conducted and administered with the maximum feasible participation of the residents of the areas and members of the groups served" (37).[22] This clause, later interpreted as the 'maximum feasible participation of the poor' galvanized the new generation of community development workers from Appalachia, VISTA program volunteers, and a privately funded group called the Appalachian Volunteers, which brought graduate students and professionals from around the country to Appalachia in order to aid the poor through legal services, architectural planning, health services and agricultural extension services.

The volunteers had access to significant federal resources through the Office of Economic Opportunity (OEO) and took seriously the mission of involving poor communities in decision-making about which projects to pursue and how funding should be allocated. By taking seriously the idea of participation, the volunteers took on projects that went beyond simply rebuilding schools and neighborhood parks. In the process, they ran into the vested interests of the local elite. Local elites were better connected than the volunteers or the communities they worked with and quickly called in own favors in Washington. In 1967, only three years after the

[22] The language requiring the 'maximum feasible participation of the poor' was inserted into the text of the Economic Opportunity Act with virtually no discussion by the task force charged by President Johnson with drafting the legislation and none at all on Capitol Hill before it was passed into law. President Johnson himself was uncomfortable with the idea of public participation of the poor in social policy and he was unlikely to have been aware of the significance of the language in the Act before he signed it. Only after the phrase gave license to community organizations in Appalachia to take public participation of the poor seriously, did those who passed the legislation realize its significance and the degree of controversy it would create (37).

Economic Opportunity Act was signed into law, it was amended to require that programs using OEO funding have the approval of local elected county officials (38). With this act of Congress, a new era of social activism in Appalachia was undermined by the local elite who continued to benefit from the inequality in power and access to resources at the expense of local communities.[23]

If the 1960s were the decade for poverty in the United States, the 1970s became the decade for the environment. Rachael Carson's publication of *Silent Spring* in 1962, and the first glimpses of the earth from outer space taken by the Apollo missions, would remind the American public of the vulnerability of the earth system and generate support for federal regulations to protect the environment. The 1970s began with the passing of the National Environmental Policy Act (NEPA) on January 1, 1970. This act was quickly followed by the 1970 Clean Air Act, the 1972 Clean Water Act (CWA), and the 1973 Endangered Species Act. By far the most significant of these new federal regulations for Appalachia were NEPA, which required for the first time that Federal agencies evaluate the environmental effects of their actions, and CWA, which set out to restore the health of the nation's waters and established water quality standards and a permitting system for point source pollution. Together NEPA and CWA afforded a legal framework within which the impacts of mining on the environment might be mitigated. With time however, it would become clear that like the federal programs targeting poverty, the new environmental regulations would be easily stymied by industry (41).

At the same time as Congress passed the nation's first wave of federal environmental regulations, a new era of technological innovation accelerated the environmental destruction of the coal mining. Global energy crises in the 1970s led to a renewed demand for coal. In turn, the mining industry focused on increasing the size and complexity of mining technology, leading to a new technological era for surface mining called Mountaintop Removal (MTR). MTR technologies allowed coal operators to level entire mountains by fully deforesting the top layer of mountain, removing all topsoil and blasting rock and subsoil to expose the coal seams beneath,

[23] The ultimate impacts of Johnson's War on Poverty on the well-being of people in Appalachia remains hotly debated. Recent evaluations of ARDA found that between 1960 and 2000, the program reduced poverty by 4.2 percentage points relative to border counties that did not receive ARDA funding (39). Some political scientists have also drawn a direct link between the CAPs program and more recent social movements against mountaintop removal (35, 40) . But what is clear is that at the end of the 1960s, poverty in Appalachia remained a significant problem and Appalachian voters ousted the party that started the War on Poverty, while repeatedly electing the party that ended it.

while depositing the soil or 'overburden' in nearby valleys with wastewater stored behind earthen dams.

MTR mining techniques made it possible to obtain coal from previously inaccessible seams and allowed for almost complete recovery, while reducing the number of workers required to a fraction of conventional (underground) mining methods. Though an extremely efficient method for extracting coal, increasing use of MTR in the 1970s led to environmental impacts at a scale far more concerning that those of conventional mining. The heavy machinery and chemicals used in MTR eroded soils, polluted the air, and acidified the water (42). During the MTR boom of the 1970s, 4% of the headwaters of Appalachia's rivers were permanently destroyed by the overburden and wastewater left behind (20).

