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SALT ON THE OHIO VALLEY FRONTIER, 1770–1820¹

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ABSTRACT. Salt, available at natural springs, seasonally attracted great herds of bison which through years of repetitious movement carved an extensive system of buffalo traces: avenues used by Anglo-Americans in settling portions of the Ohio Valley. Frontier settlement concentrated in areas of salt availability as the vital dietary element proved necessary to sustain livestock and to prepare meats, thus providing the frontier farmer with an export commodity. Salt was used as a medium of exchange enabling merchants to pursue a diversified commerce centered in urban places; indeed, the salt trade, more than any other commercial activity, sustained the Valley's early urban structure.

FREDERICK JACKSON TURNER formulated the initial generalizations relating salt to the Ohio Valley's frontier experience.² In his epic paper, Turner theorized that a general lack of salt retarded westward migration; he wrote: "The early settlers were tied to the coast by the need of salt, without which they could not preserve their meats or live in comfort."³ Conversely, he noted that salt availability stimulated frontier expansion:⁴

When discovery was made of the salt springs of the Kanawha and the Holston, and Kentucky, and central New York, the West began to be freed from dependence on the coast. It was part of the effect of finding these salt springs that enabled settlement to cross the mountains.

Finally, he noted that the buffalo paths which connected the larger salines funneled the initial American migration into specific settlement areas providing the framework upon

which patterns of sequent occupance emerged. Turner wrote:⁵

Stand at Cumberland Gap and watch the procession of civilization marching single file—the buffalo following the trails to salt springs, the Indian, the fur trader and hunter, the cattle-raiser, the pioneer farmer—and the frontier has passed by.

Historians have been hesitant to follow Turner's lead in furthering the investigation of salt and its influence on frontier settlement and economy. Local historians and antiquarians have detailed pioneer salt production in certain highly restricted localities; however, treatment of the larger region has been restricted to individual articles by Akeley, Clark, and Lippincott, supplemented only by several unpublished masters' theses.⁶ Readily embrac-

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¹ This paper presents the basic themes from the author's dissertation, *Salt and the Initial Settlement of the Ohio Valley* (unpublished Ph.D. dissertation, Indiana University, 1967). The author wishes to thank Professors O. P. Starkey, D. Carmony, N. J. G. Pounds, T. D. Clark, and W. Zelinsky for their encouragement and timely suggestions at various stages of the project.

² F. J. Turner, "The Significance of the Frontier in American History," *Proceedings of the State Historical Society of Wisconsin*, Vol. 41 (1893); reprinted in *The Frontier in American History* (New York: Holt, Rinehart, and Winston, 1962), p. 17.

³ Turner, *op. cit.*, footnote 2, p. 17.

⁴ Turner *op. cit.*, footnote 2, p. 18.

⁵ Turner, *op. cit.*, footnote 2, p. 12.

⁶ Works on local salt production include: B. W. Hager, "The Whites of Clay County As Salt Makers," *Register of the Kentucky State Historical Society*, Vol. 50 (1952), pp. 242–48; W. P. Jillson, *Big Bone Lick* (Louisville, Kentucky: Standard Printing Co., 1936); R. E. McDowell, "Bullitt's Lick: the Related Salt Works and Settlements," *Filson Club History Quarterly*, Vol. 30 (1956), pp. 240–69; J. F. Smith, "The Salt Making Industry of Clay County," *Filson Club History Quarterly*, Vol. 2 (1927), pp. 134–40; M. Threlkel, "Mann's Lick," *Filson Club History Quarterly*, Vol. 2 (1927), pp. 169–76; and R. R. White, "The Salt Industry of Clay County, Kentucky," *Register of the Kentucky State Historical Society*, Vol. 50 (1952), pp. 237–41. Regional coverage is offered by: A. P. Akeley, "Salt and the Early Settlers," *Pennsylvania History*, Vol. 12 (1945), pp. 170–73; T. D. Clark, "Salt, A Factor in the Settlement of Kentucky," *Filson Club History Quarterly*, Vol. 12 (1938), pp. 42–52; I. Lippincott, "Early Salt Trade in the Ohio Valley," *Journal of Political Economics*,

ing Turner's generalizations concerning pioneer salt economy, these studies have tended to emphasize the Valley's mid-nineteenth century commercial salt industry by focusing on the evolution of modern production techniques. Thus Turner's overview of salt's importance on the frontier stands unassailed.

