

The
Hawk's Nest
AMERICA'S WORST

Incident
INDUSTRIAL DISASTER

MARTIN CHERNIACK, M.D., M.P.H.

Foreword by Philip J. Landrigan, M.D.
and Anthony Robbins, M.D.

Yale University Press

Introduction

In only a few instances do the great arteries of the national interstate highway system defer to natural obstacles, forcing a diversion onto older and more scenic roads. In one of those exceptions: Highway 64, which runs from the coastal cities of Virginia to Saint Louis, yields to interruption by the Appalachian uplift in southern West Virginia. Traffic must follow the two lanes of U.S. 60 as it weaves through hairpin turns and narrow descents for a hundred miles, adding two to three hours of travel time before it rejoins the interstate in Charleston, the state capital. About a mile east of the town of Gauley Bridge, and thirty-five miles east of Charleston, the highway begins a spectacular descent through the gorge of the New River. A driver forced into touristic sensibility by the low-gear progress of trucks in a caravan may notice an obscure roadside marker that seems to refer to nothing visible from the road:

Mouth of the great Hawk's Nest Tunnel, three miles long, which diverts water of the New River from its five-mile long gorge. The tunnel, a mile of which is through solid rock, and a 50-foot dam give waterfall of 160 feet for electric power.

I have driven along this route on more than one occasion. Once motivated by curiosity, I hiked down a riverbank thick with foliage to appreciate some detail of the engineering marvel below. But there was nothing to see—and nothing to suggest that one of the great tragedies of American industrial history had occurred there fifty years earlier. The conventional tablet, which understates an immense but oddly obscure achievement in civil engineering of the 1930s, gives no hint of the undetermined number of men who died there, earning

for Hawk's Nest a significant footnote in the records of industrial medicine.

It was no doubt inevitable that in time someone with a professional interest in that field, such as mine, should attempt to chronicle the disaster at Hawk's Nest. For fifty years it has been known as a watershed in American industrial medicine: the event that identified a new and terrible disease and had far-reaching effects on the system of workmen's compensation. Yet, though it was believed to have caused a great but unquantified loss of life, the disaster has remained a legend. Other writers have tried, with varying degrees of success, to clarify the details of the incident. But time and a deliberate and impressively successful attempt by the corporations involved to obliterate all traces of the occurrence have frustrated attempts to produce an account that could claim either authority or completeness.

My own familiarity with the disaster developed during my training as a physician specializing in occupational health. Nearly every standard textbook in the field or historical article on occupational lung disease includes an obligatory paragraph or two on the deaths from silicosis at Gauley Bridge. During the summer and fall of 1981, while working at the National Institute for Occupational Safety and Health, in Cincinnati, Ohio, I was led to my research by a combination of personal interest and coincidence. A raft trip on the Gauley River with a knowledgeable friend ended with an "industrial tour" on foot. She showed me the dam, the power station, and the trumpetlike surge tank. I realized that the tunnel itself, deep underground and filled with water, was a hidden artifact that could only be imagined.

Several months later, by a twist of fortune, I was assigned to investigate a report of an elevated number of deaths from cardiovascular and lung disease at the Elkem metals plant in Alloy, West Virginia. This plant had at one time housed a tremendous electrometallurgical complex, owned until recently by the Union Carbide and Carbon Corporation. It was mainly to power the Alloy plant that the Hawk's Nest Tunnel had been built. I had no thought at the time of concerning myself with the Hawk's Nest tragedy; it was far from the subject of my medical studies. During my official inquiry, however, even casual conversations tended to turn to lung disease and history. Even at this early point, certain motifs arose that would later recur in my research. A production engineer explained the intuitive distrust that workers felt toward Union Carbide's environmental safety staff by recalling what had happened long ago to the men who had built the hydro tunnel. This was not the only time I encountered candor in the ranks of management. The sale of the Alloy plant to Elkem had meant only a change of name; many members of Union Carbide's staff and workers had been retained by the new owner. Some of the staff, either born outside of West Virginia or distanced from the events by a gen-

eration, freely expressed regret over a disgraceful incident, now safely in the past.

This apparent thoughtfulness was not, however, what it seemed at first. Later, when I had committed myself to uncovering the story of Hawk's Nest and therefore began to ask more probing questions, another version would often emerge, at first suggested, then insisted upon: the Negroes didn't know how to care for themselves. They got sick and died from pneumonia and too much alcohol and poker. Nobody ever proved anything against the company anyway, and it had been blown all out of proportion when you considered all the company had done for those people. These are attitudes widely held not only by representatives of Union Carbide but by some of the townspeople of Gauley Bridge. The building of the tunnel is only a generation or two removed from current memory. There are old men and women who remember it from their youth: the children of many of the best-known protagonists are now in their fifties or sixties; and it was, after all, the landmark event in the history of an area that is deeply traditional and where consciousness of local history is widespread. About fifteen years ago a historian of the area undertook a history of the tunnel project. He claims to have given up when death threats rose into double figures.

I probably would not have made the initial commitment to study the history of the tunnel but for the creativity and exuberance of Dr. Michael Bader, who was then a medical student on elective at the Cincinnati institute where I worked. Late one Friday afternoon he coaxed me to accompany him to West Virginia to study the record of the silicosis cases. This was the first of many weekends spent over statistical tables or on brief trips to southern West Virginia. We began by exploring the West Virginia Collection, official archives housed at the University of West Virginia, in Morgantown. Union Carbide had donated nine boxes of records about the New Kanawha Power Project, the organizational rubric under which the tunnel had been built. Oddly, there was not a single document related to work on the tunnel, allegations of silicosis, or the hundreds of legal actions that were brought on behalf of former workers. This extraordinary pattern of crucial deletions, which was to be repeated again and again, was a powerful provocation for me to engage in what public health workers call "shoe leather epidemiology."

It soon became clear that, while the concealment from public scrutiny was in itself remarkable, even what supposedly was general knowledge was enmeshed in controversy. The most sympathetic accounts of the Gauley Bridge tragedy had been preserved in the radical labor tradition, in which moral outrage weighed more heavily than quantifiable data. An objective compilation of reliable statistics was never carried out in the 1930s. Union Carbide had argued vehemently

Introduction

that the human toll, although regrettable, had been small, and had urged that its own estimates be credited over those of sensationalist journalists. When I reviewed these positions from the perspective of the 1980s, I was uncertain whether the issue had been more substance or symbol. It was clear, however, that Union Carbide's epidemiology had to be treated with skepticism and could not be a substitute for a fresh, quantitative evaluation of both the causes and the rate of mortality.