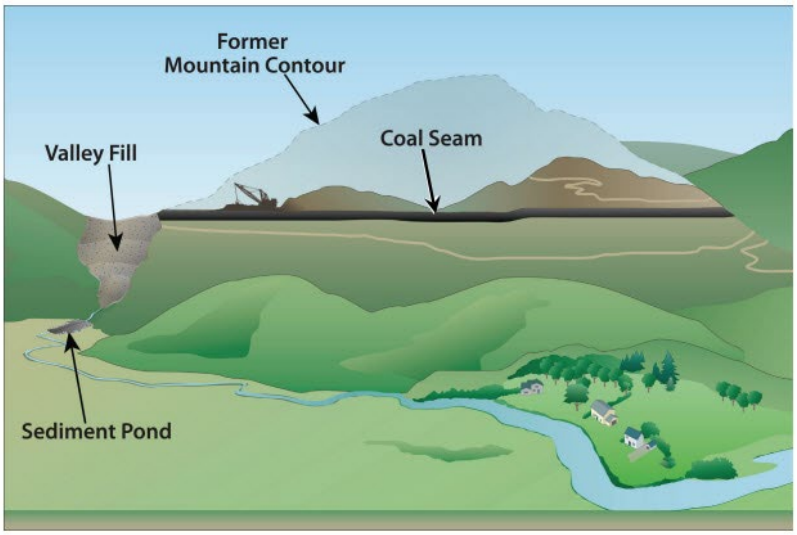

Figure 15: *Mountaintop Removal (MTR) Illustration.*
Source: US EPA, O., 2016. Basic Information about Surface Coal Mining in Appalachia. https://www.epa.gov/sc-mining/basic-information-about-surface-coal-mining-appalachia

As environmental concerns surrounding MTR grew, they were legitimized by the Buffalo Creek Disaster in 1972, in which a coal slurry dam containing toxic levels of heavy metals collapsed, and a toxic wall of water cresting at over 30 feet high and containing 132 million gallons of coal waste killed 125 people and destroyed thousands of homes (43). In the aftermath of the disaster, the Pittston Coal Company which owned the collapsed dam, denied any wrongdoing, calling the tragedy 'an act of god' and skirted any substantial penalties through a web of 'corporate opacity' and political connections (44) .

While the traumatized citizens of Buffalo Creek were unable to hold the Pittston coal company to account or rebuild their fragile community, the disaster helped spur Congress to pass the Surface Mining Control and Reclamation Act (SMCRA). Appalachian environmental activists had been for years accumulating massive documentation of the damages that coal mining imposed on the environment and people in Central Appalachia, but had been largely

ignored by elected officials at both local and national levels. The national outcry after the Buffalo Creek Disaster led Congress to act. Congress first sent SMRCA to President Ford's desk in 1974, who quickly vetoed the legislation out of fear for the coal industry's power as well as concern that restricting the energy supply might increase inflation. The bill was finally signed into law by Jimmy Carter in 1977 who championed the issue during his presidential campaign. SMRCA, in addition to regulating active mines, required companies to restore land disturbed by mining practices. While the restoration requirement seemed like a massive win for environment when SMCRA was first enacted, enforcement in Central Appalachia was predictably lax (45).

Indeed, while the alphabet soup of federal environmental regulations including SMRCA, NEPA and CWA mitigated the damages of the new surface mining technologies, the overall impact of these new laws was blunted by the power and defiance of the coal industry. Congress in its initial design of SMRCA recognized the likelihood that the coal industry would try to circumvent the provisions of SMRCA. Anticipating regulatory failure at the local level based on the historic tendency of coal companies to ignore the needs and well-being of coalfield citizens, Congress included two previsions in the design of SMRCA intended to counter the power of the coal industry. First, SMRCA was designed to include federal oversight of state mining regulatory programs. Second, SMRCA granted citizens the right to participate in the administration and enforcement of SMRCA. Even with these provisions in place, the coal industry still managed to manipulate the regulatory process to avoid compliance. Coal companies argued that by failing to restore retired coal mines to their "approximate original contour" as required by SMRCA, they were producing 'flat land' for regional development. A resource they argued that was in short supply in the mountainous lands of Central Appalachia. Using this loophole, one estimate found that 75% of MTR mines in West Virginia were operating in violation of SMRCA. When reporters investigated further they found that local regulators, in the pocket of the coal industry, had failed to enforce the restoration previsions under SMRCA (45).[24]

In spite of increasing federal regulation of the mining industry, MTR replaced underground mines in Central Appalachia throughout the 1970s. By the end of the decade, roughly 3,000km^2 or about 3.5 percent of the total surface area of Central Appalachia had been

[24] For a fascinating account of the ways in which the coal industry and local government officials obfuscated the requirements of SMCRA see McGinley, P.C., 2004. From Pick and Shovel to Mountaintop Removal: Environmental Injustice in the Appalachian Coalfields. *Environmental Law* 34, 21–106.

impacted by MTR and other forms of surface mining (46). The increase in surface mining in the 1970s led to record high production efficiency and record low employment in Central Appalachian mines (16) and left the landscape of Appalachia marred in coal ash and once abundant waterways contaminated with heavy metals and toxic chemicals. With the loss of coal mining jobs in the region, the bargaining power of UMWA continued to decline. The dramatic end of the War on Poverty and the impotence of environmental regulation to combat the power of the coal industry underscored the power imbalances that had plagued Appalachian for centuries (17).

10. A New Era of Ecological Destruction & Citizen Activism: 1980 - 2000

In 1980, the global economy went into recession and oil and coal prices dropped, causing Appalachian coal companies to further reduce employment as well as the hard-won health benefits to those who remained employed. By 1984, West Virginia had the highest unemployment rate in the country, but the local government continued to enact legislation that enriched mining companies while leaving the local economy in shambles (45). At the same time the ecological destruction caused by MTR continued to accelerate. At the beginning of the 1980s 85-ton trucks were the largest used in Central Appalachian mining, but by the 1990s the size of trucks had almost tripled to an average of 240-tons. Likewise, the sediment removed from strip mines in the 1980s and deposited in valley fills usually contained less than 250,000 cubic yards of rock and dirt. By the late 90s valley fills sometimes measured 100 million cubic yards or more. State regulators also continued to abet the environmental destruction of the coal industry. Over the course of the 1980s and 1990s, the West Virginia Department of Environmental Protection authorized coal companies to bury almost 800 miles of streams under valley fills and regularly failed to enforce federal regulation intended to protect the environment (45).