The failure to pursue salt as a theme of settlement history stems partially from the general lack of materials descriptive of frontier settlement patterns. Although manuscript materials are available, little has been done to evaluate their content. In addition, few archaeological surveys have been made to supplement the historical record; indeed, only for Pennsylvania, where two surveys have been completed, does a reliable record of the number, composition, and distribution of pioneer settlements exist.⁷ Lacking even for frontier Pennsylvania, however, are maps detailing basic transportation facilities such as trail, road, and river routes along which initial settlement accrued. Even though such considerations are essentially encyclopedic in nature, they are prerequisite to continued consideration of salt and the other natural resources important during the frontier period.

Here geographers can contribute greatly. Concerned with pioneer settlement in diverse areas of the world, American geographers seem well equipped to further describe and analyze past pioneer conditions here at home.⁸ Indeed, historical geographers have taken notice in their journals of the comprehensive frontier literature produced by historians and have related much of their own research directly to that literature.⁹ However, salt as a

factor of settlement on the American frontier has been largely ignored although Shaler and Rostlund have investigated the bison's penetration into the eastern woodlands, a penetration in which salt played an important role. Zelinsky has mapped the salt-derived place-name, "lick," in his general study of the generic parts of place-names.¹⁰

In light of past endeavor, this paper is offered as a re-evaluation of the Ohio Valley's frontier salt thesis. It will proceed from a description of the Valley's salt resource to consideration of the derived buffalo-trace system and its impact on American settlement. The management of the Valley's salt resource will then be related to the growth of towns and cities for the salt trade, as it fostered commercial enterprise, and altered the region's original settlement fabric. As such, the paper will reject certain of Turner's widely held generalizations regarding salt and settlement, accept others with varying degrees of qualification, and suggest future research direction.

THE SALT LICKS

Salt was readily available in the Ohio Valley at what the early hunters called "salt licks." Imlay, a geographer of the early Trans-Appalachian West, wrote:¹¹

A salt spring is called a "Lick," from the earth about them being furrowed out in a most curious manner by the buffalo and deer, which lick the earth on account of the saline particles with which it is impregnated.

Commonly, a lick was an actual spring where saliferous waters evaporated on reaching the surface to precipitate deposits of sodium chloride. Yet the physical appearance of the various springs differed according to the micro-environments involved; thus, descriptions of

Vol. 20 (1912), pp. 1029-52. Theses include: M. R. Hoge, "Salt on the Frontier" (unpublished M.A. thesis, University of Pittsburgh, 1931); and M. W. Mosby, "Salt Industry in the Kanawha Valley" (unpublished M.A. thesis, University of Kentucky, 1950).

⁷ W. A. Hunter, *Forts on the Pennsylvania Frontier, 1753-1758* (Harrisburg, Pennsylvania: Pennsylvania Historical and Museum Commission, 1960); and T. L. Montgomery, *Report to the Commission to Locate the Sites of the Frontier Forts of Pennsylvania* (Harrisburg, Pennsylvania: W. S. Ray, 1916).

⁸ Mention of two earlier works seems appropriate: I. Bowman, *The Pioneer Fringe* (New York: American Geographical Society, Special Publication No. 13, 1931), and W. L. G. Joerg (Ed.), *Pioneer Settlement* (New York: American Geographical Society, Special Publication No. 14, 1932).

⁹ See M. W. Mikesell, "Comparative Studies In

Frontier History," *Annals, Association of American Geographers*, Vol. 50 (1960), pp. 62-74.

¹⁰ N. S. Shaler, "The Age of the Bison in the Ohio Valley," *Kentucky Geological Survey, Memoire*, Vol. 1 (1876); E. Rostlund, "The Geographic Range of the Historic Bison in the Southeast," *Annals, Association of American Geographers*, Vol. 50 (1960), pp. 395-407; W. Zelinsky, "Some Problems in the Distribution of Generic Place-Names of the Northeastern United States," *Annals, Association of American Geographers*, Vol. 45 (1955), pp. 319-49.

¹¹ G. Imlay, *A Topographical Description of the Western Territory of North America* (London: J. Debrett, 1792), pp. 46-47.

the salines surviving in the historical literature vary considerably.