I soon learned, however, that the abundance of vital statistics that nearly overwhelm the modern epidemiologist had no counterpart in the West Virginia of the 1930s. The state's records were no better than the national census data, which were too limited in the diseases reported, particularly from individual counties, to be of practical use. After much trial and error I was obliged to reconstruct raw data from the state and from several mining counties, in particular from Fayette County, where the events had taken place. The highlights of this rather bold process of induction are presented in the text. Almost throughout this research, with its many dead ends, I remained skeptical that I would ultimately find an elevated level of mortality, since the only knowledgeable opinion on the question held that no such increase had occurred.

The culture of the county courthouse is sometimes maligned as a regressive force throughout Appalachia. I came to appreciate another dimension of it. The courthouse in Fayetteville held an invaluable archive of lives, deaths, grievances, and litigations of the people who had lived in the period under investigation. From these tomes—the institutional existence of the people of Fayette County—I assembled statistical data on deaths from 1925 to 1940 to see if young men had been struck down in unusual numbers in the years of tunnel building. Two great trials had been held and more than five hundred lawsuits filed in that courthouse. Each file potentially contained vital pieces of information that could be fitted into a larger pattern. Officially, the lawyers for the plaintiffs had turned over all their records to Union Carbide after a sad campaign that had ended with defeat in the courtroom and charges of bribery. I found, however, that copies of vital documents were still scattered through the files of the court, left through either negligence or intention. Here were physicians' reports of chest X-rays revealing silicosis, core samples taken prior to drilling that showed rich veins of silica throughout the tunnel's eventual course, instructions to juries, and terms of out-of-court settlements. If some of the impact of the event at Gauley Bridge had been lost through the clandestine manipulations of attorneys, it was in all the paper filled with obscure opinion that much vital information was preserved. From people whose fathers had worked on the Union Carbide staff or had been retained as attorneys for the corporation, I was fortunate to ob-

Introduction

tain invaluable internal documents compiled by the company in the 1930s. I regret that more of this inside story remains unattainable.

More than a little good luck aided my successful sweep for documentation; perhaps only ill luck prevented my uncovering yet richer stores. The Nicholas County clerk who helped me trace mortality in this adjacent mining county was married to the son of an undertaker who had buried many black tunnel workers on his family farm. Raw but invaluable death records from neighboring mining counties could be compared with the more comprehensive vital statistics that I had developed for Fayette County, and used as a control for understanding trends in mortality that prevailed in southern West Virginia. Although the original vital statistics were alleged to have been lost, incomplete summary data, compiled in the 1920s and 1930s, proved that they had once been available. My successful search for them was motivated by my experience as a government worker that, in the absence of fire or natural disaster, records are rarely discarded.

The Gauley Bridge tragedy seemed to have happened so long ago that I felt an unanticipated pleasure at finding so many men and women still alive who either had worked on the tunnel or knew intimate parts of the story. I mention them here because their contributions to this account are submerged within the text, which would have been far less biographical without them. I am deeply indebted to Bob Reynolds, the Fayette County assessor, who helped me reconstruct the physical aspects of the towns and camps of the 1930s, many of which, at best no more than clusters of buildings with a post office, have long since disappeared. His vivid memory and his seventy-five years of acquaintanceships led me to a long succession of other people, many of whom also knew a great deal about the tunnel. Half a dozen local men could recall time spent underground. Touched by lung disease themselves, each could account for friends—boys and young men—who had not survived the experience. There were also former employees of the New Kanawha Power Company, who inveighed indignantly against charges by venal attorneys and ignorant men, citing their own robust health as proof of the safe conditions that had prevailed in the tunnel. And there were witnesses to tragedy: a retired white coal miner who as an eleven-year-old had watched three elder brothers die painfully of lung disease contracted in the tunnel; a black woman who had come to Fayette County from South Carolina as a fifteen-year-old bride of a migrant worker and remained for the next fifty years, most of them as a widow.

It is not always easy to separate heroic victims from calculating oppressors. Former workers and managers were both civil and unyielding witnesses to their personal experiences as they remember them. The worker who claims to have earned high pay and esteem as an operator of heavy equipment is recalled by a former engineer as an unskilled

laborer. The driller whose lungs had been irremediably scarred by silica in 1931 was later hired by Union Carbide and still feels loyalty to the company. Many West Virginia towns have so long been dependent for survival on large corporate employers such as Union Carbide that an active and ideological anticorporatism is almost unthinkable; feelings of loyalty and tolerance sometimes seem to exceed natural endurance.

Obviously, memories fail and rumors prove untrue, but the thoughtfulness and resourcefulness of the people of Fayette County were incalculable assets. Many people expressed the concern that someone should write a book about the Hawk's Nest disaster. During my investigations I often felt a desire to learn more about these adaptable and courteous people, but oral history or sociological research was not my goal, by training or inclination. My perspective was more institutional and quantitative, since I was involved in a unique investigation rather than a reconsideration or a revision.

The residents of Gauley Bridge live far from the daily distractions and movement that fragment the lives and memories of most Americans. To resort to an overused term, they retain a sense of history—not one of epochal vistas, but an appreciation of the continuity of local people and events. Like veterans of some great campaign, they have earned a unique set of memories. These deserve, while they survive, to be tapped by methods and for purposes different from my own, to provide still another perspective on a great industrial tragedy. I have tried in this book to illuminate in some degree the dimensions, causes, and character of that tragedy. Whether or not an awareness of the past can be instructive to the present, I hope that this important episode in American industrial history will come to be more widely recognized.

