CHAPTER 1

Ned Ludd versus the Industrial Revolution

Are Machines the Problem?

Sherwood Forest. Who does not associate Sherwood Forest with Robin Hood—that legendary, daring hero of medieval England?

Though he was always on the wrong side of the law, he invariably is seen as heroic; for although he and his "Merry Band" stole from the rich, it was, says the thirteenth-century legend, so that he could give to the poor. Members of his band, including Little John, Friar Tuck, and the gentle, lovely Maid Marian, also achieved fame.

Seven hundred years later, another legendary character, Ned Ludd, emerged from Sherwood Forest. There are surprising similarities between Robin Hood's Merry Band and Ned Ludd's group, collectively called Luddites, but also some important differences. There is, for example, no love interest. More important, the Luddites were no Merry Band. Theirs was serious business. In fact, they were all about business, though from a decidedly negative point of view.

A Volcanic Eruption

The Luddite saga begins March 11, 1811, in Nottingham, a small town that was not far from Robin Hood's base of operations in Sherwood Forest. It was now, however, an important center for the production of cotton hosiery and lace, and throughout that winter day, framework knitters streamed in from their homes and workshops in the surrounding countryside, where they had been operating their hand looms for years.

Ironically, speeded-up and power-driven equipment, including power looms, wide stocking frames, and knitting machines, had been entering the

textile industry for several decades, mostly without incident. But recent trade problems had led the owners to decrease payments for the work, and this, combined with the rising cost of food, was driving the workers into poverty and starvation. All of this had brought matters to a head at Nottingham, and the disgruntled workers were complaining to the sympathetic townspeople; but they directed their complaints mainly against the owners they worked for, who both underpaid them and called for "cut-up" stockings. These were knitted in wide sheets, then cut up and sewn into stocking form. Inferior in quality to true knitted stockings, they not only were cheaper but could be made using unskilled labor and the (more expensive) type of stocking loom called a wide machine.

Feelings ran high, and the men demanded that something be done. A variety of "authorities," mainly dragoons from the Crown but also hired hands paid by the owners, ranged the streets and tried to maintain order. At about 9 P.M., the crowd finally dispersed, at which point the townspeople and the owners heaved a sigh of relief.

But the real trouble was about to begin. The unhappy workers, taking a leaf out of Robin Hood's book, had simply disappeared into the darkness. A particularly unhappy group marched to nearby Arnold, and in the dead of night, proceeded to break into homes containing the hated machines that had been rented from the offending owners. By daylight, some sixty large stocking frames had been destroyed.

The explosive release of anger continued over the following weeks. It was strike by surprise, then disappear into the night. The owners, so spread out that they had no way to "circle the wagons," found it difficult—in most cases, impossible—to defend against the raids, which could occur almost anywhere and anytime, sometimes even during the day. Often the raiders attacked in several different areas in the same night. It's important to note that, at least in the early stages, they targeted specific owners, and specific machines.

Throughout, the aggrieved workers knew they had to explain their actions. Aside from verbal complaints to anyone who would listen, these explanations came mainly in the form of written notices to offending parties and/or proclamations aimed at the public and at the Crown. All were signed by "Ned Ludd," or sometimes "General Ludd," or even "King Ludd." The group apparently took the name from a story often told in the area about a young man called Ned Ludlam. There were many different versions.

In one version, he was an apprentice knitter and perhaps of weak intellect. One day he was ordered by his father to get on with his work. Responding in a fury, he grabbed a hammer and smashed his frame into pieces.[1] The *Shorter Oxford English Dictionary* (1964) describes him as insane. In a dif-

ferent version of the story in the 1902 edition of the *Encyclopedia Britannica,* he was the butt of boys' pranks in the village, and on one fateful day he pursued one of his tormenters into a home that housed two of the frames used in manufacturing stockings. Not able to catch the boy, he took out his anger on the frames.[2]

Though, as with Robin Hood, there is little hard evidence of a real person by the name Ned Ludd, no one doubts that his followers were real. Over the two years following the opening foray in March 1811, the various Luddite raiding groups—apparently well organized and disciplined—caused widespread damage to machines and property, amounting to over 100,000 pounds, an enormous sum in that time.[3]

As 1811 wore on, trade continued to worsen, and farmers experienced a poor harvest, leading to still higher food costs. Though some owners did raise their payments, it was nowhere near enough. By November of that year, the raids had become even more virulent, and the raiders began to take on the mien of an organized band. Led by someone—it has never become clear who—they set off on November 10 for Bulwell and the factory of Edward Hollingsworth, an owner particularly hated by the knitters. Though Hollingsworth had expected trouble and had tried to fortify his factory, the ferocity, organization, and effectiveness of the raid caught him by surprise. In the confusion, there were shots, and a Luddite, John Westley, was killed. Nevertheless, the group overran the defenders, did their damage, then quietly dispersed and disappeared into the darkness.