From the Illinois frontier comes the following account:¹²

I saw a lick [location unknown] of singular size extending over nearly half an acre of land, all excavated three feet, that is to say, licked away, and eaten, by buffaloes, deer, and other wild animals. It has the appearance of a large pond dried. The earth is soft, salt, and sulphurous, and they [the buffalo] will resort to it.

Michaux, the French traveler, recorded the following impression of the Lower Blue Lick in Kentucky:¹³

Passed by a place where the soil is impregnated with saline substances and whither the Buffaloes used to go in great numbers to lick the particles of Salt continually exuding from the surface of the soil. There are at this spot springs whose water is bitter, putrid, blackish and full of mephitic air which frees itself at the slightest movement of the soil by the bubbles appearing on the surface of the spring as one approaches.

Sodium chloride is the most abundant solid dissolved in ground water; however, only when present in quantities as great as 250–300 parts per million do such solutions give a salty taste.¹⁴ As late as the Triassic period, the Ohio Valley was covered by an inland sea in which deposited sands and muds accumulated to several thousand feet, entrapping connate water between the mineral grains. This entrapped sea water represents the major source of the Valley's salt brine although many brines are partially composed of meteoric solutions which have migrated into their present horizons.¹⁵ The brines vary considerably in strength, for physical and chemical changes have concentrated solutions in some strata while diluting brines in others. Alteration derived from a combination of factors including ground water migration owing to earth move-

ment, evaporation, temperature and pressure change, contact with hydrocarbons, and mixing with surface and meteoric waters.¹⁶ In general, the brines of the Ohio Valley are stronger than ocean salt water indicative of more widespread concentration as opposed to dilution.¹⁷

The strata containing such salt solutions are generally sandstones, conglomerates, dolomites, or open-textured limestones; the most prolific strata for the production of brine in the Valley are found in the Pottsville series of the Pennsylvanian age.¹⁸ At Kentucky's Big Bone Lick, by way of example, the brine-saturated measure (locally known as the St. Peter sandstone) overrides the disconformity of the Cincinnati Arch at a depth of 800 feet (Fig. 1). From its original seat the brine rises under a strong hydrostatic head, passing through a series of offsetting joint planes and fissures of nearly vertical attitude which penetrate superimposed limestone rocks. This spring, as many in the Ohio Valley, occupies a glaciated site and thus brines approaching the surface must penetrate a thick layer of loose sediment producing the "quaking bogs" and "jelly ground" noted by many early travelers. In this morass, the remains of Pleistocene mammals are still in evidence despite nearly two centuries of archaeological retrieval. Thus the fossil remains of the mammoth and mastodon, caught by the deadly bog, bear witness to the seemingly ageless procession of animals who came to lick the salt earth.¹⁹

THE AMERICAN BISON

To the Valley's largest salines came the buffalo, *Bison bison americanus*. So numerous were the buffalo herds about the licks that early naturalists accepted them as an integral part of the forest environment. Indeed, many classify these bison as having been a native woodland subspecies identified as

¹² W. Faux, *A Journal of a Tour to the United States* (London: W. Simpkin and R. Marshall, 1823), p. 260.

¹³ A. Michaux, "Journal of Andre Michaux," 1793–1796, in R. G. Thwaites (Ed.), *Early Western Travels* (Cleveland: A. H. Clark, 1904), Vol. III, p. 37.

¹⁴ P. H. Price, et al., "Springs of West Virginia," *West Virginia Geological Survey*, Vol. 6 (1936), p. 20.

¹⁵ G. C. Gambs and G. W. White, "Ohio's Mineral Resources: Salt Reserves," *Ohio State University Studies, Engineering Experiment Station Circular No. 49*, Vol. 15 (1946), p. 5.

¹⁶ R. E. Greten, "Brine Production and Utilization From the Salt Sands of the Pottsville Series," *Appalachian Geological Bulletin*, Vol. 1 (1949), p. 320.

¹⁷ Some brines now contain solids in solution up to twenty-five percent of their total composition as compared with three and one-half percent for sea water; Gambs and White, *op. cit.*, footnote 15, p. 5.

¹⁸ A. C. McFarlan, *Geology of Kentucky* (Lexington: University of Kentucky Press, 1943), p. 430.

¹⁹ Jillson, *op. cit.*, footnote 6, p. 112.

