

THE REGIONAL REVIEW



Fall Creek Falls Recreational Demonstration Area, Tennessee

NATIONAL PARK SERVICE

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THE COVER

Fall Creek Falls Recreational Demonstration Area, near Pikeville, Tennessee, derives its name from the spectacular plunge made by Fall Creek to the floor of a canyon having sheer rock walls which rise 300 feet. The vertical fall is 256 feet, 89 feet higher than Niagara. Rockhouse and Caney Creek Falls are other interesting features of the 16,000-acre area. The drawing is by Ira B. Lykes.

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M. R. TILLOTSON, REGIONAL DIRECTOR

Hugh R. Awtrey, Editor

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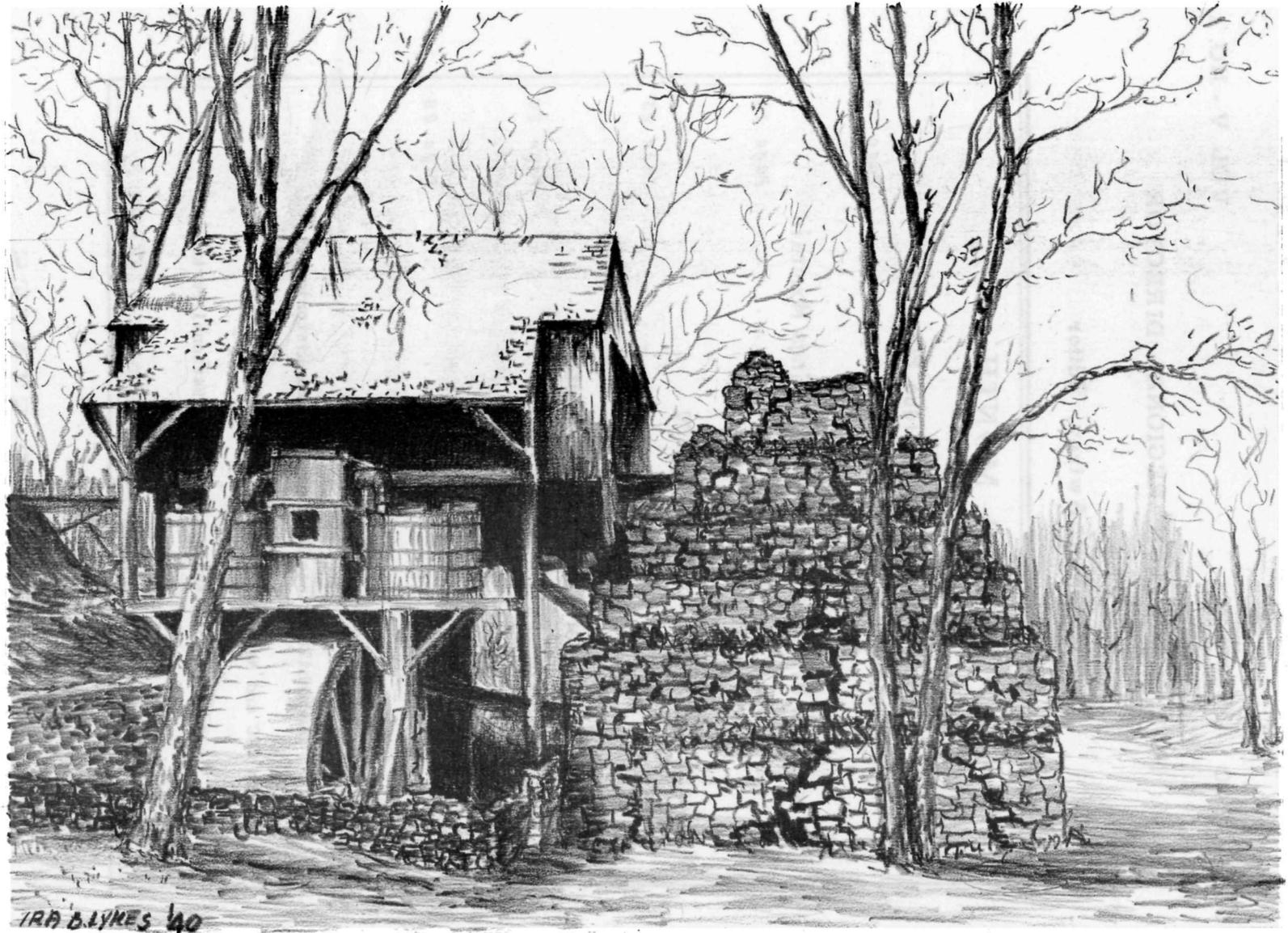
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THE UNITED STATES
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REGION ONE ~ RICHMOND, VIRGINIA



BLAST FURNACE AT HOPEWELL VILLAGE AS IT APPEARED AROUND 1920

AMERICAN CHARCOAL MAKING

In the Era of the Cold-blast Furnace

BY JACKSON KEMPER, 3RD,
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Hopewell Village National Historic Site, Pennsylvania, contains a 170-year-old cold-blast furnace which was one of the last of its type to compete with anthracite-fueled hot air furnaces. When it, with others of its kind, gave way before the new processes that were destined to contribute vitally to the development of America's great iron industry, a final chapter was written into the record of a companion technique---the making of furnace charcoal. Aware that an abandoned art eventually might become a completely lost one, the National Park Service provided a demonstration revival of the obsolescent method so that accurate textual and photographic data could be obtained for permanent record. Supervised by octogenarian Lafayette Houck, last of the Hopewell colliers, all steps of the coaling process of an earlier day were reenacted while Mr. Kemper stayed night and day at the site of operations and assembled the information which follows. Ed.

Two and a half centuries ago the Schuylkill Valley in Pennsylvania, which extends from the present coal region to the city of Philadelphia, was an untouched wilderness. The section was not only rich in metal and water power, but possessed also a great wealth of timberland which later became the first source of charcoal fuel for the great iron industry to come.

The first colonists to discover the rich valley were a group of Swedes who had settled on the Delaware River in 1638. They went up the Schuylkill by canoe and found a livelihood in trading with the Indians, fishing for shad, and cultivating the rough but fertile lands. In 1681 William Penn received his charter and grant from Charles II of England in consideration of a debt of £16,000 due to his father. With Penn came the great influx of English, Welsh, Dutch, and German settlers to what later was the Province and State of Pennsylvania.¹

Early colonial writers often mentioned rumors that there was iron ore in the Schuylkill Valley, and Penn himself encouraged the belief. It was not until 1716, however, that steps were taken to transform into pig iron the great natural resources of ore, water power, and timber. It was in that year that Thomas Rutter, who had been in business as a blacksmith near Germantown as early as 1682, moved up the river and constructed in the vicinity of what now is Pottstown the first bloomery forge of the province. The great ore beds, the thick woodlands assuring tremendous reserves of charcoal, and the bold streams promising water power soon induced many capable and hopeful men to follow Rutter's lead in the attempt to make iron. Between 1716 and 1771 more than 50 forges and furnaces are known to have been constructed in the province; and there probably were countless others.

(1) Cf. Melvin J. Weig, "Hopewell Village and the Colonial Iron Industry," *The Regional Review*, Vol. II, No. 4, April 1939, pp. 3-9.

By 1719 Rutter was convinced that his experiment at the mouth of the Manatawny could be developed into a great industry. Accordingly, with his friend Thomas Potts, and with the support of others, he began to build Colebrookdale, the first charcoal furnace in the province. It is interesting that the first charcoal furnace in England to cast hollow ware by the use of sand molds also was called Colebrookdale.

So much jealousy was excited in England by the excellent quality of the iron-ware produced in the American colonies and shipped to the mother country that in 1719 a bill was introduced in Parliament to prevent the construction of rolling and slitting mills here. The bill was rejected but the news that the colonies could produce good metal spread quickly over the Empire and aroused the enthusiasm of many enterprising young men.

William Bird, who was born in England in 1706, came to this country a year or two before 1728 and soon was recognized as a contemporary with Rutter, Potts, Samuel Savage, and Samuel McNutt in the establishment of forges and furnaces. When Rutter's will was admitted to probate in Philadelphia, November 27, 1728, Bird was a witness. He then was a resident of Amity township, a part of Philadelphia County, and at the age of 23 had attained a position of influence in his community, serving as a commissioner in the laying out of public roads. By 1733 he was working at Pine Forge as a woodchopper earning 2 shillings 8 pence a cord, and a few years later he rented a one-eighth share in the forge at £40 a year. At about that time he began to acquire property for his own enterprises west of the Schuylkill and in the vicinity of Hay Creek. He started construction of the Hopewell Forge in the fall of 1743 and was handling pig iron as early as March of the next year.

Upon the death of William Bird in 1761, forges at Birdsboro and Hopewell passed to his son, Mark Bird, who took over the management of the family business at the age of 22. Upon discovering a rich ore vein near the Hopewell forge, he built a furnace there in 1770, "or a year or two before." With the outbreak of the Revolutionary War, he answered the call of the new country and, as a lieutenant colonel in a regiment of Berks County volunteers, took command of his battalion and equipped it with his personal funds.

At the height of Mark Bird's prosperity the ironmaster believed himself immune to disaster. "Neither fire nor flood can harm me," an expression of his, was quoted for many years in the community. He was held in high esteem, and welcomed everywhere with the utmost cordiality. He was wont to create an impression when he arrived from Philadelphia in his coach drawn by four handsome horses. Yet both flood and fire visited him. His vast holdings, spread into several counties of Pennsylvania and into New Jersey and Virginia, suffered from neglect during the war, and his personal means dwindled considerably as a result of his patriotic generosity. The end came in 1788 when he was "sold out" by the sheriff to satisfy various bonds.

With the Hopewell Furnace as the center of activity, a little feudal village had gradually developed consisting of the "Big House," where the owner or manager lived, and the many tenant houses for the families of the furnace men, colliers, woodchoppers, molders, miners, teamsters, blacksmiths, wheelwrights, and others. The company store supplied every need of the village inhabitants from food to clothing, while a one-room school house gave to the younger generation the fundamentals in reading, writing, and arithmetic. A large farm and garden also were operated and

maintained by the owner of the furnace to supply the community with much of the food stuff and to provide hay enough for each family to keep a cow in an adjoining "one-cow" stable.

The lady of the Big House was looked upon as the mistress of the community. When anyone became ill or needed help in any way, she was the first person to be called in and consulted. Social activities at the Big House were festive occasions, particularly at Christmas and New Year's when the entire village took part.

Until 1837 charcoal was the only fuel which could be used successfully in the cold-blast furnace. Many attempts were made between 1815 and 1838 to use the recently discovered anthracite coal, but the experiments generally were unsatisfactory because the heat generated was insufficient to melt the ore. Then James B. Neilson of Scotland obtained a patent for the use of hot air in the blast. On February 7, 1837, George Crane was successful in smelting iron at his works at Ynyscedivin, Wales, by using Neilson's hot air blast on anthracite coal and producing 36 tons a week. In May of that year, Solomon W. Roberts of Philadelphia visited Crane's works in Wales and witnessed the satisfactory results obtained from the method. Upon his return to the United States, he made recommendations which resulted in organization of the Lehigh Crane Iron Company to manufacture pig iron with anthracite coal of the Lehigh Valley. This is believed to have been the first successful furnace of its kind in the country.

The reason that ironmasters of the 19th century wished to convert their cold-blast charcoal furnaces into hot-blast anthracite furnaces was based primarily on economic grounds. The maintenance of great wood tracts and the expense of labor for making the wood into charcoal were tremendous items. The use of anthracite coal not only obviated these factors but also brought the industry out of the wilderness, so to speak, and into the cities where product and market were in closer proximity.

It is due to this economic stage in the evolution of the great iron industry of Pennsylvania that the old art of making charcoal has been forgotten. Hopewell Furnace remained a cold-blast charcoal furnace to its final blast and was one of the last works of its kind to attempt modern competition.