It was the first death resulting from the riots, but far from the last.

In the early months of 1812, the raids slackened. E. P. Thompson, in his classic *The Making of the English Working Class,* says the attackers did see some success.[4] Many hosiers agreed to pay higher prices. The government had stationed several thousand troops in the area, however, and a bill to make frame-breaking a capital crime was put forth in Parliament.

Escalation

Even as the rioting quieted down in the Nottinghamshire area, it began to spread to other parts of the textile manufacturing areas to the north, including Yorkshire, a wool center, and Lancashire, which specialized in cotton.

The Yorkshire area saw a particularly bloody confrontation, in word, action, and reaction. William Horsfall, a local textile mill owner, refused to be intimidated and swore he would ride "up to his saddle girths in Luddite blood."[5] Horsfall was busily installing new equipment in his mill at Rawfolds. This consisted mainly of power-driven shears that could easily

quadruple the output of the cropper's traditional heavy handheld shears. (Traditional shears—which could weigh up to fifty or sixty pounds—were used to cut off projecting threads and fibers, called the nap, from the finished cloth. The croppers who wielded them were a well-paid and proud group.) Horsfall knew he was a major target, and fortified his mill accordingly—including mounting a cannon in the building, barricading the stairs with spiked rollers, and placing a tub of oil of vitriol (a highly caustic substance) at the top.

Sure enough, a major attack was mounted on April 27, 1812. A force of around 150 men, perhaps more, wielding hatchets, heavy hammers, and guns, attempted to enter by battering down the door, breaking windows, and any other means possible. But Horsfall had done his job well. The attack failed, and eventually the raiders dispersed. But in the attempt, shots were fired by both sides, and two Luddites were killed. The Luddites vowed revenge, and not long after, Horsfall was assassinated while riding his horse along a deserted route.

For several months, despite the widespread employment of government spies along with the presence of some four thousand troops in the area, not one of the Rawfolds attackers was brought up on charges. It was an astonishing show of sympathy by the community. It was also, however, partly a fear of reprisal from the Luddites.

But the government was upping the ante. On December 10, 1812, for example, the county of Leicester issued a "Caution" against all persons engaged in the crime of frame-breaking: "Every person forcibly entering a house in night time, with intent to break a frame, and every person in any manner aiding or assisting others in so doing, is guilty of burglary, which is punishable by DEATH."[6]

Part of the reason for the curious (to our eyes) connection with burglary has to do with the participation of outsiders (non-Luddites) who, looking to cash in on the raiders' rage, engaged in looting. Later riots, particularly in the north, saw even more of this, despite the fact that burglary was indeed often punishable by execution.

Still, smashing machines or other property was one thing. Even deaths during battle could be swallowed. But the assassination of a defenseless man, even one as hated as Horsfall, was another matter. Eventually, and for the first time, information was given that led to the arrest and conviction of some of the perpetrators. This was the first major break, and it led to an additional series of arrests in the three major regions involved. These included some Luddite ringleaders, all of whom were tried before a special commission at York Castle in January 1813. Twenty-four men were judged guilty, and seventeen were executed. Others were transported to Australia.

Unhappily, the situation of those who did give information was often as pitiful as those who were condemned. This included constant fear of reprisals, including ostracism, which in those tightly knit communities was a serious matter.