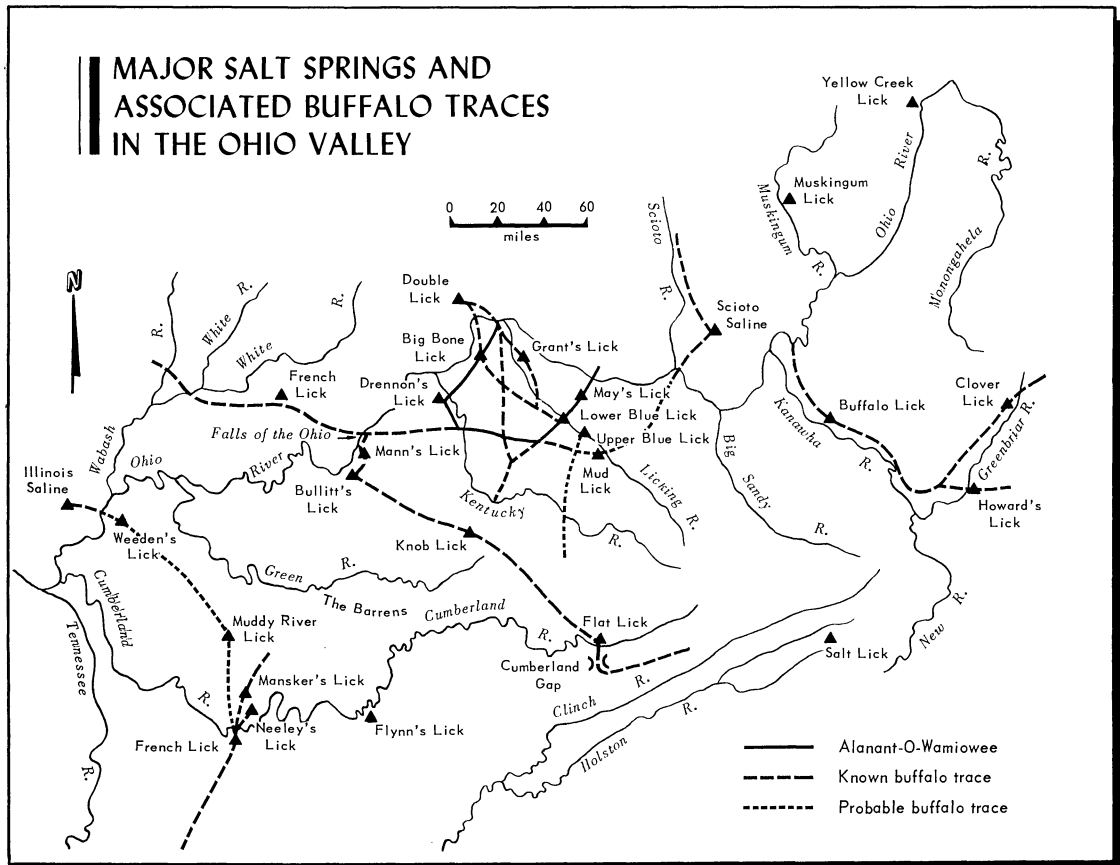


Fig. 1. Shown are the buffalo traces adopted by Anglo-Americans as routeways.

Bison bison athabasca.²⁰ Fossil remains unearthed at various of the Valley's salt springs, particularly at Big Bone Lick in Kentucky, gave apparent proof that the buffalo had inhabited the region since the late Pleistocene; subsequent investigation, however, has identified these prehistoric buffalo as the extinct *Bison bison latifrons*.²¹ Authorities now regard the modern buffalo as a recent intruder who may have come to the woodlands as late as the seventeenth century A.D.²² In this light, the

²⁰ For more detailed discussion see J. A. Allen, *The American Bisons, Living and Extinct* (Cambridge, Massachusetts: University Press, Memoirs of the Museum of Comparative Zoology at Harvard College, Vol. IV, No. 10, 1876); M. S. Garretson, *The American Bison* (New York: New York Zoological Society, 1938); F. G. Roe, *The North American Buffalo* (Toronto: University of Toronto Press, 1951).

²¹ Jillson, *op. cit.*, footnote 6, p. 19.

²² Shaler, *op. cit.*, footnote 10, p. 72.