With this story in mind it is the purpose here to describe the method used by colliers to produce their "coal". Lafayette Houck, the last of that grand old group of Hopewell colliers, who now is more than 80 years old, willingly consented to direct the building and firing of the pit. An old hearth near the village was selected and even a typical collier's hut was constructed on its original site where Mr. Houck and the writer lived during the coaling operation.

From the time the pit was first fired until the last piece of charcoal was hauled away by the teamster, with his large swaying wagon drawn by six sturdy mules, the pit had to be tended constantly. A master collier and one or two helpers

—PRESERVING HOPEWELL—

Hopewell Village National Historic Site, a 213-acre area near Birdsboro, Pennsylvania, was established in 1938 after the land had received federal protection during the preceding four years as a part of the 6,000-acre French Creek Recreational Demonstration Area. The site embraces the abandoned hamlet and its historic blast furnace, an 18th century structure which now is being restored with great care. Archeological and historical studies in progress will aid in planning further programs of Restoration.



LAFAYETTE HOUCK,
Hopewell's Last Collier.

"coaled" together, working as many as eight or nine pits at a time. The hearths were situated about the distance of a city block from one another throughout the various charcoal tracts, and the collier's hut was placed as conveniently as possible to the group of pits then being "coaled".

The hut was always conical in form (see opposite page), having a base about eight feet in diameter and a height of about ten feet. Three-inch poles were used for the uprights, and more slender poles filled the interstices between them. Leaves were used to cover the structure and to form a mat so that the final dressing of topsoil would not sift through the few remaining crevices. A door just large enough for one man to get through was placed on the "pit side" of the hut. A wood stove and rough log bunks were the furnishings of this temporary abode.

The hearth, or base, of the charcoal pit was simply a flat space 30 or 40 feet in diameter and free of all brush, roots, and stumps. An open level spot was chosen, and much care was taken that the surface of the hearth was hard and smooth so as to afford good shoveling and raking of the coal. If one side of the chosen location slanted down hill the opposite side was dug out enough to make the fill on the lower side absolutely level. The hearth had to be level to assure uniform burning.

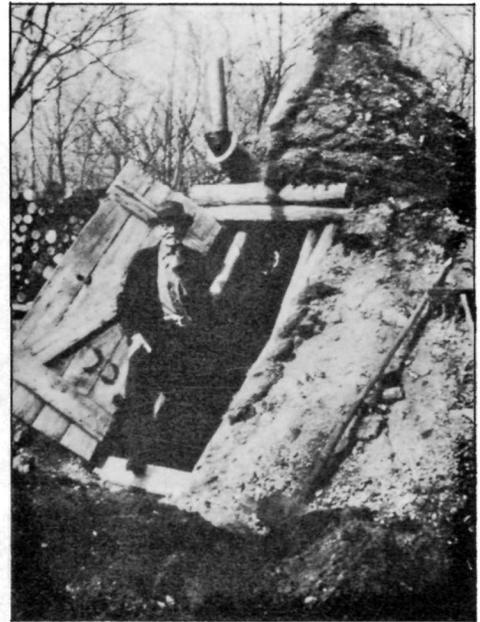
The word *pit* is misleading for it refers simply to the structure as a whole, including the hearth and the pile of wood; and in no way should it convey an impression of a hole in the ground. When a hearth once had been made, it lasted indefinitely and, in fact, improved with age and use because the charcoal dust which remained after a pit had been burned off was serviceable as a covering for the next pit burned on the same location. Because of the lack of dust on a new pit, wood often was hauled some distance in order to take advantage of an old hearth. Charcoal dust disintegrated little and afforded to plant life a rich supply of food material in the form of carbon. It therefore was necessary, when preparing an old hearth for refiring, to remove the vegetation and debris so that the old dust might be cleaned and raked back in a ring on the circumference of the hearth in readiness for the final covering of the pit.

The collier's responsibilities did not begin until the wood had been sledged in from the woodchopper's ranks to the hearth and there set on end until the entire surface was filled. This wood usually was cut during the winter months and allowed to season until the coaling operations began in late spring. Because of high winter and spring winds and other unfavorable weather conditions, the pits were fired only during the months from May until late October. Colliers often became woodchoppers during the winter in order to receive a full year's wage.

The area of woodland to be cut off for coaling was divided among the woodchop-

pers into narrow strips about 20 ax handles apart and extending the full length of the tract. The woodsmen then attempted to fell their trees so that the tops would come together along these dividing lines.

Lap-wood and *billets* are the names given to the two sizes of wood used by the colliers to "set up" their charcoal pits. The lap-wood ranged in size from an inch and one-half to four inches in diameter, while the billets varied from four to seven inches. All wood was cut in four-foot lengths. The billets were split out of the main trunks of the trees, and the branches provided most of the lap-wood. The ends of each billet and piece of lap-wood were cut purposely on a bias so that in setting the pit a rounded top or head could be formed more easily to keep the leaves and dust, which were used as a smudge blanket, from rolling off the structure.



A Typical Collier's Hut

The woodchopper "ranked" his wood as he cut, separating each cord by upright poles so that the owner, in computing the chopper's wages, could count the number of cords readily. The wages were based on the amount of wood cut, 8 shillings and 6 pence a cord being a good price in the early days.

The man who brought in the billets and lap-wood from the woodchopper's ranks to the hearth was called the "woodhauler". A mule, a horse, or even an ox was used to drag his rustic wood sled which, when loaded, would carry perhaps half a cord. The haul from the ranks to the hearth was made as short as possible and always down hill. Hearths were placed so that they were at the bottom of a rise.

The sled was fashioned crudely with wooden runners extending its entire length, which was about five feet. Rough boards surfaced the top and four upright posts kept the billets and lap-wood from rolling off. The joints of the sled were constructed loosely in order to allow plenty of "give" under the rack and strain of a heavy load being dragged over stumps, fallen logs, and rough ground.

The road leading to the pit always went right through the center of the hearth so that the hauler could unload easily and drive out at the other side on his way for another load. The hearth was filled by the hauler, not the collier. Driving his sled to the center of the hearth, the hauler, who always walked beside his mule, placed each billet and piece of lap-wood on its end, starting at the outer ring of dust and working toward the center (See page 9). The first few loads were of lap-wood only. It was laid crosswise on the top of the ring of dust in order to give a substantial support for the billets and other lap-wood to lean against. Another reason for hauling in lap-wood first and placing it on the ring was the next operation of setting the pit. Here work was begun at the center of the hearth and the pit built out to the circumference, thus leaving the small wood to "lap-off" the outside. When the hauler had filled the hearth with wood, his job was finished.

It was at this point that the collier and helpers stepped into the picture. As



Top: Preparing the hearth; middle: Hauling in the wood, and bottom: Method of placing lap-wood on the dust ring.

a woodchopper during the winter season he had worked at cutting billets and lap-wood and now, with the passing of bad weather, he was ready for a summer's job "on the hill". He first cleared his hearth of all vegetation which had grown there since the last time the tract had been coaled---possibly 30 years before---and raked out all the old dust to its edges. His next move was to locate the center of the hearth and to throw back enough of the lap-wood to enable him to get down to the surface. The *fagan*, a green pole some 18 feet long and three or four inches in diameter, was driven in at this center point so that it stood upright. A helper handed down to the collier the lap-wood that had been thrown back on the pile, and these pieces were used to construct the three-cornered chimney around the *fagan*. The chimney had an opening of about eight inches and was constructed by laying lap-wood triangularly, using each piece as a leg. In this way the chimney could be built as high as necessary.

After the chimney was about five feet high, the helper handed to the collier the billets that the latter carefully leaned against it, allowing each piece to protrude slightly at the base. When the first ring of billets had been placed, another ring was begun, the base protruding a little more each time, so that when the ring of charcoal dust finally was reached there would be enough slope to the sides of the pit to enable the final covering of leaves

and dust to rest securely without sliding off. Lap-wood was fitted in whenever pos-

sible to take up the air spaces. Each billet and piece of lap-wood were placed so that the biased cut of the chopper's ax sloped up toward the chimney. That helped to form the final rounded top and sloping sides of the finished pit.

After this first tier of billets and lap-wood, which was called the *foot*, had been set out from the chimney far enough to give the collier a footing, he climbed on it, built the chimney up another four feet or so, and then started to set the second tier of billets and lap-wood, called the *waist*. Setting the foot and waist out together, he and his assistants worked until all the billets were used up and just enough lap-wood was left to construct the *shoulders* and *head*.

Standing on the waist and again building the chimney upward another three or four feet, the collier set the remaining wood, not on end this time, but in a horizontal fashion radiating from the chimney as a center point. Building up shoulders and head in this way to the full height of the chimney, and shortening each layer of the radiating lap-wood until the top of the chimney was reached, he fashioned a rounded structure. Throughout the entire operation great care was taken to set and fit the pieces substantially together to prevent the whole from *reeling* or *twisting*. A pit hastily slapped together was certain to *reel*.

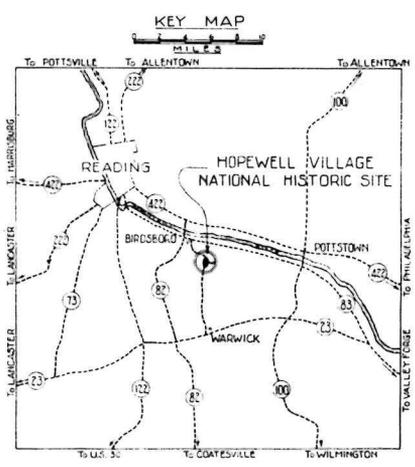
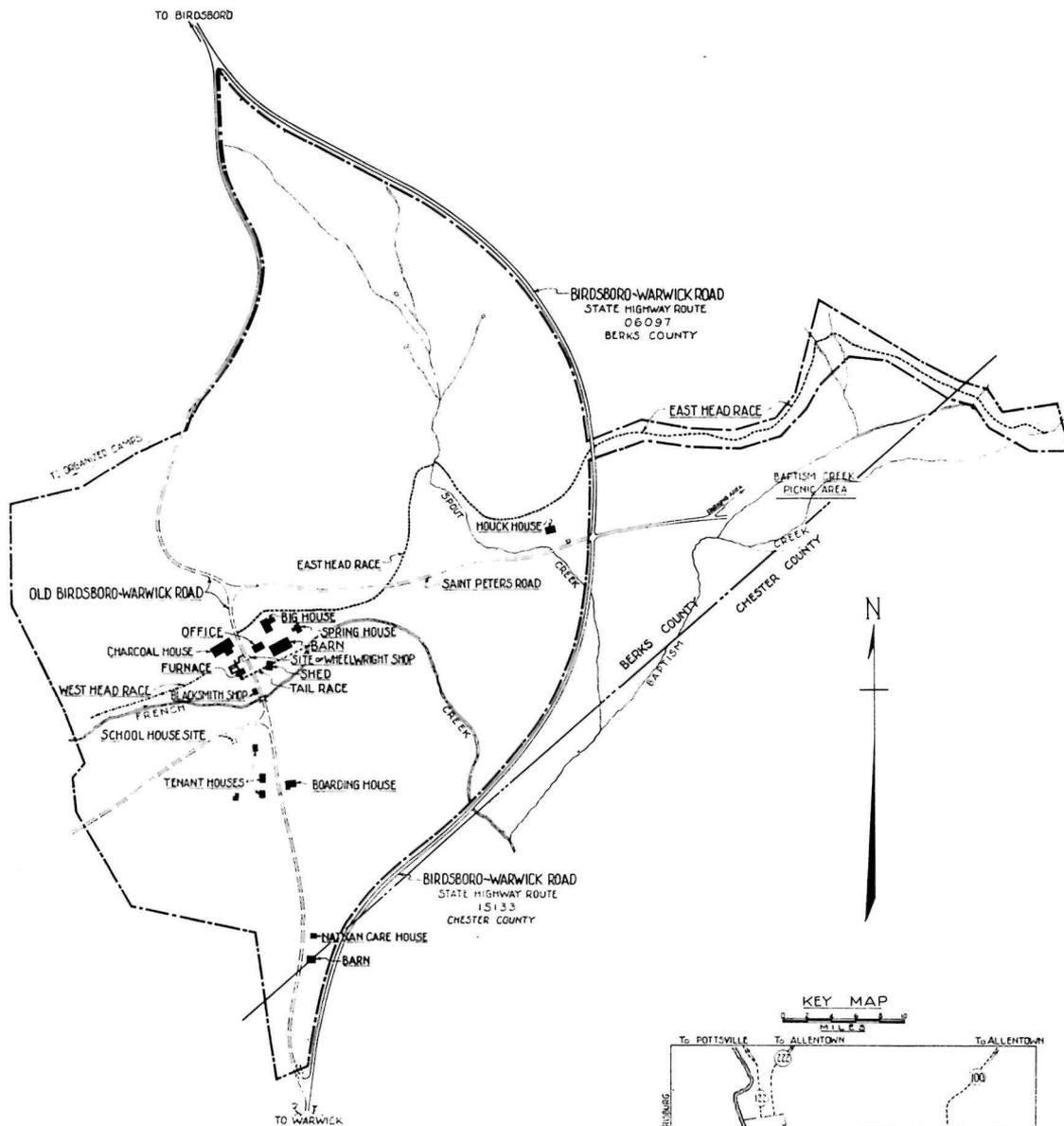
Lapping-off was the last move in completing the construction of the pit. This consisted merely in using what lap-wood was left to