Though the Luddites continued their attacks, new machines continued to be introduced in the Yorkshire area, and the number of croppers—once an independent, tough, respected group—dropped from more than 1,700 to just a few in five years.[7] The croppers, says Thompson, came closest to the popular image of the Luddite: "They were in direct conflict with machinery which both they and their employers knew perfectly well would displace them."[8]

A Difficult Time

What could have brought the Luddites—generally law-abiding, God-fearing citizens—to such a state of anger? Textile manufacture had played an important role in England's commercial success, in both domestic and world trade. And at the turn of the eighteenth century, most of the manufacturing had still been done by these independent operators. The system had worked well for many years; but by the time of the Luddite activities, a variety of factors had led to a serious decline in the fortunes of the workers. A rapid increase in population in the previous decades had led to more dependence on foreign markets. But wars, including a drawn-out series with France, and increasingly annoyed American reactions to British economic and maritime policies, had led to serious disruptions in the flow of goods. By 1810, the American Congress already included a group called the war hawks who were calling for war against England. By then the United States had become Britain's single largest customer for its products, which made this loss particularly bitter. From October 1810 to March 1811, a million pounds of woolen cloth, manufactured in the north and intended for the American market, had accumulated, unusable and unsalable. All of this had contributed to a serious economic depression. An especially cold winter had added to the workers' problems.

A change in the landholding policies of the country also prevented the workers from carrying out part-time agriculture on pieces of common land, which in the past had helped feed and even clothe them in times of need.

At the same time, the owners were trying out a new kind of production. Leading eventually to what we now know as industrial production methods, it promised economies of scale and efficiency for the owners, but it seemed highly threatening to the workers. Finally, there were, of course,

unscrupulous manufacturers who added to the trouble by using a variety of means to take advantage of their position: one method was to defraud the workers, say, in company stores; another was to employ "colts," or unapprenticed workmen, at lower wages; a third method, and one that particularly galled the proud handworkers, was to manufacture inferior goods to bring prices down and increase sales.

All of these factors conspired to make life increasingly difficult for the independent operators. Their situation, in fact, combined the economic risk of the entrepreneur with the powerlessness of the serf; they had the worst of both worlds. Cost of food and raw materials was increasing; need for their labor, decreasing.

Although some of the owner/manufacturers had been willing to at least try to help the knitters, an obstinate core of owners who, used to exercising almost total control, resented the workers' "uppityness." These owners had resolved to hold fast and in some cases even to reduce payments to their workers.

The result was that many of the workers were already in deep financial trouble. In early nineteenth-century England, this meant loss of homes, starvation, and anything else that comes with poverty; for in those days, there were no governmental safety nets such as we know today in Western countries. Malcolm I. Thomis, a British historian who wrote a groundbreaking book on the Luddites, spells out the situation: "The workers had so little cushion that a doubling in price of oats in the northern diet "put hundreds of thousands in a state of desperation. . . . In May 1812, an ironical correspondent suggested in the local press that the present troubles might be cured if doctors would only get together to find out how appetite might be eliminated."[9]

There was also a social factor. As late as 1818, a cotton spinner said, "I know it to be a fact, that the greater part of the master spinners are anxious to keep wages low for the purpose of keeping the spinners indigent and spiritless . . . [as much as] for the purpose of taking the surplus into their own pockets." He added that the textile worker "cannot travel and get work in any town like a shoe-maker, joiner, or taylor; he is confined to the district."[10]

Pre-Luddite Years

The Luddites would have preferred to accomplish their objectives in less violent ways; there had been earlier attempts at negotiating with the owners. One recommendation was a controlled introduction of cropping machinery, with alternative employment, or at least some financial help,

for displaced workers.[11] It came to naught. The workers were so spread out that it was hard to create the kind of unions we know today, which might have been able to exert the right kind of pressure. The inevitable result was that the workers as a group had little bargaining pressure, and the onus fell on individual workers.

They faced another barrier: a general resistance to the very idea of their combining forces, which showed up in a series of laws passed in 1799 and 1800. Unthinkable today, these Combination Laws strengthened and consolidated longstanding antiunion leanings by specifically forbidding the organizing or "combining" of workers to achieve higher wages, shorter hours, or better working conditions.

A second important factor is that machine-breaking was not a new idea; there were other well-documented cases before the Luddite era. One took place in 1710, a full century before the Luddite uprising, when workers smashed the machines of a London hose manufacturer who had decided to ignore a guild rule restricting employers to no more than a few apprentices.[12] Many employers then moved to the outlying areas, such as Nottinghamshire, to help them evade regulations such as those put forth by the guilds.