Ohio Valley bison were possibly the plains subspecies frequently designated as *Bison bison bison*.²³

The buffalo's recent migration into the forested Ohio Valley was greatly aided by the historic Indian who, although a predator, employed fire to enlarge, create, and sustain prairielands attractive to the bison. Shaler wrote:²⁴

Remember that the Indians . . . were much in the habit of burning the forests and so making open plains, or prairies . . . [for] the buffalo [could] not penetrate far into the denser forests; it may be that it was this destruction of the forests that laid the way open to their entrance.

Thomas Hutchins, the eighteenth century geographer and surveyor in the West, described

²³ Roe, *op. cit.*, footnote 20, p. 3.

²⁴ Shaler, *op. cit.*, footnote 10, p. 29.

the vegetational landscape derived from the Indians' hunting activity:²⁵

On the north-west and south-east sides of the Ohio below the Great Kanawha River at a little distance from it, are extensive fine natural meadows or savannahs. These meadows are from 20 to 50 miles in circuit. They have many beautiful groves of trees interspersed, as if by art in them, and which serve as a shelter for the innumerable herds of buffalo . . . with which they abound.

THE BUFFALO TRACES

Whereas the prairie grasses encouraged the buffalo in their eastward migration, the salt springs proved an even stronger attraction. The woodland bison developed a compelling appetite for salt which stimulated seasonal movement from the Valley's prairie feeding grounds to the salt licks. The salt resource attracted the migrating herds funneling their movement along specific routes and concentrating their attention at definite sites. Buffalo traces thus emerged as routes of maximum convenience connecting the larger salines. Filson, the early Ohio Valley historian, described Kentucky's licks and traces:²⁶

Many fine salt springs constantly emit water which, being manufactured, affords great quantities of fine salt . . . The amazing herds of buffalo which resort thither, by their size and number, fill the traveler with amazement and terrors, especially when he beholds the prodigious roads they have made from all quarters as if leading to some populous city.

James Smith described Kentucky's best known trace, the "Alanant-o-wamiowee," which the Americans translated from the Shawnee language as "The Buffalo Trace." "We left the lick [probably the Lower Blue Lick] and pursued our journey to Lexington following one of the old buffalo roads, which I suppose was generally 200 feet wide."²⁷ George Croghan, at an earlier period, wrote of the same trace:²⁸

²⁵ T. Hutchins, *A Topographical Description of Virginia, Pennsylvania, Maryland, and North Carolina* (London: J. Almon, 1778), pp. 14-55.

²⁶ J. Filson, *The Discovery Settlement and Present State of Kentucke* (Wilmington, Delaware: J. Adams, 1784), pp. 32-33.

²⁷ J. Smith, "Tours into Kentucky and the North-west Territory: Three Journals by the Rev. James Smith of Powhatan County, Virginia, 1783-1795-1797" (J. Morrow, Ed.), *Ohio State Archaeological and Historical Quarterly*, Vol. 16 (1907), p. 372.

²⁸ G. Croghan, "The Journals of George Croghan, 1750-1765," in R. C. Thwaites (Ed.), *Early Western*

We went to the great lick . . . In our way we passed through a fine timbered clear wood; we came into a large road which the buffaloes have beaten, spacious enough for two wagons to go abreast, and leading straight into the lick.

Many buffalo traces in the Ohio Valley were retained by Anglo-Americans as roads (Fig. 1).²⁹ Two deserve special mention. The "Alanant-o-wamiowee," which began at the mouth of the Licking River, ran south to the Big Bone and Drennon's licks, where it cut east connecting the Leestown Crossing at present-day Frankfort with the Lower Blue Lick, May's Lick, and finally the Limestone Crossing of the Ohio River at latter-day Maysville. The Wilderness Trail, the famous pioneer route to the Kentucky Blue Grass, originated at the Flat Lick where it connected with buffalo traces running to the east of Cumberland Gap. The trace struck toward the northwest where at Knob Lick the second and less famous portion of the trail continued westward to the Falls of the Ohio by way of Bullitt's and Mann's licks, respectively. From the Falls, the trace continued across southern Indiana to the French Lick and finally to the crossing on the Wabash River at present-day Vincennes.