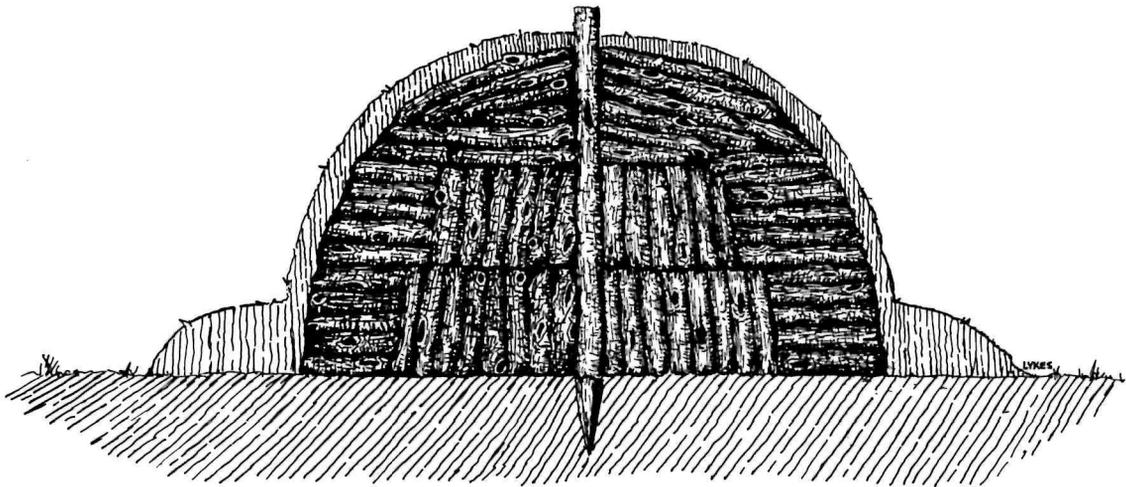


Top: Filling the hearth with lap-wood and billets; middle: Constructing the chimney, and bottom: Pit ready for covering.

construction of the pit. This consisted merely in using what lap-wood was left to

HOPEWELL VILLAGE NATIONAL HISTORIC SITE





Cross section of a completed charcoal pit, showing positions of lap-wood, billets, and outer covering of leaves and charcoal dust. The upright fagan or center pole was removed at the time of firing.

fill in all possible air spaces and cracks on the sides before the final covering of leaves and dust was spread on.

The pit now "set", the collier and his helper busied themselves in notching out a crude ladder from an eight-inch log long enough to reach from the ground to the head. Enough chips and fine kindling were cut to fill the chimney within a foot or so of the top, and a *bridgen* of three billets and several pieces of lap-wood to cover the chimney made the pit ready for "leafing and dusting".

A crude wooden rake, consisting of six or seven six-inch teeth placed about two inches apart in a small head, was used to gather up the scattered leaves on the forest floor. The job usually was done by the collier's helper who, after raking the leaves into piles, carried them to the head of the pit in the collier's basket and scattered them uniformly over the pit to a depth of several inches. These baskets were made by the collier during the dull winter months by weaving together thin strips of lath or reeds around an oval hoop. They held, when heaped over the brim, from two and one-half to three bushels of charcoal.

The long-handled collier's shovel was used to spread on the dust which had been raked to the circumference of the hearth in a ring during the early preparation of the site. A slight twist of the wrist in manipulating this tool spread the dust in a scattered spray so that all parts of the pit were covered evenly. Several inches of dust were required for the sides and at least a foot on the head and shoulders.

The pit was then ready for firing. This was done by carefully moving back enough of the dust and leaves from the bridgen, and two of the bridgen billets themselves, to allow a shovelful or so of red-hot coals from the collier's cooking fire to be placed on top of the kindling in the chimney. Care was taken that no dust or leaves fell back into the chimney when the bridgen and covering were replaced.

The lighting of the pit usually was done toward evening in order that the collier might have at least one more good night's sleep before the constant watching

began; for it was not likely that the pit would "burn through" or need "dressing" until the following afternoon. Before turning in that first night, the collier made certain there was ample dust on the head. This dust usually was carried to the top of the pit by the collier's helper and raked around at least one foot deep. It was considered necessary to have one bushel of head dust for every cord of wood in the pit.

Charcoal pits varied greatly in size, depending for the most part on the dimensions of the hearth and the amount of wood to be coaled. The average hearth in the Hopewell vicinity, however, was from 30 to 40 feet in diameter and would hold 25 to 50 cords. Any kind of wood may be used to make charcoal so long as it is "solid," but it generally was held that "the harder the wood, the better the coal." It was the practice in the region to cut clean, using everything except the dead wood, and in 30 years' time the tract could be coaled again. No ironmaster ever conceded that he had enough coal land.

If a charcoal pit was not watched and tended constantly, fire broke through the covering of leaves and dust and might destroy the entire pile. A burning flame was the dread of colliers, for coal could be made only by the charring action of a "dead fire". "Jumping the pit" was a dangerous job. The collier, holding his long-handled shovel in a horizontal position, mounted his crude ladder to the top of the pit and stepped gingerly around the head and bridgen to learn whether there were any soft spots or *mulls*. Finding these, he jumped up and down on the more substantial parts of the surface, working his way carefully toward the mulls. Air spaces in the pit caused by shrinkage of the charring wood thus were closed in part. Soft spots then were dressed by digging them out a little and placing new wood, leaves, and dust in the resulting cavities to preserve the original shape of the pit. The pit was tended in this manner every evening in order to prevent, if possible, its burning through during the night.

The phrase *give 'er fire* should be distinguished from *firing the pit*. The latter referred to the operation of lighting the original fire, the former to the task of providing draft vents to increase the fire within the pit. The burning was governed by means of holes made in the foot on the side where more heat was desired. In order to learn the location of the fire, and to see whether it had reached the surface of the hearth the collier used the fagan as a poker, the bridgen first being removed carefully to prevent leaves or dust from falling into the chimney.

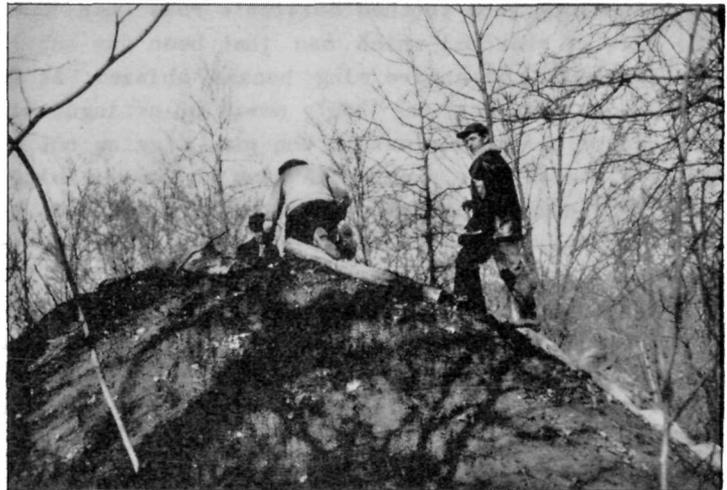
Since the pit was lighted from the top, the fire had to char downward. Ramming the fagan down through the loose coal at the head, the collier eventually struck a hard surface, either uncharred billets which the fire had not reached or the surface of the hearth. As it was a part of the collier's training to recognize the various surfaces struck by the fagan, he could calculate readily the direction in which the charring was proceeding and thereby provide the proper drafts or foot holes which were needed to effect uniform charring on all sides of the pit. When the surface of the hearth was not absolutely level the lower side always "came to foot" first. In the early stages of the burning, holes were placed about two feet up from the foot. Later, as the pit came nearer "to foot" the holes were made lower.

When the pit was burning evenly and well, a characteristic blue smoke puffed from the vents at lazy intervals, giving off a pitch tar odor which the colliers

considered to be the cause for their tremendous appetites. White smoke was an indication of a poorly charring pit and usually resulted from rapid burning due to too much draft or to the use of old dry wood. Heavy winds caused the pit to burn unevenly, and rains often made it become too hot. When a pit crackled and sputtered it was a certain indication that dry chestnut wood was being employed.

The number of days required for a pit to "burn off" varied greatly with the size of the hearth and the kind of wood. For the average hearth, which held 30 cords or so of partly seasoned wood, it normally took from 10 days to two weeks for the pit to come to foot, that is, for all the billets to char. After it had come to foot and before any of the coal was removed, it was necessary to have the dust dry enough to run off the sides like sand. Accordingly, more foot holes were made so that the pit would heat up, char the leaves, and dry the dust.

Once the pit had charred down to the foot, it might be assumed that the fire was out and that the process of raking out the coal would be simple. Charcoal carries fire for a long time, however, and the raking was a tedious and painstaking task because only small amounts could be removed at a time. The collier chose a side of the pit where the dust was driest and with his shovel dug out a portion, starting at the foot. This opening acted as a draft hole and soon there were signs of fire. At that point he stopped his digging and threw back enough of the dry dust to reseal the pit and allow it to cool.



Top: Firing the pit; middle: Jumping the pit, and bottom: Raking off the head.

This opening acted as a draft hole and soon there were signs of fire. At that point he stopped his digging and threw back enough of the dry dust to reseal the pit and allow it to cool.

The long iron-toothed collier's rake then was used to draw back into the ring the pile of charcoal which had just been dug out. A few sparks often remained in the coal and the entire ring became ablaze. As the hearths were usually far from water, dry dust was the only means of extinguishing the fires. When the collier and his helper worked around the pit, digging out a little coal here and there, each portion was kept in a separate ring so that a single fire might not destroy the total. The collier always refused to ring out more coal on his hearth than would fill the charcoal wagon because of the extra attention required to attend it. On the day when the wagon was to come for the first load the collier and his men were up and ready to start work at dawn. They spent several hours in ringing out the coal and the remainder of the morning in seeing to it that no fire remained in it.