Later, in 1768, a mill owner named Richard Arkwright invented a spinning device that found use in the manufacture of cotton yarn; but in 1788, when manufacturers attempted to apply the machines to spin wool yarn, angry workers not only wrecked the machines but also damaged the building in which they were housed. There also had been cases of break-ins and damage to knitting frames being put to use by owners. In 1779, a worsening period of trade led to riots in Lancashire, resulting not only in destruction of machinery but in burning down a mill completely. Arkwright quickly laid in a great supply of arms at his mills in Cromford and was never directly attacked.[13]

Raiders, Rebels, or Victims?

Although the Luddite movement is related to this tradition of machine-breaking, there are major differences—and different opinions of these differences. Thompson writes that the Luddite movement is distinguished "first, by its high degree of organization, second, by the political context in which it flourished. . . . Luddism," he argues, "was a *quasi-insurrectionary movement*, which continually trembled on the edge of ulterior revolutionary objectives."[14] But the various geographical sections also had somewhat different experiences. Thompson summarizes: Nottingham was the most organized and disciplined; Lancaster experienced the highest political

activity; Yorkshire moved from an initially industrial reaction to a variety of ulterior objectives, including both political insurrection and banditry.[15]

Thomis agrees with some of this, but expands on the banditry part. He points out that as the movement developed, it seemed ever more threatening, with all manner of arms raids and other mayhem mixed in with the banditry. He writes, "An almighty crime wave swept over England . . . [breaking] machinery had become a mere excuse for private assassination and robbery. . . . A real crime explosion was detonated by the Luddites, and the masqueraders . . . were debasing the coinage of real Luddism, which was highly motivated and heroically accomplished."[16] The desperation of the un- and underemployed workers also led to some serious food riots, and these too were often pinned on the Luddites, even when they were not involved.

It is clear, however, that the situation was of a magnitude and severity unprecedented in British history, and brought down responses of similarly unusual harshness. In addition to execution, jailing, and exile of those caught, a repressive force of 12,000 military personnel was stationed in the troubled regions.[17] This was a force far larger than that taken by Wellington to Portugal in his battle with Napoleon's troops four years earlier.

Still, the rioting continued till about the end of 1816. There were several reasons for its end. One was the constant and increasing pressure from the government, which included increasing numbers of both troops and spies, leading to more arrests and more executions. But perhaps even more important, the war with France had led to a set of Orders in Council, which had put much of Europe in a state of blockade and had severely restricted trade. These were finally repealed, leading to better times, and were an important factor in an apparently rapid alleviation of the textile workers' poverty.

The Importance of the Luddites

One reason the Luddite story is so important is that it not only involved an industry that played a major role in the rise of England as an economic power but also, in a major way, provided a basis and testing ground for the Industrial Revolution itself. According to the textile historian Edith A. Standen, "The first factories were built to make textiles, the first processes of mechanization were applied to them, and their production and distribution were the first to be organized on a capitalistic basis; the wish to produce them quickly, cheaply, and in enormous quantities was one of the main causes of the Industrial Revolution."[18]

Thompson concurs: "Cotton was certainly the pace-making industry of the Industrial Revolution."[19] The cotton mill was, however, also the model for the image of the "dark, Satanic mill" so grimly depicted by William Blake.[20] By the 1770s and 1780s, there were indeed large mills, employing not only women but very young children for long hours. As early as 1771, in fact, Richard Arkwright and several partners had set up a large, water-powered factory in Cromford, Derbyshire, a town not far from Nottingham. In 1776, his second Cromford Mill was over 120 feet long and seven stories high. By 1782, he employed five thousand workers in his several mills. Eight years later, he installed steam-powered machinery in his Nottingham factory.

But, regardless of the activities of the Luddites and their supporters, and of the supposedly meteoric rise of industrialization, textile manufacturing in England remained largely a cottage industry for decades. Thompson points out: "For half a century after the 'breakthrough' of the cotton-mill (around 1780) the mill workers remained as a minority of the adult labour force in the cotton industry itself. In the early 1830s the cotton hand-loom weavers alone still outnumbered all the men and women in spinning and weaving mills of cotton, wool, and silk combined."[21] The term *manufacture*—making things by hand—still made sense.