I

Preparation for Disaster

The New River, the largest in the state of West Virginia and the oldest in North America, rises in the mountains of North Carolina. There its north and south forks join to form a unified stream, crossing a corner of Virginia and entering West Virginia. It flows north for some two hundred miles, then veers in a more westerly direction. Swelled by its tributary the Greenbrier, the New suddenly narrows, rushes steeply down through a long, winding gorge, and emerges, near its junction with the smaller Gauley River, with a new name, the Kanawha. It continues its course over less mountainous terrain, soon passing Charleston, the state capital. Sixty miles farther on, more than four hundred miles from its source, it joins the Ohio. In time, the waters of the New, mingled indistinguishably with those of both lesser and greater rivers, reach the Gulf of Mexico.

Geologists, who think in geological time, predict that one day before long the New River will desert its circuitous course, burrow its way through the Blue Ridge like the Roanoke and the James, and flow across Piedmont and Tidewater directly to the Atlantic. If this happens, it will not be the first time the river has been diverted from its course. An earlier deflection affected only a few miles of the New's length and was accomplished by human beings. It occurred over a half a century ago and has been nearly forgotten. Compared with the feats of glaciers, the hydraulic accomplishments of engineers appear modest. Yet driving the New River through the center of a mountain was one of the engineering marvels of its time.

From the building of the Pyramids to the construction of the Andean roads, engineering marvels have exacted their human toll. The Hawk's Nest Tunnel was not exempt. In some ways it was, like the earlier projects, an achievement of unskilled workmen, resembling

the levee labor of antiquity more than a feat of modern technology. The deaths of an undetermined number of workmen from lung disease are a part of the story this book has to tell. Another is a consequent advance in occupational medicine: the identification of a previously unrecognized and deadly disease, acute silicosis. Behind both consequences looms the calamity of the Great Depression, which gave birth to the tragic events at Gauley Bridge, and in part to the attitudes with which they were greeted. Also in the background was a private corporation, then in its formative period, which assumed the work usually undertaken by governments, through the conquest of a major natural resource.

In the decades that followed the Civil War, the wealth and progress that had been predicted for West Virginia failed to be realized. The dependence of the state's economy on extractive industries frustrated the development of sophisticated enterprises that would have attracted more capital and thus permitted the growth of public institutions supported by the generation of corporate taxes. As a result the economy remained at the mercy of the flux of distant markets, foreign and domestic. Little control, moreover, was exerted by the state over the depletion of its resources. The ten million acres of virgin forest that had covered the state in the 1870s had been exhausted within fifty years by profligate logging. By the second decade of the twentieth century, the state ranked high as a producer of oil and was the leading source of natural gas. But the most important resource, to which both past and future were bound, was coal.

West Virginia's mountains had long been riddled with mines that produced bituminous coal of high quality. But their relative prosperity in a competitive and anarchic industry dominated by small, marginal producers was endangered by distance from eastern and midwestern markets; by the development of more efficient fields elsewhere; by an erratic wage system; and most ominously by a habit of unbridled overproduction, regulated only by bust and panic rather than by a stable and comprehensive policy. The First World War staved off disaster for a time, but by the early twenties the situation was deteriorating sharply as coal production exceeded domestic consumption twofold. The collapse of the national economy in 1929 accelerated the decline of mining throughout the state, causing poverty to reach catastrophic proportions. During the next four years, coal production in Fayette County, southeast of Charleston, dropped by 40 percent as 20 of 109 active mines closed.¹ The decimation of the United Mine Workers Union, with the unilateral abrogation of contracts on the part of mine owners, in the era of so-called "yellow dog" agreements, obliterated the modest wage security of the previous decade.

West Virginia had long depended heavily on outside capital to finance its industries. The threat posed by the collapse of coal mining

necessitated a search for new investments. The state possessed a potentially attractive lure to eastern industries seeking increasing sources of cheap energy and mineral resources. During the depression "white coal" would achieve its reputation as the premier cheap, renewable source of power and would become a chief focus of the great public works projects of the New Deal. West Virginia could boast water power in perpetual abundance. Compared to New York or Pennsylvania, the state had barely exploited this resource. Abundant minerals and inexpensive power were precisely the prerequisites of the sophisticated metallurgical and chemical industries that might salvage the West Virginian economy. It was in this context of despair and expectation that the Hawk's Nest hydroelectric project was conceived.

As early as 1899 the Willson Aluminum Company of West Virginia, by citing the exigencies of the Spanish American War, received permission from Elihu Root, the Secretary of War, to construct a temporary timber dam at Kanawha Falls, just downstream from Gauley Bridge.² By 1901 the company had completed the project, which exploited the eight-foot natural falls to drive the first hydroelectric power station in the state. The village of Glen Ferris grew up around the small aluminum-reduction plant to accommodate the company and its workers.

Six years after the Willson Aluminum Company had built its power station, the company was absorbed by the Electro-Metallurgical Company, a prominent West Virginia corporation. It soon expanded Willson's temporary dam works, without seeking a more applicable permit. The plans of the Electro-Metallurgical Company were inspired by its visionary founder, Major Moreland, who foresaw the intensive use of hydroelectric power in West Virginia to produce aluminum and alloys requiring high temperatures. As early as 1911 he had anticipated a more ambitious damming of the New River for electrometallurgical purposes. Twenty years would pass, however, before his original drafts were to be realized in the Hawk's Nest Tunnel.

The early operations of the Electro-Metallurgical Company were only moderately successful. Industrial markets for its products were limited, and some of the aluminum ended ignominiously as headstone markers for the dead of Fayette County. Nevertheless, the dam did attract some notice for the value of water power. One newspaper article proclaimed: "The potential water power of the New River is almost unlimited, but at the present time there are no dams on this river in West Virginia. At Kanawha Falls on the Kanawha River, about one and one-half miles below the junction of New River and Gauley, this water power is utilized by a manufacturing plant."³

Conglomeration, rather than entrepreneurial imagination, would dictate the ultimate importance of the Electro-Metallurgical Company to Fayette County. In 1917 it merged with three other companies to

form the Union Carbide and Carbon Corporation, a corporate entity which, within a few years, would undertake construction of the tunnel and dominate the economic development of the Kanawha Valley. The most important constituent of this new creation was the Carbons and Carbide Chemical Company. Its first product to become nationally known, Prestone antifreeze, was owed to the acquisition of the Clendenin Gasoline Company, of Clendenin, West Virginia, in 1920. The Electro-Metallurgical Company survived as a separate unit within the parent company.