The same collier's baskets which were used to carry leaves to the head of the pit were employed to fill the wagon with charcoal. The teamster carried the basket on his head after the collier had raked it full and helped him to swing it into position. Charcoal wagons varied in size but those generally in use at Hopewell held 100 to 300 bushels of coal. All were drawn by six-mule teams and equipped with high side boards and a bottom that would pull out. When the teamster reached the charcoal house he unhooked his lead team from the "spreaders" and fastened their whiffletree to a coupling connected to the sliding floor of the wagon. In that way the load was dumped without effort to the teamster or damage to the brittle charcoal.

FROM THE COLLIER'S LEXICON

Brands: Partly charred billets which remain after the pit has been coaled.

Butt: The final remains of a burned-off pit.

Coaling Out: Act of digging and raking charcoal from the pit.

Foxing the Brands: Recoaling the partly burned billets after the charcoal has been hauled away.

Dressing the Pit: Refilling a mull, where the fire had burned through, with new wood, leaves, and dust so that the exterior of the pit was restored to its original shape.

Head: The uppermost layer of lap-wood forming the rounded top of the pit.

Head Dust: Old charcoal dust placed on top of the pit to form a smudge blanket.

Lapping Off: Placing lap-wood on the outer surface to make the pit as tight as possible.

Piece: The pit after some of the coal has been removed.

Pit Will Blow: Gases generated by the charring wood often cause the top of the pit to blow off.

Shoulder: That part of the pit where the second tier of billets meets the top layer of lap-wood.

Waist: The portion of the pit where the first tier of billets meets the second tier.

THE AMERICAN RIFLE

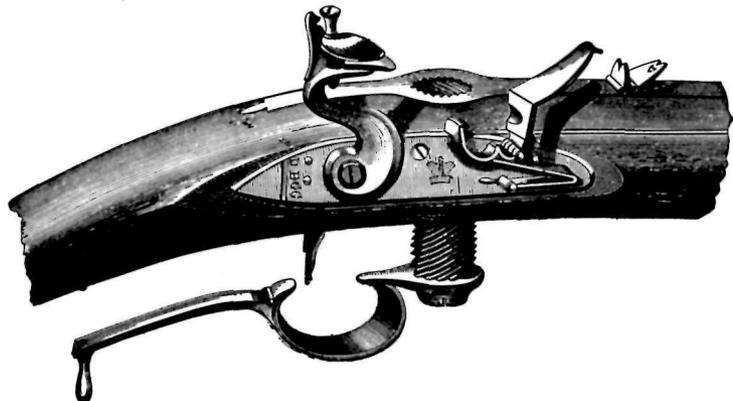
At the Battle of Kings Mountain

BY C. P. RUSSELL,
SUPERVISOR OF RESEARCH AND INFORMATION,
WASHINGTON

Progress made on the new museum at Kings Mountain National Military Park, South Carolina, is worthy of record, and the fact that the Service possesses a Ferguson rifle to put into that museum constitutes special note within the record. To the average park visitor "Ferguson rifle" means little or nothing, but to the student of military history mention of that British weapon kindles a flame of interest. The story of how the Ferguson rifle was pitted against the Kentucky rifle at Kings Mountain is significant in this day of rearmament.

Major Patrick Ferguson was born in 1744, the son of a Scottish jurist, James Ferguson of Pitfour. At an early age he became an officer in the Royal North British Dragoons, and by the time the American colonists revolted against British rule he had distinguished himself in service with the Scotch Militia and as an expeditionist during the Carib insurrection in the West Indies. In 1776 he demonstrated to British government officials a weapon of his own invention, "a rifle gun on a new construction which astonished all beholders."

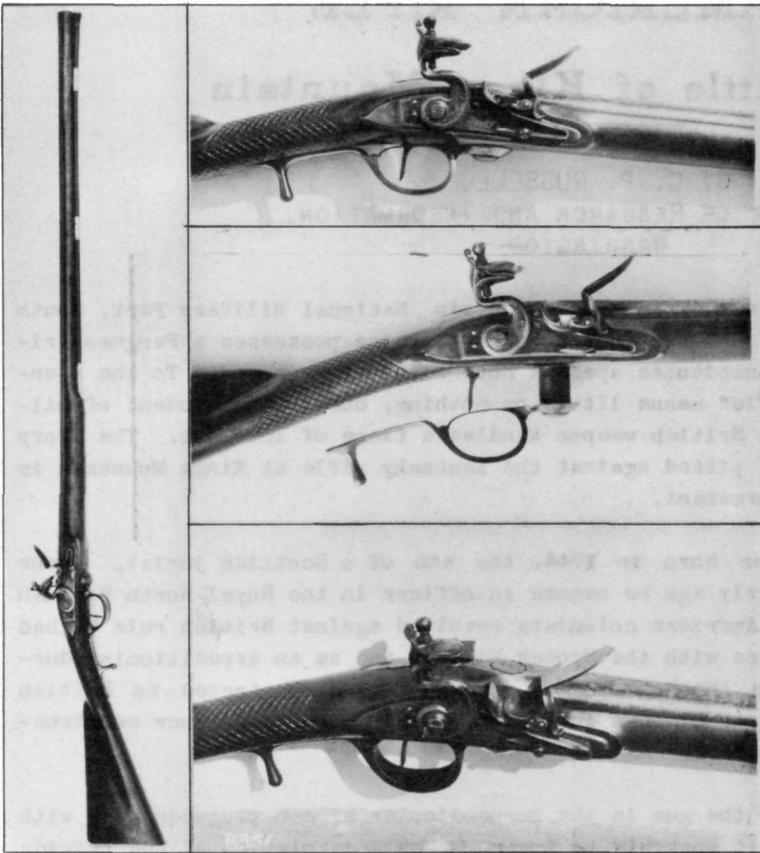
The remarkable feature of the gun is its perpendicular breech plug equipped with a screw device so as to make it possible to lower it by a revolution of the trigger guard which serves as a handle. When the breech plug is lowered, an opening is left in the top of the barrel at the breech. A spherical bullet dropped into this opening with the muzzle of the gun held downward rolls forward through the chamber where it is stopped by the lands of the rifling. A charge of powder then poured into the opening fills the chamber behind the bullet, whereupon one revolution of the trigger guard closes the breech and the weapon is ready for priming and firing. Major Ferguson demonstrated that four aimed shots per minute could be fired with an accuracy creditable to any rifle, and that the loading could be done while the marksman was running or reclining. A patent was granted for the invention on December 2, 1776, and the weapon became the first breech-loader used by organized troops of any country.



On September 11, 1777,

Revolving trigger guard of Ferguson rifle¹

¹W. S. Greener, *The Gun and Its Development; With Notes on Shooting* (Cassell, Petter, Galpin & Co., London, Paris and New York [1881]), p. 89.



Only a few of the original Ferguson rifles are extant. One of them is at Colonial National Historical Park, Yorktown, Virginia, where the above photographs were made. At the left is the profile of the piece with an 18-inch ruler to show scale. The picture at the right top displays lock and breech mechanism, with screw breech closed. In the middle the screw breech is open, and at the bottom is seen the head of the same device in closed position.

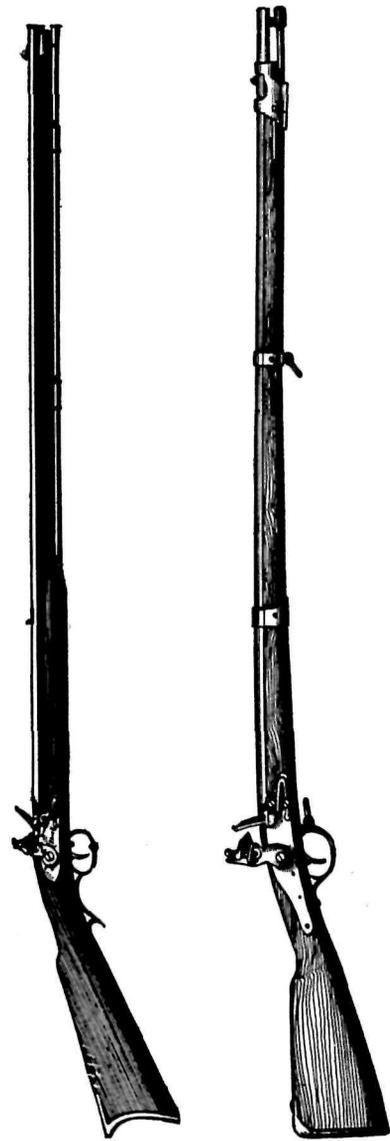
Major Ferguson commanded the small unit of picked riflemen of the British army who covered the advance of Knyphauser and his German mercenaries at Brandywine. An American who knew nothing of breech-loading rifles, but who was possessed of the old dependable Kentucky rifle, put a bullet into Ferguson's right arm, shattering the elbow. The major's arm was useless thereafter and while he was recuperating Sir William Howe jealously took advantage of his disability, disbanded Ferguson's riflemen, and put into storage the superior rifles which they had carried. This did not terminate the service of Ferguson, nor did it relegate his rifle to the discard. His command was restored and he again took the field with his handful of riflemen. At Stony Point, New York, and Little Egg Harbor, New Jersey, he came out on top in the fighting with American privateers and the famous Pulaski Legion. Had Great Britain manufactured more of the Ferguson rifles, perhaps he would have gained further victories.

Sir Henry Clinton's expedition of 1779 against Charleston, South Carolina, found Ferguson and a comparatively few of his rifles active in the depredations of several thousand Tories organized to terrorize the rebellious colonists of the Carolinas. They invaded the interior and operated on the very western border of the Carolinas. For five months he held sway over the upcountry, enticing or intimidating the young men of the region to enlist under the British flag. The local militia so formed in the wild back country were drilled by him in the ways of the British army, and all other inhabitants, so far as possible, were pledged to faithful Royal service. The patriots of the interior settlements lay helpless. Any Carolinian found in arms against the King might be---and many were---hanged for treason. Finally, a British proclamation was issued requiring all inhabitants to take active part on the royalist side, which but served to bring about a notable uprising of the Whigs who, throughout the summer of 1780, engaged in fierce guerrilla warfare against the organized Tories.

Not only did the sparsely populated settlements on the head waters of the Catawba, Broad, and Pacolet Rivers contribute to the force that opposed Ferguson, but the over-mountain settlements on the Watauga and Holston likewise sent their backwoodsmen, all of whom were well experienced in Indian warfare. The routes followed by these parties on their way to the Kings Mountain rendezvous cross the present Blue Ridge National Parkway in a number of places.

The unmerciful treatment of Buford's patriots at the hands of Tarleton had engendered savage fury on the part of the Whigs which was as bitterly reciprocated by the Tories. Utter refusal of quarter was usual in many battles. In the Carolinas, hand-to-hand encounters were common, and the contest became a war of ruthless extermination. General Greene, writing of this condition, said: "The animosity between the Whigs and Tories renders their situation truly deplorable. . . . The Whigs seem determined to extirpate the Tories, and the Tories the Whigs. . . . If a stop can not be put to these massacres, the country will be depopulated in a few months more, as neither Whig nor Tory can live."

In September, 1780, while this spirit of hatred was at its height, the regiments of backwoods patriots, who were to go down in history as "Kings Mountain Men," rendezvoused at South Mountain north of Gilbert Town and determined to set upon Ferguson and his command, then believed to be in Gilbert Town. The followers of the Whig border leaders, Campbell, Shelby, Sevier, Cleveland, Lacey, Williams, McDowell, Hambricht, Hawthorn, Brandon, Chronicle, and Hammond, descended upon Gilbert Town on October 4 only to find that the Tories, apprised of the planned attack, had evacuated that place; Ferguson was in full retreat in an attempt to evade an engagement. His goal was Charlotte and the safety of the British forces there stationed under Cornwallis. On October 6, Ferguson was attracted from his line of march to the commanding eminence, Kings Mountain, known at that time by the famous name that we apply today. His 1,100 loyalists went into camp on these heights, and Ferguson declared that "he was on Kings Mountain, that he was King of that mountain, and God Almighty could not drive him from it." He took none of the ordinary military precautions of forming breastworks, but merely placed his baggage wagons along the northeastern part of the mountain to give some slight appearance of protection in the neighborhood of his headquarters.