The regulatory promise of SMRCA, which had not only sought to limit the damages of surface mining, but also to ensure that local economies retained more of the benefits also failed to materialize. SMRCA was designed to ensure that coal companies would invest locally in exchange for mining permits. But the industrial plants, shopping centers and affordable housing that the coal operators promised in the permitting process never materialized. And abandoned

MTR sites were left as barren wastelands, without any secondary investment by coal operators (45).

Figure 16: *This image shows a still relatively early stage in the process of Mountaintop Removal mining. Hundreds of feet of elevation will ultimately be blasted from each mountain. Boone County, West Virginia. Photo Credit: Paul Corbit Brown. Reproduced with permission*

To add insult to injury, unlike the underground mines of previous generations, MTR mines required little labor, but extensive land area to operate. To make more land available for surface mining, coal companies began a new strategy of depopulating towns near active or planned MTR mines in order to expand the area of mines and avoid the protests of local residents against the environmental and health impacts of MTR. Coal companies employed a range of strategies from buying the homes of coalfield residents in exchange for the guarantee from sellers to leave the region and never return,[25] to making conditions near active MTR sights so

[25] Contracts stipulating that sellers must leave the area never to return were almost certainly legally unenforceable, but many of the families who signed them had no way of knowing that. After signing, many left the towns and hollows where their families had lived for generations never to return.

unlivable that families left of their own volition or approached coal companies themselves in a desperate plea to sell at rock bottom prices (45).

But if the 1980s were an era of continued regulatory and industry malfeasance, they were also an era of renewed citizen activism. Many of the citizen groups who organized in Central Appalachia during the 1960s continued to work for social and environmental justice in the region (40). While the prevailing politics of Central Appalachia in the 1970s did not provide many openings for successful social mobilization against the power of the coal industry, the 1980s provided more opportunities for activists in Central Appalachia. Activists and their lawyers began to use the provisions in SMRCA, NEPA and CWA to their advantage, bringing an increasing number of lawsuits against coal companies and unscrupulous regulators. With time, many of these lawsuits would prove successful at the district level (41).

In addition to the increasing use of federal law by activists to combat the power of the coal industry, the 1980s saw a renewed wave of social mobilization on the part of coal miners, as coal operators, pinched by the global recession, cut back on hard-won benefits and overtime. In 1987, the Pittston Coal Company, at the time the largest exporter of coal in the United States, unilaterally pulled out of the National Bituminous Coal Wage Agreement (NBCWA) signed in 1950 (47). The company proceeded to lower health insurance coverage for miners, discontinue benefits to retired miners, and keep mines running 24/7 without providing overtime for workers (48). The company claimed that these actions were necessary to remain operational and refused to negotiate with the UWMA over a new contract and benefits agreement. In response, miners in Virginia, West Virginia, and Kentucky organized under UMWA demanding overtime and a reinstatement of benefits. On April 5, 1989, twelve hundred union miners in Virginia and an additional five hundred in West Virginia and Kentucky went on strike (47).

Union activists brought with them lessons from earlier unsuccessful strikes including a violent strike in 1984 against the A.T. Massey Coal Group in West Virginia that ended in a stalemate and had left the UMWA bruised politically and battered with heavy legal penalties. Union organizers had also learned from the history of the civil rights movement in the United States and quoted entire passages from the speeches of Dr. Martin Luther King Jr at union rallies. The UMWA leaders strategized that if they could disrupt Pittston's mining operations using nonviolent tactics, they would be able to force the company to negotiate a new contract without losing public support or forcing the government to intervene and break the strike before Pittston

acceded to their demands. Coalfield communities across Central Appalachia thus began a broad-based campaign of nonviolent civil disobedience aimed at disrupting Pittston's coal operations(47).

As the movement grew, the union received support from community groups, labor unions and church groups from around the country. But as with the strikes of previous generations, both federal and local courts sided with the coal industry and imposed injunctions on striking miners banning everything from driving too slowly on roads near Pittston mines which might be used as a tactic for striking miners to delay trucks going to and from the mines, to making it illegal for more than nine people to gather as part of a picket line. Local law enforcement personnel made it their responsibility to escort coal trucks. Thousands of strikers were arrested and millions of dollars in fines were doled out to protestors engaged in civil disobedience. The Pittston Coal Company hoped that with the cost of the strike mounting, the union would lose popular support and end the strike without a new contract.