One of the first acts of the expanded corporation was to increase the size of the dam on the Kanawha Falls. This turned out to be more complicated than building the original, primitive structure. The permit that the War Department had given Willson Aluminum in 1899 had been revocable as well as limited, and the Electro-Metallurgical Company had good reason to anticipate trouble in winning a renewal. The Army Corps of Engineers had informed Congress as early as 1913 that control of the New River, like that of all other navigable rivers in the country, belonged to the federal government. The supposed condition of navigability had been established after a fashion by no less an authority than John C. Marshall, a whitewater adventurer and amateur navigator as well as chief justice of the U.S. Supreme Court. In 1812 Marshall, in a boat loaded with a ton and a half of provisions, had traversed the entire New River Gorge and on as far as the Kanawha Falls. Unimpressed by the rapids on the New River, he was optimistic about its navigability, once modest improvements had been made. He had been forced to disembark only once, at Kanawha Falls, and noted that his boatman was completely inexperienced on the river. However insignificant such a volume of traffic might seem a century later, a dam across the river would clearly impede "navigation" as strictly defined, and the Army Corps of Engineers could be expected to object. Indeed, the Federal Power Commission eventually did raise this issue, initiating a legal conflict that would last for thirty years.⁴

In 1917, however, federal interference with private enterprise was unaggressive, and Union Carbide found a simple way to circumvent the problem of legality: it began extension of the dam without notifying the army. By 1918 two hundred feet of concrete were in place on the dam and a new powerhouse had been erected at Glen Ferris. A year later, when all construction was complete, the company finally notified the army of the modifications and applied for extension of the permit. The corporation's fears had been justified. Permission was refused—but no action was taken to remove the new structures.⁵ Inaction as well as regulation was within the federal government's prerogative.

A great deal was at stake for the expanded corporation. The possibilities for cheap and efficient generation of hydroelectric power in the region were enormous. Even today, though the metallurgical works

at Glen Ferris were dismantled long ago, the sixty-five-year-old power station still produces five megawatts of electricity for the corporate successor to Union Carbide. But the potential of any plant built along the relatively calm flow of the Kanawha was infinitely less than that of one that might tap the swift waters of the New. For example, in comparison with the requirements of the dam and power station at London, twelve miles below the Kanawha Falls, six times less water volume would be needed for the plant that was eventually built at Hawk's Nest. For several years the company made no public move to exploit that part of the river. Quietly, however, it acquired titles to key sections of the river bottom and adjacent lands. By 1924 topographic maps and blueprints showed a system of dams, tunnels, and powerhouses for the production of hydroelectric power.

From the beginning Union Carbide's exploitation of water resources was intended for grander purposes than maintaining the Glen Ferris works. A new metallurgical complex had been sited for construction at the village of Boncar, five miles below Glen Ferris. These works, to be far larger than those at Kanawha Falls, would require far greater resources of power. With this in view, early in 1927 the company formalized its acquisitions on the New River by forming the New Kanawha Power Company to develop them for hydroelectric power generation. Ostensibly, this new enterprise was chartered to construct public utilities in West Virginia, but no serious attempt was made to pretend that New Kanawha was more than a legal fiction created by the parent company. The operating officer who presented the request to the Public Service Commission of West Virginia was Leonard Davis, the executive vice president of Union Carbide. The chief engineer of the new company, O. M. Jones, had long been on the engineering staff of the Electro-Metallurgical Company.⁶ For several years before the new company was incorporated, he had supervised plans for the Hawk's Nest Tunnel and the Boncar plant. The commission readily licensed the dummy company to develop and produce power for general public sales and for commercial use. In the company's brief history, however, this power had only one purchaser: Union Carbide. The New Kanawha Power Company was an administrative chimera, combining solitary corporate control with minimal liability. Commissioned to produce hydroelectricity, it did not generate a single watt under its own name; a licensed public utility, its entire bounty was kept in private hands.

In May 1927 the New Kanawha Power Company filed with the federal government a declaration of intent to pursue its plan for the New River. This was to include two dams, two tunnels, and two power stations, as well as the plant at Boncar. The site for dam and tunnel were well chosen. Only a short distance upstream from Gauley Bridge, halfway to the spectacular promontory known as Hawk's Nest, the

river bursts out of the New River Gorge, in which its formidable volume of water has been confined between narrow walls for over sixty miles. The river above the gorge is a thousand feet wide; within it the width narrows to no more than a hundred feet. The stretch of the river at Hawk's Nest, a part of which is in one of West Virginia's oldest state parks, offers some of the most dramatic mountain scenery in the eastern United States.

It also provides an ideal situation in which to produce hydroelectric power. From the source of the New to Gauley Bridge, the river descends at an average pitch of 8.2 feet per mile. In the section of the gorge just above Hawk's Nest, the descent averages 30.6 feet per mile, adding immense impetus to the flow. The proposed dam, by creating a shallow reservoir 3.65 miles long, was to divert a part of that flow from just below Hawk's Nest through a three-mile-long tunnel with a descent of 162 feet that would end a mile and a half upstream from Gauley Bridge. There the new station would convert the caged ferocity of the water into electrical power. The river's flow was directed over four generator turbines, and the generated power would then be carried over six miles of cable, strung on twenty-three towers. Crossing and recrossing the river and surmounting other natural obstacles, it would reach the plant at Boncar.

No federal action was taken on the New Kanawha Power Company's petition. In effect this meant that, for the present at least, it need fear no interference with its plans, even though the New-Kanawha River contributes more than 50 percent of the volume of the Ohio River at times of low flow. During this uncertain period in the evolution of the Federal Power Commission, such inaction was not unusual. Federal reluctance to claim authority over the New River had been sustained in the Republican administrations of the 1920s. In 1925, the commission, claiming prerogatives under the newly mandated Federal Water Powers Act, had opposed hydroelectric development of the New by rejecting a petition filed by the Appalachian Electric Power Company. President Coolidge's Justice Department, under Attorney General William D. Mitchell, had advised the FPC that it was without constitutional authority and held no jurisdiction for regulatory action. Acting in a climate of federal passivity and legal instability, Appalachian Power tried in the courts to void the act entirely. Not until 1933 was its constitutionality upheld, in a landmark case with national implications for public control over power and waterways.