Outside the Kentucky area, where the bison were numerically less significant, the traces were correspondingly less-developed. Where traces did exist, as in West Virginia and Tennessee, most had been reclaimed by second-growth vegetation following the destruction of the buffalo herds by white hunters. Second-growth timber was exceedingly difficult to penetrate; therefore, obscured traces were of little use to farmers on entering these areas. Only in the Nashville Basin and along the Kanawha River where permanent settlement followed quickly the exploitative "hunter's frontier," did the surviving traces invite extensive use.

Journals 1748-1765 (Cleveland: A. H. Clark, 1914), Vol. I, p. 135.

²⁹ An extensive eighteenth century map literature was consulted in attempting this cartographic reconstruction of the Valley's trace system. Utilized also were the numerous travel journals, gazetteers, and emigrant guides of the period, as well as local historical and archaeological surveys when available. Similar sources were employed in the compilation of all the settlement data subsequently presented in map form.

THE BUFFALO HUNTERS

The first Anglo-Americans to cross the Appalachians in large numbers were hunters and trappers operating initially from Harris' Ferry in Pennsylvania and from scattered settlements in the Great Valley of Virginia. Combining exploitation and exploration, these so-called "long-hunters" explored the West, mapped the important traces, publicized the most important licks, and generally served as the vanguard for permanent settlement. Despite a potentially lucrative fur trade with Indians in the Great Lakes area, these English hunters were primarily concerned with the buffalo which, unlike the beaver, thrived in the more readily accessible Ohio Valley.

Buffalo hunters in the Cumberland area, which was seemingly the Valley's most productive hunting ground, came by way of Kaskaskia, the French village occupied by the English after 1765. The Philadelphia firm of Baynton, Wharton, and Morgan stimulated this hunting activity as part of a grand commercial scheme to supply the English garrisons of the West and to develop a western fur and hide trade. Under George Morgan's direction, merchandise was shipped by wagon to Fort Pitt and then by flatboat to the Illinois Country. Salt was perhaps the most important commodity included since the producing salt springs of the Mississippi Valley were all located in newly-created Spanish Louisiana. Carried eventually to Tennessee, this salt was used to cure buffalo hides and meat. At an early date, therefore, a commercial tie developed between Illinois and Tennessee which, curious as it may seem, involved long-distance salt importation into an area of natural salt availability.

In 1767 the Morgan interests received from the Cumberland area some 18,000 pounds of buffalo beef, fifty-five buffalo tongues, and a "great" weight of tallow, but less than Morgan needed.³⁰ The herds diminished rapidly caused, Morgan claimed, by the French who entered the area from Spanish territory.³¹

They have so thinned the buffaloe . . . that you will not see the 1/20 part of the Qty as formerly and unless some method be taken to put a Stop

³⁰ H. S. Arnow, *Seedtime on the Cumberland* (New York: MacMillan Co., 1963), p. 127; quoting letters of Morgan sent to Baynton and Wharton.

³¹ Arnow, *op. cit.*, footnote 30, p. 130.

to this Practice it will in a short Time be a difficult Matter to supply even Fort Chartres with Meat from thence.

SALT AND PERMANENT SETTLEMENT

Prior to the Revolutionary War, permanent settlers in the Ohio Valley were few indeed. As previously mentioned, Turner believed that the general lack of salt in the Trans-Appalachian West had discouraged settlement, a situation altered by the discovery of the western salines.³² It is not certain, however, that the salt springs, once discovered, were appreciated by the Anglo-Americans for their salt-making potential; immediate benefits accrued only to the hunter who preyed upon the game attracted to the salt brine. Implying no greater use of the licks than for hunting, Thomas Walker wrote of the large salt lick at present-day Roanoke, Virginia, and the influence which the use of this saline exerted on the initial occupance of Virginia's Great Valley:³³

This lick has been one of the best places for game in these parts, and would have been of much greater advantage to the inhabitants than it has been if the hunters had not killed the buffaloes . . . and the elk and deer for their skins.

Perhaps the lack of protection against the Indian was the true cause of frontier retardation, a condition altered by the re-fortification of the West at the beginning of the American Revolution. The western garrisons gave eastern merchants a rationale for establishing the extended trade routes along which salt and other supplies moved freely. Whereas salt may have tied the settler to the coast, as Turner suggested, it seemingly did so only where eastern supply routes failed to penetrate the western wilderness. In western Virginia and Pennsylvania, as in Illinois, salt supplies were imported; originated along the Atlantic trade routes from England to the West Indies, a foreign salt product was distributed by way of Philadelphia and Baltimore. In addition, the establishment and supply of the western garrisons went hand in hand with the lifting of colonial restrictions on frontier settlement. With restrictions on settlement re-

³² Turner, *op. cit.*, footnote 2, p. 17.