It was in this context that the UMWA decided to take over Pittston's mammoth Moss 3 coal preparation plant in a peaceful but extraordinary act of civil disobedience. Organizers strategized that Moss 3 was essential to Pittston's operations, and that stopping production at the facility would force the company to the bargaining table. They also anticipated that national attention from the takeover would provide a platform for challenging the legitimacy of the legal rules and injunctions being used to cripple the strike. On September 17—the 170th day of the strike—a group of 99 miners entered the Moss 3 plant and peacefully took over. Their entry had been meticulously planned and organized by the UMWA leadership. By the time the company and the state police knew what was going on, thousands of supporters had gathered just beyond the plant in what the participants called Camp Solidarity. The huge presence of peaceful observers made it difficult for the police to forcibly remove the miners inside Moss 3. The occupying miners (some of whom had previously been operators at the Moss 3 plant) guaranteed Pittston and law enforcement that the plant would not be damaged and allowed regular inspections to be carried out by Pittston representatives. Yet despite repeated orders given by local courts and state troopers for the protestors to vacate Moss 3, the miners refused to leave. Over the course of the four day occupation of Moss 3, an estimated 40,000 supporters of the strike visited Camp Solidarity (49). Supporters of the striking miners poured into Virginia in caravans from states as far away as Michigan, Ohio and Texas. Leaders repeatedly stressed the

importance of non-violence. Beer and alcohol remained conspicuously absent from Camp Solidarity (47).

On the evening of September 20th union organizers felt that they had the upper hand. National public opinion was on their side, no one had been injured by the strike, and the Moss 3 plant was in perfect working order. They decided to leave the plant on their own terms and, under the cover of darkness, the 99 men occupying Moss 3 were swallowed back into the crowds of supporters outside the plant so that none would be arrested as they left. The mood was jubilant. As one witness reported, the Moss 3 takeover showed that the union and the miners it represented could "lead with our head as well as our heart" (47).

While Moss 3 was not the end of the Pittston Coal Strike, it marked a distinct turning point. A month after the Moss 3 takeover, the president of the Pittston Coal Company admitted to investors that the company had "overestimated the ability of the courts to control the UMWA's strike activity" (47). The strike had brought Pittston coal production to a standstill for a week and the company knew that it could happen again. Within months Pittston had negotiated a new contract with the union. The strike formally ended on February 20th 1990. Pittston Coal and UMWA came to a settlement that awarded health and retirement benefits to current and previous workers and promised a reduced work schedule (48).

In the wake of the Pittston strike and the Moss 3 takeover, both local and federal action against the coal industry and especially MTR increased. Grassroots organizations organized support to amend tax laws that allowed out-of-state holding companies to pay almost no local taxes on their coal assets, and led a successful campaign to end the use of the broad form deed nearly a century after it was first conceived (50). At the federal level, the Clean Air Act was amended in 1990 to reduce levels of sulfur dioxide in the air. Although the amendments were aimed to help improve the air in high-risk areas like the ones surrounding MTR sites, a failure to account for nuance meant it actually led to a higher demand for Central Appalachian coal because it is relatively low in sulfur compared to western coal (51). Other federal policies in the 1990s were more effective at benefiting Appalachian residents and decreasing the power of the coal industry. The Pittston strike helped to induce Congress to pass the 1992 Coal Industry Retiree Health Benefit Act (aka the "Coal Act"), which provided funding for health care benefits for UMWA retirees and their dependents even when the company they retired from was no longer in business. Also in 1992, the passage of the Energy Policy Act created mandates to

increase clean energy and energy efficiency in the United States, thus beginning federal efforts to decrease reliance on the coal and with that the power of the coal industry.

The courts in Appalachia also began to side more frequently with aggrieved citizens and environmental activists in lawsuits against the coal industry. After a helicopter flight over MTR sites in West Virginia, one district judge wrote about the extent and permanence of environmental degradation caused by MTR:

> mined sites were visible from miles away. The sites stood out among the natural wooded ridges as huge white plateaus, and the valley fills appeared as massive, artificially landscaped stair steps. Some mine sites were twenty years old, yet tree growth was stunted or non-existent…If there are fish, they cannot migrate. If there is any life form that cannot acclimate to life deep in the rubble pile, it is eliminated. No effect on related environmental values is more adverse than obliteration. Under a valley fill, the water quantity of the stream becomes zero. Because there is no stream, there is no water quality (45).

Yet in spite of several victories in the 1990s, the power of the coal industry meant that every step forward in the pursuit of social and environmental justice for Appalachian activists seemed to be followed by two steps backward. Case in point, the ruling of the district court against mining interests quoted above was quickly overturned by the conservative Fourth Circuit Court of Appeals (45) -- a pattern that would repeat itself time and again over the coming decades (41).

By the end of the 20th Century, it was clear that the peak of coal mining in Appalachia was past. Coal reserves were only a fraction of what they were at the start of the century, and coal production in Wyoming and other western states was nearly double that of Appalachia (32). In spite of the looming end of coal mining in Central Appalachia, coal companies continued to insinuate themselves into local politics and win the hearts and minds of Appalachian citizens. At the same time, growing networks of social and environmental activists, aided by the emergent availability of the internet and increasingly nuanced organizational and legal strategies, continued to fight the power of the coal industry in search of a more socially and environmentally just future for Central Appalachia (16).