That the passivity of the federal government was based in opportune politics rather than geology was given convincing evidence in 1940, when under almost identical circumstances, the Federal Power Commission claimed jurisdiction over the Allegheny Power Company's upstream dam and power generating facility. Whereas Union Carbide acknowledged the New River's navigability only below Kanawha Falls,

the government had found it completely navigable along a 111-mile stretch of water, beginning 166 miles above Hawk's Nest Dam.

It was later claimed by many that the Union Carbide and Carbon Corporation rushed completion of the Hawk's Nest project out of fear that this habit of federal compliance with the wishes of industry might end. There is no question that the corporation profited from the prevailing climate. In any case it may be assumed that the company was not disappointed at the Federal Power Commission's delays. As future events would prove, Union Carbide encountered little difficulty in weathering federal storms over the New River, even at the height of the New Deal.

A year later, in September 1928, Union Carbide turned to the more predictable State Public Service Commission and filed the declaration again. It need not suffer no anxiety over the response of this body, which had already proved itself a reliable partner. In 1924 the commission had rejected a proposal by the Appalachian Electric Power Company to construct a competing dam on the New River. The grounds cited were that Union Carbide, through its subsidiary the Electro-Metallurgical Company, had preeminent rights to apply for construction on the river because it had bought so much land there. As expected, the commission gave its full approval to New Kanawha's plans for development. This was the largest project that the commission had ever reviewed under the provisions of the West Virginia Water Powers Act of 1915—a bill that was heavily criticized and later amended for its failure to restrict private industrial use of publicly owned water.

The commission did take up the question of potential disruption of river traffic. The dam proposed in the initial plan for deflecting water from the New through the Hawk's Nest Tunnel would rise fifteen feet above the level of the reservoir formed above the dam. Representatives of the Hatfield-Campbell's Creek Coal Company of Cincinnati protested that such a dam would interfere with the fleet of coal barges that it maintained on the Kanawha. It was a symbolic and final protest from traditional mining against the threat of hydroelectricity. The New Kanawha Power Company contended that the likelihood of interruption to the water supply below the dam was remote. The longest interruption would be the eighteen hours it would take for tunnel and reservoir to fill. Although this issue clearly involved navigability of the river, it was never referred to the Army Corps of Engineers, which oversees the integrity of inland water routes. The commission dismissed the barge company's objection.

The commission employed a consultant, Charles E. Krebs, a well-known West Virginia mining engineer, to review the project. His report was favorable, a judgment that he would rescind in the light of future events. Though Union Carbide openly admitted that the New

Kanawha Power Company was a wholly owned subsidiary and that the power it produced was intended exclusively for the use of the parent company, approval was quickly granted. This pattern would continue throughout construction of the huge facility. At no point did the Public Service Commission fail to comply swiftly with requests from Union Carbide, even when the proposals differed considerably from those originally approved. The commission's docility in requiring not even minimal concessions to conservation, such as stream gauges and fishways at the dam, was striking. This docility would have far-reaching effects on the work force that would eventually drill the tunnel. By classing the operation as a construction project, it deprived them of protective provisions for underground workers required by the state's Department of Mines.

It is easy to question the motives that underlay the enthusiastic acquiescence by state officials to nearly all of Union Carbide's requests for years to come. Such speculations should be balanced, however, against the commission's awareness of the depressed state of West Virginia's economy and the crucial benefits that large infusions of capital from outside might bring. The Alloy plant represented just the kind of modern industry that might prove a successor to coal mining. Moreover, public interest groups took no more active role than government in objecting to dam or tunnel plans on environmental grounds. Though environmental protests were less prevalent in the 1920s than today, the Izaak Walton League was in fact attempting to prevent the damming of the Cheat River in the same region, even though that project was designed for public as well as private use. Yet, except for one predictable protest—that hydroelectric power would pose a threat to the state's coal mining industry—scarcely any critical reservations were expressed about New Kanawha's proposal before the commission or any other governmental body. The generally positive reaction to the project was reflected in an article in a Charleston newspaper: "It was evident from the testimony of company officials that they had taken every care to guard the rights and interests of the state as well as of individuals who might in any way be affected by the dams."⁷ It remains remarkable, nonetheless, that a private corporation could buy parts of a major river system and effectively dewater more than five miles of riverbed without encountering significant objection from either state or federal government.

Whatever the motives of the commission, the manner in which the New Kanawha Power Company informed state officials of alterations in plans was cavalier. The original proposal was for two contiguous tunnels, each to have its own dam and power station. Seven million dollars was to be spent on this project by the company, with the final investment to reach nine million dollars. Two years later the company amended its declaration of intent with construction plans that included

only a single, larger tunnel and improvements on the old works at Glen Ferris.⁸ Company records show, however, that the plan for two tunnels had been scrapped eighteen months earlier. The altered plans were filed after the construction company that won the contract had bid just \$4.2 million. Union Carbide made no acknowledgement of the vast savings it would achieve by the revised plan. Instead it repeated the estimate of an expenditure of nine million dollars.

A similar vagueness characterized the company's descriptions of the metallurgical plant it would build at Boncar. This was represented to be like the plant at Glen Ferris, which employed about 150 people. Leonard Davis implied to the commission that the hydroelectric station would provide power for several industrial sites. In fact, the Hawk's Nest power station, and the enormous tunnel that served it, were intended solely for the use of the Boncar plant. The size of the tunnel and the capacity of the station—which the company would later boast could illuminate the entire city of Charleston—suggest that the Boncar facility was planned from the first to become an industrial mammoth. Not long after the plant's construction, the name of the town was changed to Alloy in honor of its chief product: ferrosilicon alloy, widely used in the steel industry.

Thirty-five contractors bid on the construction rights for the tunnel in September 1929.⁹ On 13 March 1930 the contract was granted to the lowest bidder, the Rinehart and Dennis Company of Charlottesville, Virginia. Though this company had made the lowest bid, it was neither inexperienced nor given to shoddy work. Rinehart and Dennis was well known throughout the South. It had already built major dams and power stations for the Southern Power Company and the Duke Power Company, and dams and other structures for the water system of New York City at Valhalla, New York. In a period of thirty years it had drilled fifty-one tunnels, many of them for eastern and southern railroads. Clearly, it was well qualified to build the tunnel at Hawk's Nest.