One reason the Luddites rose up in England and not, for example, in the United States, had to do with a curious difference between the two countries. As one scholar in the history of technology, D. S. L. Cardwell, explained it, "[I]n America during the nineteenth century land was cheap and labour, especially skilled labor, was expensive. In Britain the opposite conditions prevailed: land was expensive and labour was cheap. Accordingly there was in America a strong incentive to invent and apply labour saving machinery."[22]

Still, some of the early developments in industrialization did arise in England, and certainly played a part in the riots. But the story is not simple. As noted earlier, the population increase and a major upsurge of trade in the eighteenth century had created a strong demand for yarn to be spun for weaving. The inability of the cottage system to produce sufficient yarn provided an impetus for innovations in spinning technology.[23] A good example of such technology is James Hargreaves's spinning jenny (invented 1764, patented 1770), which enabled a number of threads to be spun simultaneously by one person. But it was designed not only to be housed in homes but to be human powered, as well.

On the other hand, an *oversupply* of hand-loom weavers in the wool industry delayed adoption of automated looms and was a basic factor in Luddite rioting in the Yorkshire region.

New inventions did not invariably lead to greater industrialization. One scholar, G. N. von Tunzelman, even argues that use of the spinning jenny in activities such as woolen spinning "actually permitted the domestic system to survive longer. Nevertheless," he adds, "most advances were eventually absorbed into factories."[24]

Background of the Luddite Movement

My own feeling, it is probably clear by now, is that today's technophobes, who use the Luddites as their battle cry and emblem, simply misread the Luddite saga. It was not at heart an attempt to halt the progress of technology. Remember that in spite of the Luddites' largely rural outlook, the operators were well acquainted with technological innovation, and in some cases, profited handsomely from it. For example, the entire industry took off after new, mechanized spinning methods were introduced that sped up the production of cotton yarn in the mid-1700s. The Luddites were both smarter and more realistic than to think that they could hold back continuing mechanization. Except for the croppers—a small, select group—many, perhaps most, of the workers probably were not averse to machines per se.

This view is supported by what was happening in the world of science in their day. Whereas the American and the French Revolutions had stirred up a cauldron of radical ideas in politics, in England any passion for the new was more likely to be satisfied in the world of science.[25] And among its enthusiasts could be found many of the country's artisans, including, no doubt, many of the skilled workers in the textile field.

At the same time and probably connected with this admiration of science, a sea change was taking place in the world of technological innovation. Prior to then, most such innovations were the work of tinkerers; almost any skilled worker could come up with a new way of doing things, or even of creating a major technological innovation.

The story of Richard Arkwright, the powerful owner mentioned earlier, is a good case in point. His training and early experience were as a barber and a wig-maker. Changing fashions in the mid-eighteenth century led to a drop in demand for wigs, however, and Arkwright was looking around for another source of income. He chanced to meet a reed-maker and a clock-maker who were trying to build a cotton spinning machine to answer the need for a major increase in yarn production. Result: Arkwright, who had no formal training in science or engineering, came up with a machine that opened the door to the Industrial Revolution. In fact, he even lacked the ability to construct a model, and John Kay, the clock-maker, built it for him.

The steam engine is another good example. Thomas Newcomen, a blacksmith, came up with the first useful steam, or fire, engine in 1712. Used in mines for many years to pump out unwanted water, it was nevertheless highly inefficient. John Smeaton, a lawyer turned instrument-maker, made improvements in the engine by means of his directed, careful experiments, but it remained for James Watt, a professionally trained instrument-maker who used a far more mathematical, scientific, and theoretical approach, to bring the steam engine to the point where it could be economically employed in textile manufacture. His double-cylinder design dates back to 1765 and so was in existence for decades before the Luddites began their activities.

In general, then, neither scientifically based invention nor technological innovation was new to the Luddites. Clearly, they were mainly interested in getting back at a system that regarded them as little more than chattel, by hitting the owners where it would hurt the most.

Effects of the Luddite Rebellion

Few of us would wish that the Luddites had succeeded in halting the spread of technology. But we can hardly blame them for trying. Still, though the Luddite uprising had little effect on the long-term rise of technology, it has had some very real effects on the society that spawned it. The Luddites so alarmed the authorities that all of what Jacques Ellul calls the techniques of the state—financial, military, police, administrative, and political—were deeply affected.[26] The criminal justice system, for example, long a haphazard hodgepodge, was tightened and strengthened. In addition, some of the acts that so infuriated the Luddites, such as the Combination Laws, were repealed. Finally, the workers learned that by working together they could successfully challenge the hefty forces of authority. In that sense, the political fallout of Luddism was more important than the economic consequences.