11. A Struggle for a New Development Paradigm: 2000 to Present

Nearly 50 billion tons of coal have been extracted from Appalachian coalfields over the past two centuries,, accounting for more than half of the US's cumulative coal production (20). This coal has generated enormous wealth for some,[26] but for the vast majority of Central Appalachia's people, the commodification of the region's abundant natural resources has left a legacy of poverty and environmental destruction. MTR coalfields mar a total of 12 million acres of Appalachian mountains (52). Coal mining has left 75% of all rivers in Central Appalachia polluted with high levels of toxic metals and sulfates (42). The heavy machinery and chemicals used in MTR erode soils, pollute the air, and acidify rivers and streams (42). Mining has led to a 20% increase in surface water runoff, leaving mining impacted areas vulnerable to flooding (43). At the same time, poverty, poor health and unemployment continue to impact the well-being of the people of Central Appalachia. Morbidity and mortality rates in Central Appalachia remain significantly above the national average[27] and many central Appalachian counties still see poverty rates of nearly 30% (54). West Virginia and Kentucky report college attainment levels 35% below the national average, along with fewer social and community organizations and lower scores on indictors of social capital and community trust (42).

Today, coal production in Central Appalachia is at a historic low. Appalachian coalfields produced 421 million short tons of coal in 2000, by 2010 production dropped to 334 million short tons, and by 2020 production had plummeted to 138.5 million short tons (55). Mining jobs have declined in lockstep with decreasing coal production and continued mechanization and now account for less than 1% of all jobs in the region. The remaining mines provide minimal benefits to the people of Appalachia. Coal companies use their power and influence to minimize their tax liability and evade the taxes they do owe. Land owned by coal companies has been historically under-assessed to minimize tax bills (56), and until the late 1980s land owned by out-of-state holding companies was altogether exempt from most property taxes (50). The resultant meager tax base has left Central Appalachian states unable to pay for local infrastructure projects or afford the social services necessary to meet the health and educational needs of residents.

[26] Since 1960 alone coal companies have earned approximately 1 trillion in revenue (2017 equivalent) from the coalfields of Appalachia.

[27] In 2010 the national mortality rate was 7.9 deaths per thousand, yet the mortality rate in Tennessee was 9.4, 9.7 in Kentucky, and 11.5 in West Virginia (53).

Moreover, the limited taxes that are collected from the coal industry are only partially returned to the counties with the highest density of mining activity. More often than not, tax revenue from the mining industry funds the needs of larger urban areas. The revenue that is returned to rural mining communities is often used for building roads that in turn benefit the coal operators (56).

The mining industry does its best to obfuscate its history of tax avoidance by emphasizing the value of the taxes they do pay. But trumpeting the meager tax revenues paid to Appalachian states by the coal industry ignores the costs of coal mining incurred by state governments. In 2006 the coal industry in Kentucky generated $528 million in tax revenue but actually cost the state $642 million in subsidies, creating a $115 million deficit (57). Furthermore, the adverse health impacts of coal mining result in higher morbidity and mortality and cost Central Appalachian states an estimated $40 billion annually in health-related costs (58).

As the viability and morality of coal production has come under increasing question in the 21st century, coal companies have stepped up their efforts to assert that coal (and thereby the industry that extracts it) are crucial to Appalachian regional identity and culture. Friends of Coal, a group founded in 2002 by the West Virginia Coal Association, aims to convince coalfield citizens that the coal industry is central to Appalachia's economy, identity, and way of life. Friends of Coal funds massive media campaigns, community improvement projects, and sponsors sports events that perpetuate the ideology that mining is beneficial for everyone. The organization employs popular figures in the region including retired football coaches, race car drivers, retired military servicemen, and professional outdoorsmen to propagate their message. Perhaps most insidiously, Friends of Coal grants money to public schools in exchange for classroom study units on the benefits of coal. And it hosts regional inter-school competitions in which students have the opportunity to enter their projects on coal in one of the following categories: science, math, English literature, art, music, technology-multimedia, or social studies. Winners in each of the categories receive cash prizes (43).

Figure 17: *'Friends of Coal' West Virginia specialty license plate. Available from the Department of Motor Vehicles. Source: https://transportation.wv.gov/DMV/Vehicle-Services/License-Plates/Special-Plates/Pages/Special-Plate.aspx?p=75*

The coal industry also continues to coopt politicians and state and federal regulatory agencies by donating large sums of money to political campaigns throughout Central Appalachia. Between 1999 and 2005, the coal industry contributed at least $8.57 million to state-level political candidates in West Virginia, and mining contributions totaling $500,000 accounted for approximately a quarter of total campaign contributions in West Virginia's 2008 gubernatorial race. At the federal level, coal companies donated $9 million to political candidates between 1998 and 2004, which made it no surprise when Congress under the Bush administration embraced a variety of measures geared towards facilitating the growth of MTR mining (41).