Build it Rinehart and Dennis would do, with extraordinary efficiency and dispatch. A contract provision requiring economic penalties for work delayed beyond two years would be obviated by the breakneck speed imposed by the contractor on its drilling crews. From the perspective of Union Carbide and the engineers of the New Kanawha Power Company, Rinehart and Dennis proved itself a heroically able contractor. As the chief engineering consultant would write in 1936, five years after the completion of drilling: "I have frequently discussed on the job, and in our respective offices, the always very satisfactory way Rinehart and Dennis have solved the many problems they have been naturally confronted with on so difficult an engineering undertaking. . . . During my more than forty years of experience with contractors in many parts of the world, I have never worked with a better

contractor than Rinehart and Dennis."¹⁰ Whatever clouds might have darkened the reputation of Rinehart and Dennis in the intervening years, it is clear that, from the perspective of Union Carbide, its contractor had performed in an exemplary manner.

Throughout the drilling of the tunnel, Union Carbide kept both planning and supervision in its own hands. On 13 March 1930, the day the contract was awarded, officials of the New Kanawha Power Company registered at the Glen Ferris Inn at Kanawha Falls to hire a staff to oversee the construction. Its engineers had drawn up the plans for the tunnel, dam, and power station. It would continue to make all decisions affecting the extent of its lining, incline, and grade, and the eventual widening of the tunnel. It set deadlines for the completion of tunneling and subsequent extensions, and therefore determined the pace at which the work must proceed.

New Kanawha also spelled out the terms for medical care, safety precautions, ventilation, food, water, and housing. In order to ensure that these provisions, as well as those concerned with construction, should be carried out, New Kanawha retained the right to inspect and advise on all of them. A staff for this purpose would be always present at the construction site, under the direction of O. M. Jones. As a vice president of Union Carbide later testified, "During the course of construction we maintained a large engineering staff at the project and our engineers, who have had wide experience in both construction and operation in our other plants, where safety and health records are of the highest, were daily in the tunnel as well as on other parts of the work."¹¹

It seems clear that Rinehart and Dennis was, and remained, merely a construction firm under the direction of Union Carbide engineers. Though it was larger and proportionately more important, its relationship with the company was functionally parallel to that of subcontractors. These included Dupont, which provided explosives and technical staff, and hired its own personnel, and Ingersoll-Rand, Westinghouse, and Allis Chalmers, which maintained similar relationships for respective parts of tunnel, dam, and plant constructions. In time the vicissitudes of a common interest would obscure some of these distinctions. Former Rinehart and Dennis employees joined the Union Carbide staff, in part to assist Union Carbide's defense attorneys in the eventual legal debacles, and attorneys representing Rinehart and Dennis were informed of this work. But in 1930, the relationship was purely hierarchical. The primacy of decision making that Union Carbide retained even in areas that might have seemed the prerogative of a contractor is demonstrated in the fact that, only a few days before ground-breaking for the tunnel, staff of New Kanawha used power from its Glen Ferris station to experiment with electric arc rock drilling. This technique, which had been attempted in the South African gold

mines, did not work at Hawk's Nest. Nevertheless, the trial makes it clear the extent to which Union Carbide kept every aspect of work on the tunnel in its own hands. Even the choice of drill models and pneumatic hammers was made by the New Kanawha staff.

Only eighteen days after the planning session at the Glen Ferris Inn, ground was broken for the tunnel, on 31 March 1930. Piloting a giant steam shovel, O. M. Jones dug the first, symbolic shovelful of earth.¹² Word that construction would soon begin had already spread throughout the southeastern United States. Workers were pouring into the Gauley Bridge area. The rumor of possible employment need not have awaited the awarding of a contract. Nevertheless, the influx was remarkably quick, and many questions were raised as to how such speedy marshaling of a work force had been possible. Various explanations were offered. According to Rinehart and Dennis, "The men employed, especially those in the tunnel, were largely recruited from workers who had previous experience in tunnel work or coal mining, since the power project site is in the midst of railway tunnels and coal mines."¹³ This statement is, on its face, plausible. Men of Fayette County had worked underground as far back as the beginning of the state's coal industry. The first reported strike by West Virginia miners had been brought against the Hawk's Nest Coal Company in 1880. By 1930 the abandonment of mines in the area had left many experienced miners in need of work—and enough of them did work on the Hawk's Nest Tunnel for their deaths to serve as a measure of mortality on the job. But they were a small proportion of the total work force, which numbered nearly five thousand men. The male population of the county was over 80 percent white. According to Union Carbide's own records, 65 percent of the workers were black.¹⁴ It is known that, for reasons we shall soon understand, few of these blacks came from Fayette County. Of the whites employed, some may well have been local, but only 738 whites ever worked inside the tunnel. The tunnel workers were, then, mostly migrants. Internal documents compiled by Union Carbide make clear that considerably less than 20 percent of the workers were local in origin. The claim made by Rinehart and Dennis is simply untrue.

Conversely, another claim made by the contractor about the work force may have been true. Insofar as choice can be free in the face of material poverty, the men who worked on the tunnel came voluntarily and without coercion. Some accounts accuse Rinehart and Dennis of resorting to press-gang methods of recruitment: one-way fares paid to Gauley Bridge and a system of payment and of indebtedness to the company's commissary that ensured economic captivity. These tactics were by no means unusual at the time. They are said to have been common practice in providing the thousands of southern blacks who had worked the West Virginia coal mines since the 1890s.

But black workers on the Hawk's Nest Tunnel who lived and remained in the area denied that such methods had been used on this job. "Leaders" had indeed been hired by the contractor to disperse throughout the Carolinas and Georgia and attract labor for the tunnel, but men had paid their own fares to get to Gauley Bridge.¹⁵ In 1930 and 1931 nothing more sinister than rumor was required to lure unemployed laborers to any site that offered a chance of work.

The account of an eighteen-year-old from South Carolina may be typical. With his father and uncle, he had worked for Rinehart and Dennis on seasonal jobs in the Carolinas. He first heard of the tunnel through a work acquaintance, a company stringer who was supplied with bus fare and a stipend to promote employment among southern blacks. The boy paid his own fare to Gauley Bridge. He was immediately added to the rolls because he was known to several of the contractor's foremen.