Left: A Kentucky rifle of the Revolutionary period; right; a Jäger rifle

The united backwoodsmen, led by Campbell, had pursued the fleeing Tories from



PERSPECTIVE OF ADMINISTRATION-MUSEUM BUILDING, KINGS MOUNTAIN NATIONAL MILITARY PARK, SOUTH CAROLINA

Gilbert Town. Spies sent forward obtained accurate information on the numbers and intentions of the Tories. It became evident to the Whig leaders that, if they were to overtake their quarry before reinforcements sent by Cornwallis might join them, a more speedy pursuit would be necessary. Accordingly, on the night of October 5, the best men, horses, and equipment were selected for a forced march. About 900 picked horsemen, all well armed with the Kentucky rifle, traveled by way of Cowpens, South Carolina, marching throughout the rainy night of October 6, crossed the swollen Broad River at Cherokee Ford, and on the afternoon of October 7 came upon the loyalists on their supposed stronghold.

The story of the battle which ensued is one of the thrilling chapters in our history. The Whigs surrounded the mountain and, in spite of a few bayonet charges made by the Tories, pressed up the slopes and poured into the loyalist lines such deadly fire from the long rifles that in less than an hour 225 had been killed, 163 wounded, and 716 made prisoners. Major Ferguson fell with eight bullets in his body. The Whigs lost 28 killed and 62 wounded.

Probably no other battle in the Revolution was so picturesque or so furiously fought as that at Kings Mountain. The very mountain thundered. Not a regular soldier was in the American ranks. Every man there was actuated by a spirit of democracy. They fought under leaders of their own choosing for the right to live in a land governed by men of their own choice.

Soon after the battle a simple stone was placed to mark the grave where Ferguson and his men were buried. The inscription reads: "Colonel Ferguson, an officer belonging to his Britannic Majesty, was here defeated and killed."

With the death of Ferguson the rifles of his invention, with which probably 150 of his men were armed, disappeared. Some were broken in the fight and others were carried off by the victors. One given by Ferguson to his companion, De Peyster, is today an heirloom in the family of the latter's descendants in New York City. It was exhibited by the United States government at the Worlds Fair at Chicago in 1893. A very few are to be found in museum collections in this country and in England. The one possessed by the National Park Service was obtained from a dealer in England through the vigilance of B. Floyd Flickinger, formerly superintendent of Colonial National Historical Park, Virginia.

On Kings Mountain there soon will be a museum in which can be told the story of the Revolutionary backwoodsman and his place in the scheme of Americanism. In that museum will be presented the story of the cultural, social, and economic background of the Kings Mountain patriots, as well as the details of the battle and its effect on the Revolution as a whole. Here lies the rare opportunity to preserve for all time significant relics of Colonial and Revolutionary days and at the same time interpret for a multitude of visitors the basic elements in the story of the old frontier---a story which affected most of the nation during the century that followed the Revolution.

Our interest here will turn to those intriguing reminders of how our Colonial ancestors lived---their houses, their tools and implements, their furniture, their books, and their guns. Because of the significance of the American rifle in the battle of Kings Mountain, it must be a feature of any Kings Mountain exhibit. In the Carolinas it was as much a part of each patriot as was his good right arm.

Light in weight, graceful in line, economical in consumption of powder and lead, fatally precise, and distinctly American, it was for 100 years the great arbitrator that settled all differences throughout the American wilderness. George Washington, while a surveyor in the back country, as scout and diplomat on his march into the Ohio country, and while with his Virginians on Braddock's fatal expedition, had formed the acquaintance of the hunters, Indian fighters, and pioneers of the Alleghenies---riflemen all. These men were drawn upon in 1775 to form the first units of the United States Army, ten companies of "expert riflemen." The British, in an attempt to compete with American accuracy of fire, cried for Jäger, German huntsmen armed with rifles, and begged that they might be included in the contingents of German troops.

From the numerous written comments on the American rifle and riflemen made by British leaders, it would be possible to quote at length regarding the effect of American rifle fire upon British morale and casualty lists. We may call attention again to the statistics on the Kings Mountain dead: British, 225; American, 28. Draper records that 20 dead Tories were found behind certain protruding rocks on the crest of the hill, and that each victim was marked by a bullet hole in his forehead. Colonel George Hanger, British officer with Tarleton in South Carolina, provides the following observation on the precision of American rifle fire:

I never in my life saw better rifles (or men who shot better) than those made in America: they are chiefly made in Lancaster, and two or three neighboring towns in that vicinity, in Pennsylvania. The barrels weigh about six pounds two or three ounces, and carry a ball no larger than thirty-six to the pound; at least I never saw one of a larger caliber, and I have seen many hundreds and hundreds. I am not going to relate any thing respecting the American war; but to mention one instance, as a proof of most excellent skill of an American rifleman. If any man shew me an instance of better shooting, I will stand corrected.

Colonel, now General Tartleton, and myself, were standing a few yards out of a wood, observing the situation of a part of the enemy which we intended to attack. There was a rivulet in the enemy's front, and a mill on it, to which we stood directly with our horses' heads fronting, observing their motions. It was an absolute plain field between us and the mill; not so much as a single bush on it. Our orderly-bugle stood behind us, about three yards, but with his horse's side to our horses' tails. A rifle-man passed over the mill-dam, evidently observing two officers, and laid himself down on his belly; for, in such positions, they always lie, to take a good shot at a long distance. He took a deliberate and cool shot at my friend, at me, and the bugle-horn man. (I have passed several times over this ground, and ever observed it with the greatest attention; and I can positively assert that the distance he fired from, at us, was full four hundred yards). Now, observe how well this fellow shot. It was in the month of August, and not a breath of wind was stirring. Colonel Tartleton's horse and mine, I am certain, were not anything like two feet apart; for we were in close consultation, how we should attack with our troops, which laid 300 yards in the wood, and could not be perceived by the enemy. A rifle-ball passed between him and me; looking directly to the mill, I observed the flash of the powder. I said to my friend, "I think we had better move, or we shall have two or three of these gentlemen, shortly, amusing themselves at our expence." The words were hardly out of my mouth, when the bugle horn man, behind us, and directly central, jumped off his horse, and said, "Sir, my horse is shot." The horse staggered, fell down,

and died. He was shot directly behind the fore-leg, near to the heart, at least where the great blood-vessels lie, which lead to the heart. He took the saddle and bridle off, went into the wood, and got another horse. We had a number of spare horses, led by negro lads.

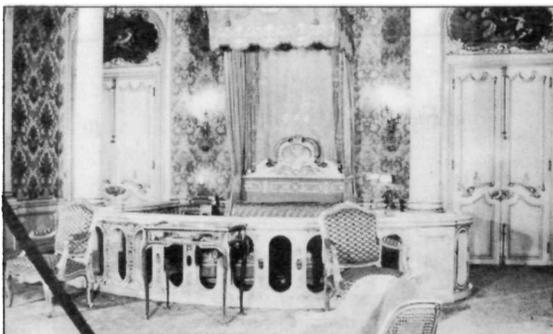
The rifle had been introduced into America about 1700 when there was considerable immigration into Pennsylvania from Switzerland and Austria, the only part of the world at that time where it was in use. It was then short, heavy, clumsy, and little more accurate than the musket. From this arm the American gunsmiths evolved the long, slender, small-bore gun (about 36 balls to the pound) which by 1750 had reached the same state of development that characterized it at the time of the Revolution. The German Jäger rifle brought to America during the Revolution was by no means the equal of the American piece. It was short-barreled and took a ball of 19 to the pound. With its large ball and small powder charge its recoil was heavy and its accurate range but little greater than that of the smoothbore musket. It was the same gun that had been introduced into America in 1700.

The standard military firearm of the Revolutionary period was the flintlock musket weighing about 11 pounds. Its caliber was 11 gauge, that is, it would take a lead ball of 11 to the pound. at 100 yards a good marksman might make 40 per cent of hits on a target the size of a man standing. The musket ball, fitting loosely in the barrel, could be loaded quickly. The fact that the military musket always was equipped with a bayonet made it the dependable weapon for all close fighting. As was so convincingly shown on the occasions of the futile bayonet charges of Ferguson's regulars on Kings Mountain, however, the bayonet was not effective if enemy lines did not stand to take the punishment of hand-to-hand fighting.

Each Whig on Kings Mountain had been told to act as his own captain, to yield as he found it necessary, and to take every advantage that was presented. In short, the patriots followed the Indian mode of attack, using the splendid cover that the timber about the mountain afforded, and selecting a definite human target for every ball fired. Splendid leadership and command were exercised by the Whig officers to make for concerted action every time a crisis arose. This coordination, plus the Kentucky rifle and the "individual power of woodcraft, markmanship, and sportsmanship" of each participant in the American forces, overcame all the military training and discipline which had been injected into his Tory troops by Ferguson.



Vanderbilt Mansion Becomes National Historic Site



"A magnificent example of the type of great estate built by captains of industry in the era of expansion that succeeded the War Between the States; representative of an important phase of the economic, sociological, and cultural history of the United States."

That is the description applied by the Advisory Board on National Parks, Historic Sites, Buildings, and Monuments to the 42-year-old Vanderbilt Mansion, near Hyde Park in Dutchess County, New York, which was designated this month as a national historic site and opened to the public as a unit of the National Park System. Once the home of the late Frederick W. Vanderbilt, the palatial residence, with dependent buildings and some 300 acres containing fine trees more than two centuries old, was given to the nation by Mrs. Margaret Louise VanAlen, a niece, as a memorial to her uncle.

The handsome mansion, designed and built in 1898 by McKim, Meade and White in Italian Renaissance style, is of fire-resistant reinforced concrete construction, and contains 17 rooms, 12 baths, and accommodations for 14 servants. Of prime importance are its superlative interiors, such as the Louis XV salon, the dining room, and other rooms containing mantels, which are masterpieces of Italian art, Venetian chairs, Medici tapestries, prized rugs, and many other valuable objects worthy of national custodianship. Dependencies include a large carriage house, two gatehouses of six to eight rooms each, an extensive greenhouse, a pavilion, and a boathouse and dock on the Hudson River. Title to the newest national historic site dates to the grant to Peter Fauconier, secretary to Lord Clarendon, royal governor of New York from 1702 to 1708.

Top, front of mansion; second, Louis XV salon; third, dining room, and fourth, Mrs. Vanderbilt's bedroom.

Mrs. Dexter Cooper has entered on duty at the site as the first woman superintendent in the history of the Service.

A SUCCESS IN NATURE LEADER TRAINING

Virginia Institute, First in South, Graduates 21

BY REYNOLD E. CARLSON,
DIRECTOR OF THE VIRGINIA NATURAL HISTORY INSTITUTE,
NATURE SPECIALIST,
NATIONAL RECREATION ASSOCIATION.

At about 9:30 o'clock on the evening of July 19, William A. Bryson, 39, Supervisor of Recreation for the city of Richmond, Virginia, rose from a rude, backless bench, walked into the bright circle of light cast by a campfire, and stretched out his hand for a rectangle of paper measuring 9½ by 12 inches. Through the ancient process of alphabetic selection he had become the first alumnus of the Virginia Natural History Institute. By similar destiny Lancaster D. Burling, 58, of Raleigh, North Carolina, formerly geologist for the Dominion of Canada, became graduate No. 2. Nineteen fellow students then received like paper certificates testifying to their completion of a four-week course of study.

The Institute was a pioneer. It offered the first training course for nature leaders that had ever been organized in the South.¹ It originated out of the need of

¹ Cf. Reynold E. Carlson, "Virginia Natural History Institute," *The Regional Review*, Vol. IV, Nos. 4-5, April-May 1940, pp. 25-27. Ed.