The coal industry also routinely pours money into the election of state level judges, even influencing the elections of justices for vacant state supreme court seats (41). Federally appointed judges in Appalachia also seem to favor the coal industry. In the past two decades, environmental activists have increasingly used the statutory and regulatory requirements of the CWA and NEPA (discussed previously) to bring lawsuits against coal operators and state regulators who routinely flout the previsions of these federal acts. While these cases have often been successful in lower courts, federal courts have routinely sided with coal interests, undoing the rulings of lower courts. Between 2000 and 2010, at least four major pro-environment cases were successful in district courts, only to be overturned by the conservative Fourth Circuit Court

of Appeals (41).[28] The Fourth Circuit Court reversed pro-environment decisions of lower courts even when their reversal directly contradicted the statutory and regulatory commands of NEPA and CWA, instead favoring states' rights to "promote energy extraction" over the "divergent" federal government interest of environmental regulation (52). The unwillingness of the Fourth Circuit Court to enforce the federal regulatory previsions of the CWA and NEPA mean that even when environmental activists are successful at the local level, external political dynamics still serve to buttress the power of the coal industry in Appalachia.

While the history of Central Appalachia on its surface is a history of the power of the coal industry over coalfield residents, it is also a history of struggle and social mobilization against the power of outside interests and incumbent actors for social and environmental justice.[29] For over a century, coal communities have struggled against coal companies. Those struggles were almost always about more than simple wage increases. Rather, social mobilization was often framed in terms of human dignity and the freedom to protect and provide for one's family. Central to this struggle have been themes of ownership and dispossession of Appalachia's abundant resources. Historically, outside ownership over physical space was central to the ability of coal companies to extract massive quantities of coal at low costs to themselves while maintaining control over their labor force (30). Scholars and activists working to foster sustainable development in Appalachia have found that even today issues of ownership and access to resources are at the heart of many of the ongoing challenges in the region. But understanding what types of resources have value and how to support Appalachian communities in building and maintaining their resources requires a deeper understanding of the history of Appalachian communities. Indeed, home ownership rates, a common metric of financial well-being, are relatively high in the coalfield communities of Central Appalachia. But the value of coalfield homes are so low that they are effectively no longer tradeable assets. In contrast,

[28] Circuit court judges are appointed for life by the President and confirmed by the Senate. Judges that have been appointed by republican presidents more frequently side with industry in NEPA cases. Likewise judges appointed by democratic presidents more frequently side with pro-environment groups.

[29] While this case study focuses on social mobilization on the part of coal miners, their families and supporters against the power of the coal industry, it would be remiss not to mention that this legacy of rebellion goes back much further in Appalachia. Transitions of resistance can be traced to the Whiskey Rebellion in the late 1700s and the battle of the Cherokee Indians to preserve their culture and land in the Appalachian mountains. In the 20th century, the Council of the Southern Mountains, a community organization founded in 1912 by religious leaders, academics and social workers, focused on education and community development in Appalachia for over 70 years (40).

econometric analysis of a variety of capital assets in Central Appalachia has found a positive relationships between access to public land (in other words land that is not owned by coal companies or other corporate interests) and the well-being of Appalachian communities (56). Other studies have found that continued cooperate ownership of physical space in Appalachia hampers the ability of activists and community organizations to find space to come together to pursue their work (30). Social and environmental activists in Central Appalachia thus increasingly recognize the importance of building not only individual but more importantly community assets in Central Appalachia. They also link access to communal resources and shared spaces with the ability of Appalachian communities to build the necessary "capacity to govern" in ways the promote a transition to a more just and sustainable future (30).

Today networks of citizens activists (many with their roots in the social and environmental movements of the 1960s) are working together to fight for a "just transition" in Central Appalachia (30).[30] A future where the profits of resource extraction remain in the state and where new industries support a more sustainable future for the people of Appalachia. A recent study of civil society organizations in Appalachia found a total of 98 separate initiatives committed to a transition toward a sustainable future for Appalachia (59). The study found a variety of approaches that the 98 initiatives in their sample have taken to support sustainable development

Figure 18: *Protest against mountaintop removal in Washington DC September 2010. Photo credit: Kate Sheppard @kate_sheppard. Reproduced with permission*

[30] Indeed a bill supported by a number of Appalachian grassroots organizations called the "Reclaim Act" is Appalachia's vision of what a 'Green New Deal' would look like for Appalachia. The Reclaim Act was introduced in 2016 and seeks to amend the 1977 SMCRA. The Reclaim Act would direct $1 billion over five years to support cleanup of abandoned mine sites in Appalachia, restore degraded wildlife habitat, and support economic development in communities that have been hardest hit by the coal industry's decline. In 2021, the bill was still languishing before the senate.

in Appalachian communities. Some are more focused on renewable energy and supporting sociotechnical transitions away from coal, others are more focused on fostering democracy and promoting equity, and still others aim to stop MTR mining and the pollution and environmental destruction caused by ongoing fossil fuel extraction (59).[31]

In 2006, a broad-based group of community activists from across Appalachia recognized that the systemic challenges facing Appalachia were larger than any single group could tackle on its own. This group formed a regional coalition of grassroots, non-profit organizations called the Alliance for Appalachia with the goal of fostering a just transition in Appalachia. The Alliance for Appalachia is committed to "addressing the dominance of extreme political and economic power" in the region and to fighting "battles that are much too large for any single organization to address alone" (30). Early on, the members of the Alliance for Appalachia recognized the importance of capacity building as foundational to their efforts. As the Alliance for Appalachia sees it, efforts to build capacity are not only about supporting local communities, but also about ensuring local communities have the necessary tools to fight incumbent interests intent on maintaining business as usual development pathways in Appalachia.