Who, then, were the men who built the Hawk's Nest Tunnel? An Electro-Metallurgical Company memorandum of April 1936 from Leonard Davis is revealing:

Hawk's Nest Tunnel Employment Profile

	White	Black	Total
Inside Tunnel only	379	1115	1494
Inside and outside	359	1129	1488
Outside, never in tunnel	952	953	1905
Total	1690	3197	4887

Of the nearly three thousand men who worked at least part of the time inside the tunnel, 75 percent were black. Of the whites, a considerable percentage were foremen—sixty-eight men—or operators of heavy equipment. That the blacks were predominantly migrant laborers is evident not only from demographic statistics, but also from anecdotal accounts given either during court trials or at the hearings later held before a congressional subcommittee. Like many others, George Robison, a driller, recalled that most of the blacks came from the Carolinas, Georgia, Alabama, or Florida. Several of these accounts also attribute the small number of local blacks on the work force to the fact that northern blacks resisted the physical abuse employed by the contractor. One such account refers to the aggressiveness of the "West Virginia nigger." Black workers accustomed to labor practices in the lumbering camps and coal mines of the state would not tolerate the methods that the company from Virginia had brought with it. When Rinehart and Dennis foremen allegedly threatened them (but not white workers) with beatings and physical coercion, these northern

blacks sometimes fought back. According to more than one account, one local black defended himself by pulling a gun on a foreman. No more local blacks were hired for work inside the tunnel. A review of death certificates of blacks known to have worked on the tunnel shows the absence of even surreptitious employment of local black men.

Color was not the only source of divisiveness during construction of the tunnel. Lines were clearly drawn on the basis of class as well. To some degree the distinctions were inherent in the relation of owner to contractor. Rinehart and Dennis maintained only a minimal technical staff, including a vice president named E. J. Perkins, a purchasing officer, and two or three mechanics and engineers. The contractor also provided commissary and boardinghouse facilities, but the preponderance of their supervisory staff were merely foremen, most of whom were paid by the hour like the men whose work they oversaw. The distinction of being foremen was based more on race—nearly all were white—than on their nominal position in management. Even the white foremen of labor and drilling crews were paid on average only fifteen cents more per hour than the black laborers they commanded. By comparison, the most skilled operators of heavy equipment, most of them Rinehart and Dennis retainers, were salaried and might earn \$250 a month, twice a foreman's wages. In contrast to the contractor's meager and low-ranking staff, nearly all the engineers and middle-level technical personnel were employed by the New Kanawha Power Company. Most came from the North, with local men filling the lesser positions.

Apart from the hierarchy of positions occupied by employees of the two companies, other distinctions were perceived locally. The actual differences between Union Carbide's educated engineers and the hardened laborers brought in by Rinehart and Dennis made for inevitable invidious comparisons. New Kanawha's staff represented to the residents of Gauley Bridge a finer class of men, whereas the others were meanspirited, "slave-driving" southerners. It is not uncommon in the mining counties of West Virginia to find a deference to the styles of the East and Midwest in contrast to those of the South. Even today men who worked on the tunnel and were later employed at the Alloy plant universally criticize the "southern company" and often praise Union Carbide as an honorable employer.

It was, nevertheless, the southern company that drove a tunnel through three miles of solid rock under nearly impossible conditions laid down by the New Kanawha Power Company. Although Rinehart and Dennis had to complete the drilling within two years, under the terms of the contract, the work was finished in less than that time; in fact, almost the entire project was completed within the two years—by December 1931, to be exact. During maximum operations the tunnel moved forward 250 to 300 feet per week. This rate required the

most rapid drilling techniques. According to much testimony presented later in court and at congressional hearings, this precluded taking such standard safety precautions as the use of water to suppress airborne dust. Mining experts held that such measures would slow progress by one-half to two-thirds of the rate achieved. The extent to which precautions for the health of the workers were observed will be discussed in chapter 2.

It has been suggested that the haste with which the drilling was carried out was intended to finish the work and permit dispersal of the workers before the deterioration of their lungs became evident.¹⁶ This is unlikely. The rapid progress of acute silicosis—the disease progresses in months rather than years—was not widely known at the time, and another, obvious explanation presents itself. Tunnel drilling, in contrast to mining, brings no monetary return until the entire project is completed, so return on investment is diminished more by the duration of construction than by cumulative costs. Work on the plant at Alloy was delayed, and the hydroelectric power that the tunnel would make possible was not yet needed, so New Kanawha twice extended the schedule for the Rinehart and Dennis projects, from April to December 1932, and again to December 1933, without exacting penalties under the contract. By this time, however, the tunnel was essentially finished, and only skeleton crews remained on the site. Labor, unlike time, was a dispensable commodity.

There was a clear reason for the project at least to begin quickly. The trial order, issued by the state's Public Service Commission, that approved the project was to expire on 1 May 1930. Had construction not got under way before that date, the commission could have required reapplication. This time jurisdiction would have fallen under the 1929 revision of the State Water Powers Act of 1915, a far stricter law containing provisions to safeguard the public interest. It was speculated at the time that the haste to begin operations was meant to avoid closer scrutiny of the plans, public disclosure of which remained ambiguous.¹⁷

The invocation and groundbreaking took place on 30 March 1930.¹⁸ Significant tunnel excavation did not begin, however, until mid-June. Ten miles of track first had to be laid along the river from Boncar, past Glen Ferris and Gauley Bridge, to the mouth of the tunnel, Shaft 1, a mile and a half farther upstream. This track would convey heavy equipment and allow pulverized rock, or *muck*, to be carried away.¹⁹ As it turned out, it would also be used for ore trains, but that was not mentioned in any of the plans approved by the commission.

Exactly as planned, one crew bored southeastward from the opening of Shaft 1 through Gauley Mountain, at the site of the future power station. Another, starting from the opening of Shaft 4, near the dam

built at Hawk's Nest to control flow rates from the diversion of the New River, burrowed northwestward through the mountain. The distance between the two project sites was over three miles: 16,282 feet measured horizontally, with a graded drop of 162 feet. Roughly midway between them a short but wide shaft, or adit, was driven straight downward from a ravine in one slope of the mountain.²⁰ From its bottom two more shafts, numbered 2 and 3, were drilled in opposite directions to meet Shafts 1 and 4, respectively. The central shaft was later plugged and converted into a giant surge basin, 695 feet long, to accommodate tunnel overflows.