VIRGINIA NATURAL HISTORY INSTITUTE

This Certifies, that Edith Setton has successfully
completed the course in *Nature Interpretation and Field Natural History*

Date June 24 - July 20, 1940

SWIFT CREEK RECREATIONAL DEMONSTRATION AREA


President


Director

parks, recreation departments, camps, and schools for leaders who have field experience and can interpret the natural world from the recreational point of view.

The course was sponsored by four cooperating agencies: the National Park Service, the National Recreation Association, the Virginia State Conservation Commission, and the Richmond Professional Institute of the College of William and Mary. University credits were granted by the College of William and Mary to students satisfactorily completing requirements. Facilities of one of the organized camping units at Swift Creek Recreational Demonstration Area, eighteen miles southwest of Richmond, were made available to the students, Cabins, dining hall, lodge, nature museum, and craft shop provided ample accommodations for the varied activities of the program.

In its first session, the Institute selected 21 students from nine different states and the District of Columbia. Seven came from North Carolina, five from Virginia, two from the District of Columbia, and one each from Alabama, Arkansas, Georgia, Indiana, Mississippi, New York, and Pennsylvania. Included in the roster were Service employees, supervisors in city parks and recreation departments, teachers, and college students. They entered into the camp program with almost a missionary zeal, and followed it with that enthusiasm which is the greatest reward of the leader and instructor.

Although their backgrounds varied greatly, all the students were actuated by the



Institute students take field trips. Above: geology. Below: wildlife

same serious purpose: to obtain training in natural history, in technique of presentation, and in leadership of activities related to the nature field. Some of the students already were employed in situations in which materials from the school could be applied directly.

With a discussion of the interpretative program of the National Park Service and of the basis for the development of such programs in other park areas, Dr. Carl P. Russel, the Service's Supervisor of Research and Information, opened the course on June 23. The remaining 21 members of the faculty of the Institute were representatives of the Service staff in the Washington and Richmond offices, and of the Fish and Wildlife Service of the Department of the Interior, the National Recreation Association, the

University of Richmond, the Virginia Commission of Game and Inland Fisheries, and other agencies. A typical day in camp consisted in a morning field trip, a mid-day swim, an afternoon classroom lecture followed by a two-hour period for work on individual projects in the craft shop, library, or museum, and an evening campfire conducted by the students, frequently with visiting speakers.²



Forenoon field trips were taken to various parts of the park for the study of the natural history of the Swift Creek area, for the collection of specimens, and for the demonstration of techniques of presentation to various groups. Saturdays were occupied with full-day trips, the first being to historic Jamestown, Yorktown, and Williamsburg; the second, a visit to the University of Richmond and a tour of historic places in Richmond; and the third, a boat trip in the Dismal Swamp.

Practice in leadership was provided when Institute students acted as nature leaders for children and adults visiting Swift Creek. Campfires, held about four times a week, were planned by the students, each of whom was given several opportunities to participate in the organization of the evening programs.

During the course a simple museum of local nature materials was developed, affording practice in the preparation of specimens and the interpretation of physical materials. Work in crafts allied to nature---plaster casting of leaves and footprints and construction of displays of animal, plant, and mineral specimens, and the like---was possible in the craft shop. A camp library, with books supplied by students, instructors, the Richmond Public Library, and the Service, made available fairly adequate reference material.

Much emphasis was placed on park developments in relationship to recreational needs, the necessity for "human conservation" being recognized as going hand in hand with the necessity for the conservation of natural resources. The program was not



At top: a pause during a wildlife field trip. Bottom: examining the tracks of a wild turkey.

²An excellent cross-section record of the routine of the Institute is available in the 700-foot natural color motion picture, *A Day at a Nature Leaders' Camp*, which was filmed by Ira B. Lykes of the Region One Office, National Park Service.

only one of teaching facts, but also one of interpreting the physical world in such a manner as to lead to its greater enjoyment. The instructors attempted therefore to acquaint the students with the technique of presenting natural history and with activities which might be practiced later in public contacts.

Since the four-week session was filled with a wide variety of strenuous activities, it appeared that one month was all too short a time for the accomplishment of all that was desired. It is hoped that a future session may be lengthened to at least six weeks.

ROSTER OF GRADUATES

William A. Bryson,	Richmond, Va.	Lois Klinefelter,	Norfolk, Va.
Lancaster D. Burling,	Raleigh, N. C.	Lyle K. Lynch,	Canton, Miss.
Jack P. Cessna,	Gettysburg, Pa.	Arthur Lucas,	Durham, N. C.
Donald F. Charlton,	Hollis, N. Y.	Dorothy C. Miller,	Indianapolis, Ind.
Herndon Dowling,	Tuscaloosa, Ala.	John T. Mullady,	Washington, D. C.
Daniel Goldman,	Washington, D. C.	Avis Oliver,	Petersburg, Va.
Charles M. Graves,	Atlanta, Ga.	Dalton M. Parker,	Greensboro, N. C.
Cary J. Hansel,	Marion, N. C.	Charles E. Prusack,	Salina, Pa.
Arthur H. Jones,	Charlotte, N. C.	Edith Settan,	Greensboro, N. C.
Vernon Jones,	Richmond, Va.	Earl Southall,	Petersburg, Va.
	Margaret Y. Wall,	Forest City,	N. C.

A STUDENT'S VIEW

Participant in First Institute Explains 'Why We Were There'

BY EDITH SETTAN,
Greensboro, North Carolina

We were a band gathered in a little colony at one of the organized camping sites at Swift Creek Recreational Demonstration Area, Virginia. On our arrival, Sunday, June 23, we were total strangers from nine different states and the District of Columbia. At first sight we seemed to be a heterogeneous group; certainly we were all ages, from college students to mature men and women; and it took only a few minutes of conversation to discover that our walks in life were as diversified as our ages. There were park rangers and college professors, elementary school teachers and recreational leaders. There was a National Park Service research and planning supervisor and there was a district representative of the National Recreation Association. There were graduate students and undergraduates. There were high school teachers and scout leaders.

"What is the tie that binds?" I thought, as I looked around on that first night. "What is the call that has drawn to a focal point representatives from so many different groups?" It appeared strange to me that people of such varied types should have gathered here on the same spot, at the same time, each evidently expecting to derive benefits from the same source. *Why We Are Here* appealed to me as a caption worthy of elaboration. Accordingly, I decided to interview each member of the group with that in mind.



That there was a tie that bound, a strong one, was demonstrated immediately. Within 24 hours we had adjusted ourselves so perfectly to each other and to our environment that it seemed we had always belonged there. Nature had lost no time in making us her own. We were in the heart of the woods rejoicing in our carefree existence and missing not a bit the inconveniences and intricacies of modern civilization. The outside world, with its many distractions and complicated problems, had become a vague memory. We had almost forgotten even the wars abroad. We were absorbed in our new and simple way of living. We were a harmonious group working together for a common cause, and bound by good comradeship.

"Back to nature" was the keynote, as I am sure you have guessed by now. That is a slogan that will strike a responsive chord in every human breast. The natural environment of our earliest ancestors has a lure and a fascination that always exist, but they exist more clearly for some than for others. There are people so busily engrossed with the everyday duties of making a living that they have failed to notice the simple yet dramatic happenings in the natural world. Others, caught in the whirl of artificial pleasures, are totally unconscious of the world of wonder around them. Still others are starving for recreation; they have no means for expensive vacations, and are asleep to the realization of the recreational opportunities that are at their feet or in the very air they breathe---and that may be had for the asking. Finally there are those who are conscious in varying degrees of the wonders in nature, but who feel a need for guidance in discovering and interpreting their environment.

That brings us back where we started: "Why were we here?" I soon found the point of contact that had brought us together. It was a love for the out-or-doors, a belief in its recreational possibilities, and a desire to help interpret it to the public. We believed whole-heartedly in the recreational programs now emphasized throughout the country, and we were particularly interested in the nature aspects of those programs. We believed that there was a need for people more adequately trained in natural sciences to become leaders in this field. We believed that they should be people who looked with something of awe and wonder upon the natural processes operating in our world; and we believed that they should be able to transmit this feeling to others.

With this general purpose of the group as a background, let us consider the specific lines of approach in the minds of the individuals. The statement of one member, the district representative of the National Recreation Association, appears to be so clear-cut and vivid that I quote it:

My purpose is threefold. First, it is to explore possibilities of nature recreation for families, the possibilities in one's own backyard; second, to explore the wider possibilities of city recreational centers, and third, to increase my own personal skill.

The National Park Service state supervisor was interested particularly in better nature programs for parks, programs that would give a meaningful interpretation to these areas set aside for the preservation of wildlife and for the enjoyment of man. The city park nature and recreational leaders wanted to equip themselves better by getting a broader vision of their field. They were mingling with fellow workers,

(Continued on Page 32)

The CCC and National Defense

BY JAMES J. MCENTEE,
DIRECTOR,
CIVILIAN CONSERVATION CORPS

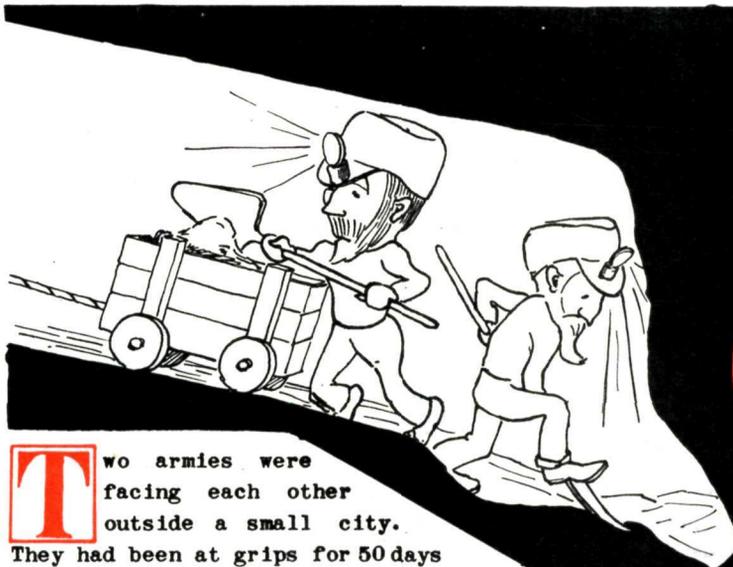
When the CCC was begun in 1933, there was a tremendous amount of conservation work to be done in parks and forests and on farm and grazing lands. Forests had been burned or cut over, land had been over-cultivated or over-grazed. They began to take on new life through the work of the Corps. Scars on the face of Mother Nature, caused by years of human improvidence, began to disappear. An army of 300,000 young men moved over the land bent, not on a wartime mission to destroy, but on a peacetime mission to build.

Huge amounts of work have been done in planting trees, restoring burned over areas, protecting our forests from fires, and making them a generally more habitable place for wildlife. National Park Service and Forest Service camps were among the first established and it was from these that we got our first measure of the value of the CCC as an instrument of conservation.

It is hard to say which of the objectives of the Corps is the most important. Job training of youth certainly is a worthy enterprise if we are to maintain a nation with equal opportunity for all. No work is more important to our national defense than the making of able, responsible citizens. Certainly the reclaiming of huge areas in the midwest and far western states that had been over-grazed and overfarmed will pay out to future generations many times the money spent on them. And by their reclamation we have stored up a reserve of productive land on which to call in a national emergency. The restoration of our timber lands was talked of for many years before those youngsters came off the streets of our cities and towns and from our farms and did something about it.