Further, the Luddites' powerful image has lived on and even prospered in our own day (see chapter 10). Over the years since then, it has shown up in some surprising ways, especially in the world of literature.

In fact, one of the unquenchable images in our society, one that has lasted virtually undiminished for almost two hundred years, is Frankenstein's monster. (Frankenstein was the name of the doctor who created him, not that of the monster.) Yet few today understand that the monster was, and remains, an allegory of science and technology gone wild. And it came directly out of the Luddite story.

Among the Luddites' defenders was the famous British poet Lord Byron. When Parliament was debating the institution of a death penalty

for frame-breaking in 1812, Byron (he really was a Lord) stood up and presented a strong argument against the proposal—using some of the same reasoning the workers had been offering right along. He spoke of "men sacrificed to improvements in mechanism."[27]

Though he failed to carry the day, his feelings about the Luddites and their cause had a powerful, and lasting, effect. This came about in a curious way. He had spent the summer of 1816 cooped up in a Swiss villa during a period of rainy weather. Among his companions were the Shelleys, Mary and Percy Bysshe, and one of the ways they kept themselves occupied was to set up a ghost story competition. Mary, well aware of Byron's feelings about the Luddite movement, personalized them in her story, which she decided to turn into a novel. By December, she was working on chapter 4, in which she details Frankenstein's objective: "I thought, if I could bestow animation upon lifeless matter, I might in process of time . . . renew life where death had apparently devoted the body to corruption."[28]

Sounds like a typical optimistic view of medical science. The title of the resulting novel, *Frankenstein, or the Modern Prometheus,* suggested otherwise, however. And it reflected in a potent and personalized way a fear or warning that there are areas in science and technology where humans should not tread, that new technologies especially hold fearful risks, that in fact the old ways may well be better. Mary Wollstonecraft Shelley, age nineteen, had created one of the enduring images of our modern era.

Throughout the Romantic era, such noted essayists as Ruskin, Carlyle, Emerson, and Thoreau incorporated the idea into their writings, while William Morris incorporated it into his Arts and Crafts movement. It can be seen in the early-twentieth-century Southern Agrarian writings in the United States. A fair amount of science fiction reflects the general idea. Examples include the powerful antiutopia novels of Karel Capek (*R.U.R.* [Rossum's Universal Robots], 1920), Aldous Huxley (*Brave New World,* 1932), George Orwell (*1984,* 1949), and Anthony Burgess (*A Clockwork Orange,* 1962).

A variety of modern writings reflect similar feelings, as for example, those of Lewis Mumford, Jacques Ellul, and Edward Goldsmith. Even Kirkpatrick Sale, who has done a recent history of the Luddites, reflects this attitude. Though each of these writers might, if given the chance, distance himself from a true antitechnology stance, their basic fears shine through clearly in their writings.

It's true that some of these writings, notably such powerful novels as *Brave New World, 1984,* and *A Clockwork Orange,* are really aimed at the totalitarian superstate. But Ellul's point is that modern technology and the power of the state are inextricably entwined.

We often hear that those who forget or ignore the past are condemned to repeat it. But it is also true that those who look back often see what they want to see; they often find what they want to find. So it is with the meaning of the Luddite story.

In any case, neither the Luddite uprising nor its powerful image has presented much of a barrier to the progress of technology. On the other hand, the public and, perhaps to a lesser extent, the scientific establishment itself, have today a less optimistic view of this progress than was common a century ago. Rather, what we are seeing more of is a kind of wary acceptance, a recognition that there are costs as well as benefits and that it is important to try to balance these before permitting a new technology to move forward.

As for the riots themselves, they were, to some extent, the lashing out of a group that was caught in the chaos of a changing industry. But even more, they were a response to the Luddites' economic situation rather than a revolt against technology.

That is, while the economic *results* were less important than the political and administrative fallout, the *causes* of nineteenth-century Luddism were indeed economic. Although some of the feuds I cover in the coming chapters were matters of pride, ambition, competition, and other personal factors, many, as we'll see, also had much to do with money and profit.