The Alliance for Appalachia sees an important link between the capacity to measure the harms done by the coal industry and the ability of local environmental activists to hold coal companies accountable for their actions. As part of a broader strategy to combat MTR, environmental activist groups supported by the Alliance for Appalachia have for years pushed for an update to the CWA. Their goal was to strengthen the regulation of selenium levels in mountain streams and rivers. Selenium which is released in high amounts during MTR into local waterways can be quickly bioaccumulated in food chains, reaching toxic levels that are dangerous to both animals and humans. Activists recognized that the cornerstone of any successful selenium regulation would be a robust process for monitoring, reporting and enforcement. They wanted the standard used to monitor selenium levels in streams to be easily measurable through "citizen monitoring" programs so that the new regulation could not be evaded by coal companies and regulatory agencies in the pockets of the coal industry (30).

[31] While grassroots groups in Appalachia support a wide variety of social and environmental causes, opposition to MTR has proven to be a particularly salient rallying point. For example, Kentuckians for the Commonwealth and other grassroots groups recently led a successful campaign to stop the U.S. Army Corps of Engineers from rubber-stamping permits that allow MTR companies to create new valley fills (50).

Finally in 2016, the EPA published an update to the CWA in the Federal Register that included a new selenium standard. Unfortunately, the Appalachian Alliance felt that the update was only a partial win as flexibilities drafted into the rule undermine the effectiveness of the citizen monitoring approach (30).

In addition, grassroots organizations in Central Appalachia have long recognized that fostering a just transition requires strategies that build a capacity to promote equity among communities impacted by historical legacies of disempowerment. As the Appalachian Alliance puts it "historical patterns of corporate greed disrupt democratic power structures" and any effort to transition to a more sustainable future must first address this fundamental maldistribution of power (30). One approach that has a proven track-record of empowering citizens in Central Appalachia is participatory action research. As the Highlander Research and Education Center, a grassroots organization that has been working in Central Appalachia since the 1930s, explains: participatory research "puts power in the hands of people" most affected by maldistributions of power and enables them to create collaborative, meaningful, lasting solutions (60). This kind of work takes time, resources, and commitment. One successful example of participatory research as a tool of empowerment comes from Ivanhoe, a coal town on the banks of the New River in southwestern Virginia. Supported by local activist-academics and the Highlander Research and Education Center, the town worked together to collaboratively document their history and collectively published a book called "Remembering our past, building our future" in 1990 (61). Through the process of uncovering their shared history and writing the book, the community of Ivanhoe deepened their sense of community and place. The process also honed the ability of the Ivanhoe's citizens to identify and articulate the ways in which the history of industrial exploitation had led to the town's current challenges. While time intensive, the effort empowered the community of Ivanhoe to stand up against powerful interest groups and realize a more just distribution of resources in their community. Building on this history of participatory research, the Alliance for Appalachia continues to support projects that empower Appalachians to imagine a better future for themselves. Using artistic communication including storytelling, theater, filmmaking, and pop-up exhibits in public spaces like farmers' markets, and community meetings, the Alliance for Appalachia seeks to restore damaged democratic spaces and craft shared visions of a just transition (30).

In spite of many successful examples of advocacy and action by grassroots organizations, the co-evolution of nature and society in Appalachia continues to evolve in ways that leave large swaths of the population in poverty and a degraded environment for future generations. The people of Central Appalachia are looking toward a post-coal future. Some hope that the coal industry and the jobs it creates will survive just another decade so that they too can provide for their families with the high-paying (albeit limited) jobs that the coal industry brings to the region (62). Others recognize that another decade of MTR will strip the region of even more of its natural resources and natural beauty and leave behind little in terms of investment for future generations. The quest for sustainable development that can benefit all people, equitably, now and in future generation, continues.

12. Appendix A: Selected Additional Resources

If you wish to explore this case further, the following books, documentaries and research papers add richness and nuance to the necessarily condensed history of Appalachia presented in this teaching case. There are of course innumerable resources on the history of Appalachia and the bibliography of this case is a good place to look for specific topics. The selected resources listed here were chosen as they complement the teaching objectives of this case and highlight the themes of power and empowerment woven throughout the history of Appalachia. The two documentaries provide rich oral and visual narratives the labor movement in Appalachia and the toll of mining on the environment and human well-being..

1. **Book:** Stoll, Steven., 2017. Ramp Hollow: the ordeal of Appalachia, First edition. Ed. Hill and Wang, New York.

   This nuanced history of Appalachia explores the dispossession of people from their land and the commons that supported them. It chronicles the many waves of the capitalist 'scramble for Appalachia' and details how the power and greed of outsiders left poverty and environmental destructions in their wake.

2. **Book:** Gaventa, J., 1980. Power and powerlessness: quiescence and rebellion in an Appalachian valley. University of Illinois Press, Urbana.

   John Gaventa's influential study of power in Appalachia focuses on a single empirical case—Clear Fork Valley in central Appalachia. In this book, Gaventa studies the mechanisms of power that maintain quiescence and suppress rebellion in a situation of high and long-lasting inequality. Upon publication in 1980, the book broke new ground in the theoretical understanding of power and won multiple scholarly awards. Building on the work of several theorists of power, Gaventa identified three different dimensions or mechanisms through which maldistributions of power are maintained by powerful actors protecting their own interests.