Now a new objective has been added to the program of the Corps---the training of men for specialized work in connection with national defense. The task of converting the Corps into a unit making the maximum contribution will not be a difficult one. All of us know that the CCC has been doing, and doing well, most of the things which we now are being called upon to do as a national defense contribution. This means, so far as the Corps is concerned, not the entering of a new field but an intensification of efforts already under way. For seven years the Corps has been contributing to national defense by increasing national health, by building up natural resources wealth, by teaching skills to enrollees, and by giving millions of youngsters opportunity to become better and more useful American citizens.

We are equipped and have the man power to carry out a broad program of intensive training in such fields as automotive and aviation mechanics, cooking and baking, road and bridge building and maintenance, map making and surveying, radio and telephone communications, and other fields which require a large number of skilled men in wartime. In the 1,500 camps of the Corps, there are 150 major types of work, which, for purposes of training, may be broken down into about 300 different occupations. Each camp offers between 30 and 75 occupations for training. It is on this framework that we are building our national defense training program.--- *Adapted from addresses delivered July 11 at College Park, Maryland, and July 12 in George Washington National Forest.*

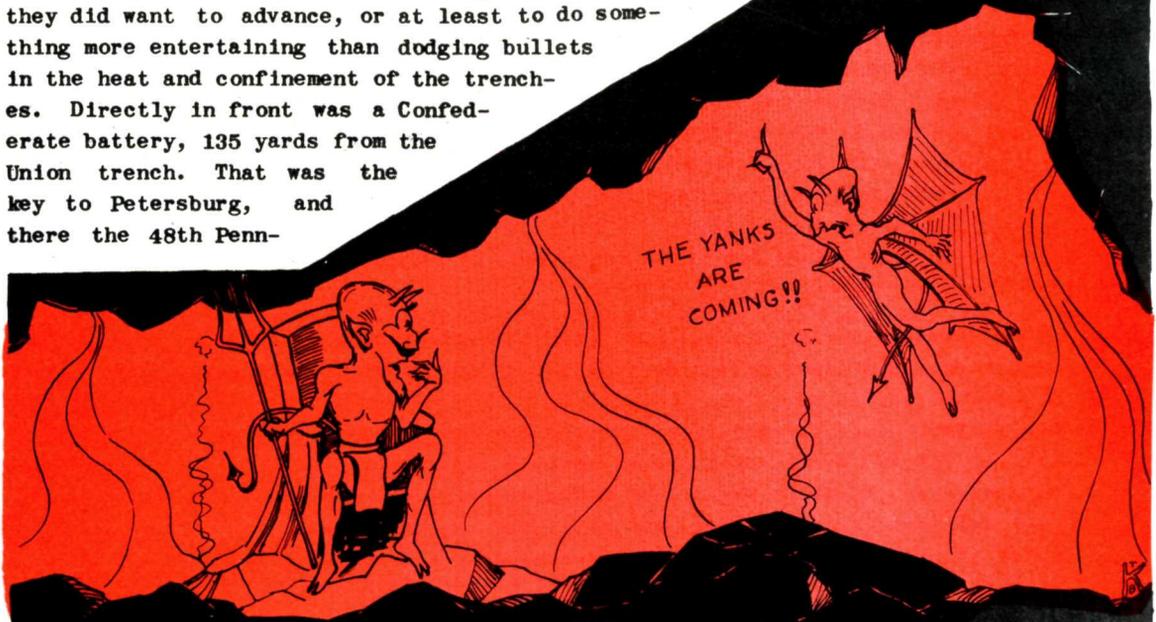


WAR UNDER- GROUND

Two armies were facing each other outside a small city. They had been at grips for 50 days and the struggle had taken them over 70 miles of ground, finally to this point. Four days of attack the week before had brought the troops to the very edge of the city, which was the key to the belligerent capital; but there the assaults had worn themselves out, and hastily built entrenchments and batteries blocked the way.

At one place along the three-mile line the attackers had seized the edge of a hill and entrenched themselves at nightfall within shouting distance of a defensive battery. Holding that section of advanced line were 400 men of a regiment recruited in the coal mining country. They probably were not too much interested in the strategic situation, but they did want to advance, or at least to do something more entertaining than dodging bullets in the heat and confinement of the trenches. Directly in front was a Confederate battery, 135 yards from the Union trench. That was the key to Petersburg, and there the 48th Penn-

by
Raleigh
C.
Taylor



sylvania Regiment intended to go. No men could live to reach that battery above ground; but it appeared to be feasible to tunnel under it.

The colonel, Henry Pleasants, a mining engineer, pursued the idea through proper military channels.¹ Some of his superiors favored it; some scoffed.² Others were indifferent but admitted it could do no harm, and would keep the men amused.³ Colonel Pleasants gathered such necessary materials as he could find while the digging progressed, using every possible makeshift to obtain what he needed with or without official support.⁴

The operation involved was, of course, not a new expedient in war, but the necessary unbroken length of tunnel was greater than had ever been attempted. Colonel Delafield of the Engineers had duly reported the digging of 1,251 running meters of gallery, some of it 50 feet underground, by the French in the Crimea.⁵ A rumor reached Confederate headquarters that mining was under way, but an Englishman visiting there stated that at the siege of Delhi it had proved impossible to run a tunnel more than 400 feet.⁶ At Vicksburg the year before there had been a Federal mine, but the tunnel was started from an approach trench which had already reached the defenders' ditch. Twelve hundred pounds of powder were used. Since the Confederates knew fairly well what was going on, although countermining failed, they lost few men in the explosion and, having previously constructed a second line, held the remainder of the fort without difficulty. Two Union regiments occupied the breach, losing about 30 men.⁷

There was, then, a recent precedent for Colonel Pleasants' project, a precedent of which Grant had full knowledge. The Petersburg mine, however, was on a much larger scale, and every effort was made to keep knowledge of it from the Confederates. So far as the exact location was concerned this was accomplished. The excavated earth was scattered along parapets or covered with brush before daylight.⁸ Nevertheless the enemy heard something of a mining operation and began to dig, early in July, at several likely points --- including Pegram's battery, the objective of Pleasants' tunnel.⁹

The Pennsylvanians were having their troubles.¹⁰ Army picks had to be reshaped for use underground. Planking came from an old bridge, and later from a sawmill five miles away. The tunnel collapsed when it reached a wet spot and had to be retimbered. A putty-like marl slowed the digging which, as the tunnel lengthened, required the work of all 400 men in the regiment. It had been stated by various authorities that bad air would stop the work. To avoid this a ventilation system was devised. It consisted of a wooden tube leading from the entrance to the end of the tunnel, and a chimney just behind the Union works. A fire in that chimney caused a draft through the tunnel. As the smoke had to be concealed, fires were kept burning at intervals

¹*The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies*, Serial 81, pp. 396, 417. Hereafter O. R.

²*Committee on the Conduct of the War, Battle of Petersburg*, Washington, 1865, p.113.

³O. R., Serial 80, p. 58.

⁴*Ibid.*, p. 556. Joseph Gould, *The Story of the Forty-Eighth*, p. 212.

⁵*The Art of War in Europe*, Washington, 1861, p. 58.

⁶E. P. Alexander, *Military Memoirs of a Confederate*, pp. 564-5.

⁷*Battles and Leaders of the Civil War*, Vol. III, pp. 527, 539.

⁸*Story of the Forty-Eighth*, p. 222 (Correspondent's account, dated July 27, 1864); *Battles and Leaders*, Vol. IV., p. 546; Henry Pleasants, Jr., *Tragedy of the Crater*, Boston, 1938.

⁹O. R., Serial 82, p. 771.

¹⁰The Digging had started June 25, 1864.

along the line as though the men were cooking. It was necessary to keep a check on the length and direction of the tunnel. For this purpose, using a crude transit (the only one he had been able to obtain), Pleasants made observations from the front line, within 130 yards of the Confederate sharpshooters. By this risky and hurried expedient he was able to place the mine exactly, as events proved.¹¹



Occupied with these labors, Colonel Pleasants was no doubt glad to receive a letter from Brigadier General J. G. Barnard, Chief Engineer of the Armies in the Field, dated City Point, July 3, containing 10 detailed questions concerning his progress and plans. Pleasants replied four days later, answering three of the queries.¹² It appears that this was the only official interest shown in the actual process, although there was much discussion about its possible results and the best method of utilizing them.

HUMOR AT THE FRONT

The tragedies of war almost invariably are tempered by the good natured jests of the soldier. Confederates in the ranks accepted the rumors of a Federal mine as something of a joke and told newcomers that Grant's men were attempting to tunnel all the way under Petersburg and attack the Southern army from the rear. Conscripts were informed solemnly by the more seasoned veterans that the mine already had reached Sycamore Street, the main thoroughfare of the town, and that a railroad was being operated in it. Greenhorns were assured that by listening carefully they could hear the roar of the locomotive, and that smoke could be seen issuing from the spaces between the cobblestones in the street. ---Adapted from Douglas Southall Freeman, *R. E. Lee: A Biography* (Charles Scribner's Sons, New York, 1936), III, 464.

The Confederates had dug a shaft and horizontal listening gallery on each side of Pegram's Battery, where their tunneling reached a total length of 203 feet. These shafts were only 10 feet under the ground while the Federals were 20 feet under, so that the Confederates apparently could not hear their enemy,¹³ although their digging was audible to the Federals and caused a cessation of work for one day. Curiously enough, the Confederate miners at Colquitt's Salient, a mile distant, reported that they heard Federal digging, although none appears to have been in progress at that point.¹⁴

Pleasants' men continued their work on July 18, digging a gallery 75 feet long across the end of the 510-foot main tunnel and following the assumed course of the Confederate works. This was finished July 23, but the explosive was not put in place immediately. Eight thousand pounds of powder were used for the charging, and all was complete on July 28 save for lighting the

¹¹ O. R., Serial 80, p. 556; *Committee*, cited above; *Story of the Forty-Eighth*, p. 222.

¹² O. R., Serial 81, pp. 610-611.

¹³ O. R., Serial 82, pp. 807-808, 813, 816, 819.

¹⁴ O. R., Serial 82, p. 790.

fuze.¹⁵ Unfortunately, the fuze was supplied in short lengths that had to be spliced. Half an hour after it was lighted at 3:30 a. m., July 30, there was no result. Two men of the 48th volunteered to relight it. Then, at 4:44, in the first light of day, Pegram's Battery, with 278 men and four guns, was demolished and hurled into the air. "The size of the crater formed by the explosion was at least 200 feet long, 50 feet wide, and 25 feet deep."¹⁶

The miner had done his work, and done it well. It now was up to the infantry.¹⁷

¹⁵Duane had sent for the mining records before Sebastapol and got me to read them to learn the proper charge: for, what with malaria, and sunstroke, and quinine, whiskey, and arsenic, he can hardly see, but clings to duty to the last! Finding nothing there, he said the book was a humbug, and determined on 8,000 pounds. . . ." T. Lyman, *Meade's Headquarters*, p. 196 note. Burnside believed that a greater charge would produce a crater with less sloping sides, less of an obstacle to troops (O. R., 80, p. 59), and had suggested putting in each of the eight magazines from 1,200 to 1,400 pounds of powder." O. R., Serial 82, p. 447.

¹⁶O. R., 80, p. 558, Report of Henry Pleasants, Lieutenant Colonel, Forty-eighth Pennsylvania.

¹⁷*Cf.* Raleigh C. Taylor, "The Petersburg Crater --- Then and Now," *The Regional Review*, Vol. I, No. 3, July 1939, pp. 27-28.

A STUDENT GIVES VIEWS ON FIRST NATURAL HISTORY INSTITUTE

(Continued from Page 27)

getting and giving new ideas. They were interested in the technique of group leadership, and were discovering possibilities for developing small recreational centers.

Some of the younger members of the group were looking forward to work in national or state parks. Here they were making valuable contacts and getting actual experience. Others of this group were trying to prepare themselves to do volunteer work or to become community recreational leaders. All were exploring the field of nature with the idea of better understanding and interpreting it.