³³ T. Walker, *Journal of an Exploration in the Spring of the Year 1750* (Boston: Little, Brown, and Co., 1888), p. 10.

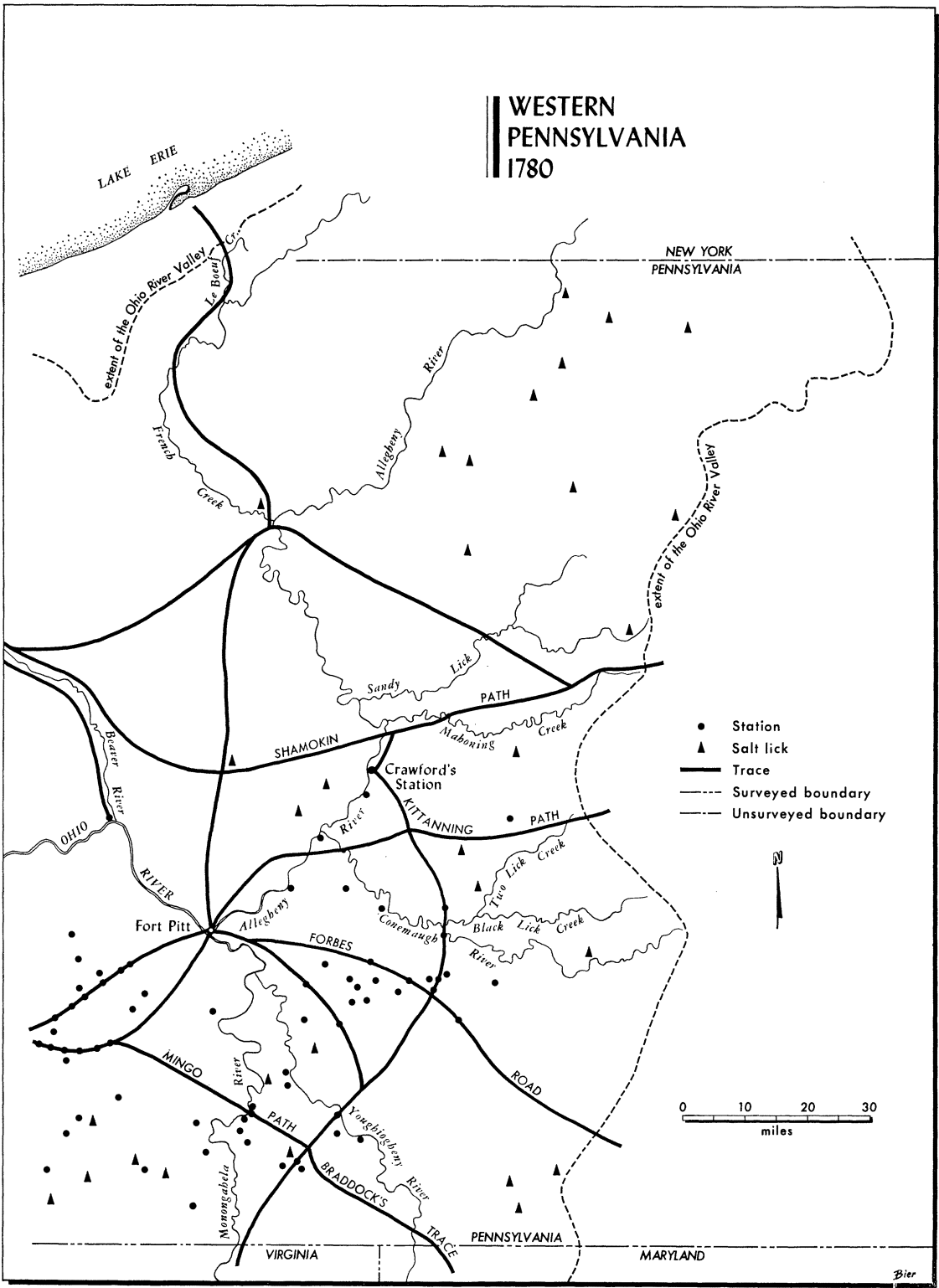


Fig. 2.