3. **Book:** Bell, S.E., Gottlieb, R., 2016. Fighting King Coal: The Challenges to Micromobilization in Central Appalachia, Urban and Industrial Environments. The MIT Press, Cambridge.

   In this book, Bell documents a robust grassroots, women-driven environmental justice movement in Appalachia today. Despite the dedication of activists, the actual number of people involved in the environmental justice movement is small in comparison to the population negatively affected by the flooding, pollution, water contamination and illness caused by coal mining. Bell seeks to answer the question of why so few of the people who suffer from industry-produced environmental damages actively participate in social movements. Like Gaventa, Bell highlights the multi-dimensional power of coal companies in stifling decent. She finds that four obstacles inhibit participation in

environmental justice movements including depleted social capital, efforts to 'gender' or 'other' activist involvement, construction of pro-coal ideology by the coal industry, and finally the invisibility of damage done by the coal industry in Appalachia. This book is also a tour de force in modern qualitative research methods and worth assigning to students interested in pursuing qualitative studies in their own research projects.

4. **Book**: Fisher, S. (Ed.), 1993. Fighting Back in Appalachia: Traditions of Resistance and Change. Temple University Press, Philadelphia.

   This book emphasizes that the history of Appalachia is not just a history of exploitation of people and nature by powerful interests. Rather, the history of Appalachia is also a history of resistance and community activism against the power of the coal industry and cooperate greed. The book consists of multiple individually authored essays that document a wide variety of efforts by Appalachians since the 1960s to undermine the power of vested interests in the pursuit of a more sustainable future for the region. The book is remarkable for highlighting the strategies of activists and organizers instead of dwelling on the power and destructive forces of big coal. Chapter 10, a first-hand account of the Pittston Coal Strike is particularly worth reading.

5. **Documentary:** Kopple, B., Dickens, H., 2006. Harlan County, USA, The Criterion collection. Showtime Entertainment, NY.

   Barbara Kopple's award winning documentary covers the "Brookside Strike", an effort by coal miners and their wives from the Brookside Mine in Harlan County, Kentucky to organize and negotiate with the Duke Power Company. The film won the Academy Award for best documentary. Selected scenes from this documentary are especially useful for examining Gaventa's three dimensions of power in the context of a classroom session. The documentary is usually available for free within the United States on YouTube. Minutes 27 through 30 in the YouTube version offer a particularly good example of all three dimensions of power at play in one clip.

6. **Documentary:** Evans, M.-L., Freeman, J., Wallace, D., McAteer, J.D., Trumka, R.L., 2017. Blood on the mountain. Virgil Films, New York, New York.

   'Blood on the Mountain' focuses on both the environmental and social impacts of mining in West Virginia. The film has an impressive historical sweep linking generations of exploitation of both people and nature with the ways in which power and control is maintained by the coal industry in Appalachia today. Minutes 57 through 104 offer a particularly striking clip for a classroom setting of the impact of Mountaintop Removal (MTR) on nature and people in Appalachia and the ways in which the coal companies influence public perception of the industry in spite of its social and environmental costs.

7. **Paper:** Betsy Taylor, Mary Hufford, Kendall Bilbrey, 2017. A Green New Deal for Appalachia: Economic Transition, Coal Reclamation Costs, Bottom-Up Policymaking

(Part 1). Journal of Appalachian studies 23, 8–28. https://doi.org/10.5406/jappastud.23.1.0008

The first part of this two-part paper analyzes the post-fossil fuel transition in Appalachia. The paper demonstrates that this transition is not only economic challenge, but rather requires a transition in knowledge systems and governance structures as well. The paper calls for: i. a 'relocalized' economy in Appalachia that is more independent from, and, resilient to, macro-level economic and political forces; ii. More extensive documentation and understanding of the damages caused by over a century of coal mining in Appalachia; and iii. Transformed governance structures that value civic engagement that support the capacity for local governance.

8. **Paper:** Tarus, L., Hufford, M., Taylor, B., 2017. A Green New Deal for Appalachia: Economic Transition, Coal Reclamation Costs, Bottom-Up Policymaking (Part 2). *Journal of Appalachian Studies*. https://doi.org/10.5406/jappastud.23.2.0151

   The second part of this two-part paper explores the challenges facing contemporary Appalachian citizen-activists in the struggle for a more sustainable future. It argues that one of the biggest challenges citizens face is the burden of navigating "a terrain in which structures of corporate greed have disrupted citizens' democratic power" (pp.159). Therefore a prerequisite for achieving any type of Green New Deal for Appalachia requires that activists in the region foster their capacity to promote equity. To do so, they much foster multiple capacities including the capacity to link knowledge (knowledge that is often obscured by opaque cooperate and bureaucratic structures) with action, the capacity to measure social and environmental harms and to engage with the legal and political system to address those harms, and perhaps most importantly the capacity to collectively govern and overcome the "cultural disempowerment" of "false dualisms" that narrow points of view and divide rather than unite Appalachian citizens (pp. 157).

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