Drilling occupied only a part of each day. *Mucking*, removing the broken rock produced by the drilling, was a major operation as well. The debris was piled onto rail cars pulled by *dinkeys*, small electric or diesel-powered locomotives that ran as far as the drilling had progressed. Before that could happen, a floor of concrete had to be poured and tracks laid. This smooth surface would later discourage obstructive depositing of debris by the flowing water. Concrete was also used to line walls and ceiling in sections of the tunnel drilled through shale instead of hard sandstone. This friable rock was found in a quarter of the tunnel's length, particularly at the upstream end, in Shaft 4. Because the shale might disintegrate under the force of the water and block the tunnel, a lattice of wooden four-by-fours was first attached to walls and ceiling. Later the concrete was applied from two large gun carriages. Work on this operation moved from fifty to a hundred feet a day.

Once the crews in all tunnels except Shaft 4 were well advanced within Gauley Mountain, the New Kanawha Power Company instructed Rinehart and Dennis to undertake a series of enlargements that would increase the diameter along a third of the tunnel's length by 40 to 50 percent.²¹ The muck removed from these sections was rich in silica and was carried by rail to Boncar, where it was stored for future use in the Alloy plant. Whatever the purposes of this move, which will be discussed in chapter 2, it naturally slowed progress on the tunnel.

In spite of this delay, and the formidable proportions of the entire project, Rinehart and Dennis "holed through"—the two pairs of shafts meeting within a foot of the plan—in the extraordinarily short period of seventeen-and-a-half months. Goals were met and exceeded. Shafts 1 and 2 met on 9 August 1931, 3 and 4 on 19 September, ten weeks ahead of schedule. This included not only the excavation but much of the lining and finishing work as well, although smaller crews remained active through the spring of 1932. In view of the fact that actual drilling within the tunnels had not been started until the middle of June 1930 on Shaft 1 and the second week of October on Shaft

2—the last to be initiated—this record is all the more remarkable. It was accomplished in spite of the fact that 40 percent of the work force never entered the tunnel, but was employed aboveground on the dam, the power station, and related constructions.

The same sort of intensity that was evident in the pursuit of engineering milestones was advanced in an effort to restore the area to its preconstruction normality. Hubert Skidmore, the literary chronicler of the Hawk's Nest story, described the rapid dissolution of the small army of men who had labored in the tunnel: "A few of the trackmen were kept on and some of the stronger muckers were converted into a clean-up crew, but in Number One and Number Two, the drillers, chunkers, the dump crews, and dinky crews were paid off and sent home."²²

At least as remarkable as the speed and efficiency of the work is the performance of the entire complex today. The structural integrity of the power station, with its well-crafted fittings and high-quality mortise work, documents the engineers' and contractor's attention to detail. The dam across the New River at Hawk's Nest was intended to modify the pool without fundamentally altering water flow, submerging the banks, or creating a substantial reservoir. This intent was largely achieved, though back silted, allegedly due to failure to use the sluice gates, has changed the contour of the riverbanks. The Hawk's Nest power station first began to provide power to the plant at Alloy in January 1937. The maximum generation reported from it occurred on 21 April 1948, when 103 megawatt hours were produced. The plant can still reach a capacity of 101 to 102 megawatt hours. Only once since installation, because of the failure of a bearing nearly forty years ago, has a generator unit had to be replaced. Meanwhile, for nearly fifty years the station has been a continuous source of power at a minimal cost for maintenance and overhead.

As for the tunnel, it has been full of water during this entire period. There is a local suspicion that, if it were ever emptied, structural erosion would cause it to collapse. This prediction is unlikely ever to be confirmed.

The Hawk's Nest Tunnel is incontrovertibly a marvel of engineering prowess. Because of the low wage scales that prevailed in this region during the Great Depression, its monetary cost was ludicrously low. Within nine years after its completion—half of the predicted period—the project had more than repaid the initial investment. But its cost in human terms, social and individual, has raised painful and perplexing questions. Some, involving mainly the private use of public resources, were raised before the tunnel was begun, and have been recorded in this chapter. More urgent questions arose when the first workers began to sicken and die, even while the work of excavation proceeded. These questions were asked again and again in more than

five hundred suits brought against Rinehart and Dennis and the New Kanawha Power Company and in hearings before a congressional committee in 1936, where it was alleged that 476 men had perished from lung disease incurred from work on the tunnel. Beneath the factual inquiries into conditions of employment of a labor force by two corporations, there lay more fundamental doubts—questions of honesty, responsibility, and simple humanity. The most serious of the questions, briefly, are these: Did the New Kanawha Power Company—that is, Union Carbide—know that Gauley Mountain was composed mainly of sandstone with a very high content of silica? How well was it aware of the danger to the workers from silicosis, a disease which had long been well known? What steps, if any, did it take to protect its workers? What was its purpose in widening the tunnel, thereby increasing the hazard to the workers? How many men died as a direct result of work in the tunnel? In short, what actually happened in the disaster at Gauley Bridge?

These questions, and the tragic events that caused them to be asked, are the subject of the succeeding chapters. Few of these questions can be answered, or the events reconstructed, with complete confidence. Many essential facts are missing—forgotten, deliberately obscured, or perhaps hidden forever in a flooded tunnel. Injuries and deaths can be recorded with at least the reliability that available statistics permit. Motives and intentions are material only for speculation. They will accordingly be given lesser weight in the chapters that follow. Yet patient examination of scattered sources reveals enough remaining evidence to suggest a probable sequence of events and to justify some tentative conclusions that may replace both official versions and anecdotal accounts.

In investigating any history that involves confrontation between the strong and the weak, the rich and the poor, the articulate and the voiceless, it is especially difficult to maintain one's objectivity. It may even seem a heartless indulgence. But it is particularly essential in reviewing the events at Gauley Bridge, since recollections are split along a divide of class and power, and at hardly any points do they agree. No doubt that goal of objectivity has not been fully achieved here, but it has been attempted.