The teacher group I left for the last because I am of it. The schools are emphasizing science in the elementary grades or science on the children's level, whatever the age. We were here to make a broader and better acquaintance with the field of nature. We wanted to live and experience what we were trying to teach. We wanted to learn more of the technique of field trips, nature crafts, and collections. Some of us were so enthusiastic about nature interpretation and so convinced of its value that we had dreams of using our long vacations in this delightful way, either in parks or in camps.

Among our most enthusiastic members was a park ranger who declared: "I shall never work another day. From now on my work will be my hobby."

In conclusion, I should like to say that we consider this experiment of living and learning together to be even more successful than we had anticipated. Through wise planning, some of the best scientific talent in the country was brought directly to us. By these specialists, knowledge was given and interest aroused in new fields. In the great outdoor laboratory, rich in scientific materials, we observed and discovered many secrets of animal and plant life, secrets so fascinating and so full of meaning that I am sure we shall go on searching and discovering more and more.

Interpreting the Natchez Trace National Parkway

By Jesse D. Jennings,
Associate Archeologist.

. . . The interpretative possibilities of the Natchez Trace National Parkway represent a continuum of events which emerges from the mists of prehistory to end in the social and economic forces at work in the South today. The need is for interpretation of this shifting, kaleidoscopic pageant which is the South, with all the forces, extraneous and internal, which combine to make its colorful heritage, into a coherent whole. The monumental task . . . is one of research, accumulation of data, assimilation of the facts acquired, synthesis, evaluation, and finally welding the material into a simplified exposition of the country so abruptly sectioned by the parkway motor road.

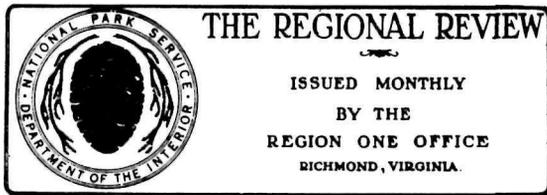
Some of the simplest possibilities in presenting to the traveler current Southern problems, culture, and an appreciation for its rich resources lie in explanations of such prosaic things as conservation of the soil through erosion control and crop rotation, or of the forests through fire prevention and forest management. Any treatment of these points leads naturally into an analysis of the peculiar problems of Southern agriculture . . . Again the staple crops of the South and the shifting basis of Southern agriculture can all be exemplified along the parkway motor road.

In the city of Natchez itself and in its vicinity, we find the thought and artifacts of the historic old South stricken immobile in an embalmed nostalgia. Here, perhaps better than any other place in the South, the story of slavery and plantation life, with its magnolia and mint julep connotations, could be presented. Here the streamlined modern world meets and fails to conquer the genteel lassitude of the South's once most opulent city . . . The world of tomorrow would receive attention in a simplified exposition of the architectural and engineering features involved in the construction of the motor road to make it a restful, attractive avenue for business and recreational traveler.

The program affords a promise of significant accomplishment, but at the same time represents a major challenge to interpretative ingenuity for development of a logical narrative sparkling with humor, given a grim vitality with inescapable facts, and memorably punctuated with dramatic highlights from the old and new South. . . The plan as visualized requires years of intelligent thought and effort. If, however, some compromise can be achieved between the ideal and the practicable, we shall have contributed greatly to the awakening among parkway travelers of an awareness of America and its complex heritage. ---From Mr. Jennings' monthly report for May 1940.

NEW FUNDS VOTED FOR NATCHEZ TRACE ACQUISITION

An appropriation of \$350,000 for purchase of lands to be added to the Natchez Trace National Parkway has been provided by the State of Mississippi. With previous funds voted for the purpose but not yet expended the total monies available for acquisition exceeds \$650,000. Land purchases in connection with the parkway development are made from general highway funds in Alabama and Tennessee.



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LOVE FOR THE SOIL

"This land, this red land, is us," said John Steinbeck in *The Grapes of Wrath*, "and the flood years and the dust years and the drought years are us."

"The plain truth," wrote Hugh H. Bennett in *Soil Conservation*, "is that Americans, as a people, have never learned to love the land and to regard it as an enduring resource."

The Regional Review has observed many such east-and-west statements and has vacillated between these diametric polar attractions of the sphere of conservation. French peasants, anchored for generations to modest plots of earth, divide and subdivide their inheritances from sire to son until the tiny remainders sometimes defy mathematical fractionation. American pioneers, with unexplored thousands of square miles before them, enjoyed the rare advantages of "finders keepers". They took for granted the virginal resources of the cheap lands that they had chosen, staked, and utilized.

Now the land of the earth, viewed in the awesome perspective of geologic time, may be virginally beflowered yesterday, despoiled, sterile, and barren today, yet miraculously revirginized tomorrow. Nevertheless, when considered in terms of human days, it bears for long the stigma of despoliation. That explains in reverse, perhaps, why the tide of American exploration, land conquest, and exploitation, has turned back upon itself in the last 60 years. In short, many thousands of Americans, some conscience-hurt, some proud of rarely provident ancestors, now experience an embracing affection for certain parcels of soil. That soil may be the humble home of a Pansy Yokum of Dogpatch or the broad acres of an opulent

estate, but the sentiments of the owners are basically the same.

Living on the land endears it to humankind. It also engenders a worshipful respect for superlative native lands upon which there may live no one at all. Americans, a bit more matured now and no longer in 1940 the unvaccinated threats to human drawing room progress that the European lecturer of the 19th century so consistently imagined them to be, have grown to love their kindly soil. They wish, as never before, to safeguard it against invasion, natural, economic, or military. They wish, at last, to defend it and preserve it *for its own sake*.

The National Park System has made a significant psychological contribution to this national sentiment. Its historic shrines have nurtured a reverent respect for America's past; its wilderness parks have brought a sincere admiration for the natural splendors which escaped the impetuous onrush of an adolescent nation; its monuments have safeguarded scientific marvels against the destructive results of heartless greed and thoughtless neglect. Finally, all these areas have afforded primary materials for a national devotion to the principle of saving, guarding, and perpetuating the soil which gave us birth and now sustains us in a time when other nations of the world suffer the cruel stresses of ruthless conflict. Our parks, monuments, and historic sites are cross sections of our love for country.

HYPHENS FOR EVERY HOME

A task fraught with peril but underlined with adventure is that of editing the gratuitous materials supplied by *The Review's* friendly contributors. The effort to achieve at least a fair uniformity in orthography often leads into such puzzling blind alleys in the serried pages of the dictionary that the editor is left in open-mouthed wonder.

Mr. Kemper's excellent article of this issue (pp. 3-14) inspired an investiga-

(Continued on Page 36)

Publications and Reports

THE NATION'S RESOURCES AND THE DEFENSE PROGRAM

The role of the United States Department of the Interior in any national military crisis which might result from extraordinary world conditions was explained this month by Secretary Ickes in an article, "The Nation's Resources," which appeared in the *Army and Navy Journal* (Vol. LXXVII, No. 45, pp. 1097, 1103).

"It would be difficult to imagine the plight of a nation in an international crisis," wrote Mr. Ickes, "if it had no, or few, basic resources.

"Consider what our situation would be if we had little coal, no great supply of lumber, only a few minerals, not much power, and a paucity of petroleum. Without an abundance of resources it would be virtually impossible to manufacture quantities of tanks, guns, planes, munitions, ships, and other material necessary for successful national defense.

"Fortunately, we have the resources. With the exception of a few strategic and critical minerals, the United States possesses the basic raw materials necessary for modern industry, and, consequently, for national defense. Our chief problem is not supplies, but coordination and production. . .

"The Department of the Interior plays a fundamental role in national defense. The work of the Department is almost entirely devoted to the appraisal, discovery, management and conservation of the nation's resources. . . It is fully prepared and instantly ready to offer its facilities, its skills, and its resources for the national defense. Orders have already been issued that defense matters are to be given priority. To coordinate defense activities, a Departmental Defense Resources Committee has been established. This Committee has been established as a clearing house on all defense problems and will provide a mechanism by which outside agencies may quickly be put into contact with the Bureaus and technical experts who can render the assistance required.

"The Department of the Interior, in short, is ready and able to do its full share in the defense of our democracy."

SOUTH CAROLINA PARKS INCLUDED IN AMERICAN GUIDE SERIES

South Carolina State Parks, a 44-page booklet copiously illustrated with photographs, drawings, and maps, has been published cooperatively by the South Carolina State Commission of Forestry and workers of the Writers' Program and the South Carolina Art Project of the Work Projects Administration. Each of the 15 park areas is described and its facilities are explained and illustrated. Commenting upon the development of the state system, one of the newest of the country, the foreword says:

"For every person in South Carolina---the young, the old, the rich, the poor, the sportsman, the mother of a family, the laborer, the farmer, the college professor, and all others--- there is a state park within approximately 50 miles of home, where picnic shelters provide for a day's outing, where sanitary bathing facilities may be found, or well equipped cabins accommodate guests for a longer vacation.

"The 15 parks in South Carolina, completed or under construction, dot the state from sea level to the highest mountain in its area. In 14 of the parks swimming facilities are provided; in six there are 45 cabins; in three there are summer camps; in three there is opportunity for salt water fishing; and in many others there is fresh water fishing."

NEW NATURE PUBLICATION ISSUED BY GEORGIA

The third number of *Outdoor Georgia*, edited by Charles N. Elliott, acting commissioner of the state's Department of Natural Resources, appeared this month. The publication, launched in May is issued monthly "in the interest of Georgia wildlife and for fishermen, hunters, nature lovers, and conservationists." Articles in No. 3 include "Beyond Distant Horizons," a study of the state park system; "Highroads of the Wilderness," "Wildlife and the Soil," and "Chinooks of the Chattahoochee."

The magazine is a sales publication at 15 cents.

NEW KENTUCKY ARCHEOLOGICAL MATERIALS AVAILABLE

Recent additions to the University of Kentucky series of *Reports in Anthropology and Archaeology* include "Cypress Creek Villages, Sites 11 and 12," a 41-page report by William S. Webb and William G. Haag, and "Ricketts Site Revisited, Site 3, Montgomery County, Kentucky," prepared by Professor Webb and W. D. Funkhouser. The latter publication is a 67-page indexed booklet.

Both numbers of the series were prepared with the assistance of the Work Projects Administration.

EVERY MAN HIS OWN HYPHEN

(Continued from Page 34)

tion of *woodchopper*, whether it be one word, two words, or a hyphenated compromise. *Woodcutter*, it developed, earned a normal position in the dictionary text, but its kinsman *woodchopper* was relegated to the fine print. Further search revealed *wood hewer*, in the more genteel type, as two words, but it was defined simply as a two-word *wood chopper*. A similar exploration showed *upcountry* to be one word, *low country* two. And there are *smallbore* rifles and *smooth-bore* rifles.

Enforcement, by the way, sits in any gilded salon, but *inforcement* does not exist. Still, *reinforcement* is your only choice in the repetitive. Altogether, it looks like a warm season. ---H. R. A.

THE CONTRIBUTORS

REYNOLD E. CARLSON (Vol. IV, Nos. 4-5)

JACKSON KEMPER, 3rd, formerly a member of the staff at French Creek Recreational Demonstration Area, Pennsylvania, has a lifelong familiarity with the old Hopewell Village iron-making community which had been associated with his family for more than a century before its purchase by the federal government. Assigned to historical research at the area, he observed at first hand the process of charcoal making which he described so faithfully in his article. He is a graduate ('34) of Hobart College.

C. P. RUSSELL (Vol. I, No. 6)

EDITH SETTAN, one of the matriculants at the recent Virginia Natural History Institute, is a teacher of science in the public school system of Greensboro, North Carolina. Mrs. Settan is an alumna ('26) of the Woman's College of the University of North Carolina.

RALEIGH C. TAYLOR (Vol. III, No. 2)