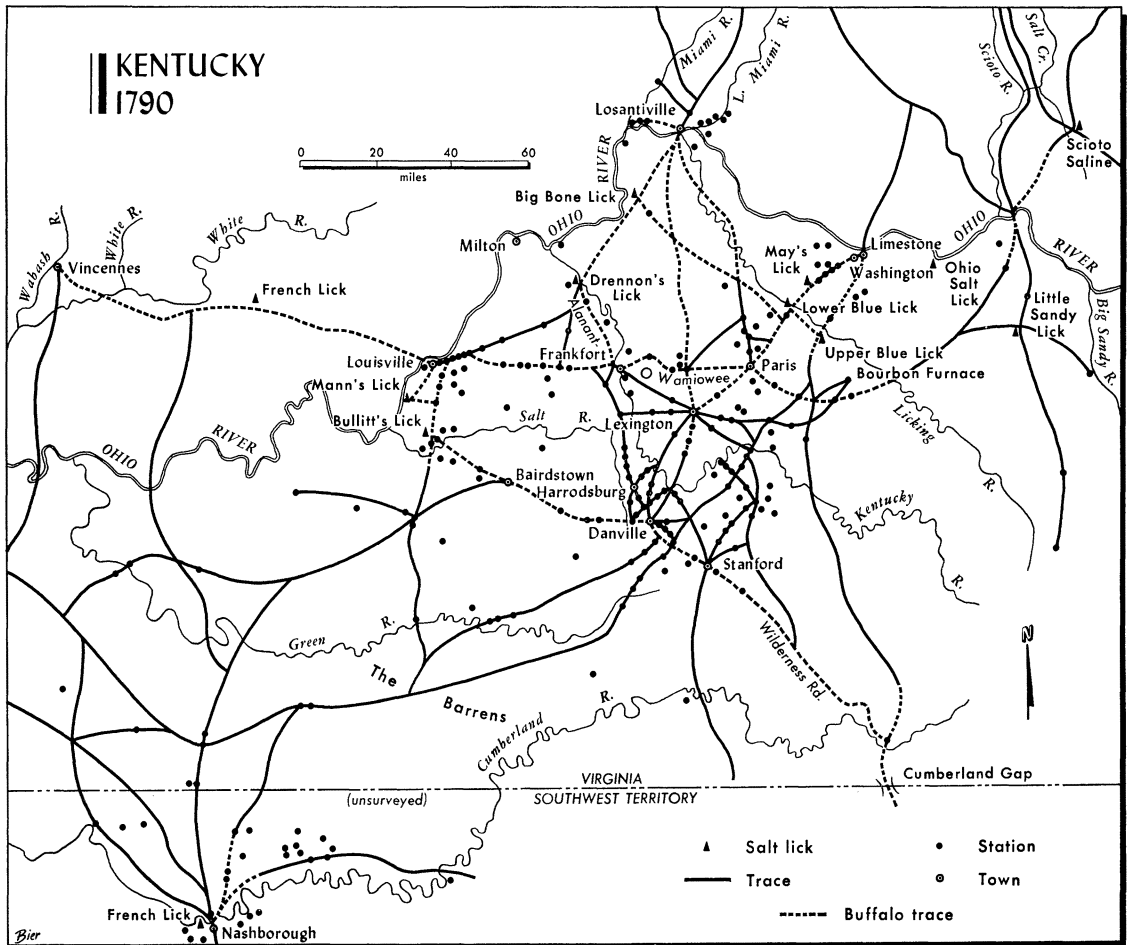


Fig. 3.

moved, the basic trade commodities available, and adequate protection assured, the large-scale migration into the Ohio Valley began.

Western Pennsylvania

In Pennsylvania, Fort Pitt represented the primary bastion on which the major supply routes focused. Lesser forts or "stations" were established in adjacent areas served by several of these routes: *i.e.*, Forbes' Road, Braddock's Trace, the Mingo Path, and the Kittanning Path respectively (Fig. 2). Generally, American settlers sought the relative isolation of individual farmsteads, but under threat of continual Indian attack their settlements most frequently became communal experiments conducted in the confines of fortified compounds.

The stations varied from small two-room blockhouses to large stockaded villages and although one cannot assume any size equivalent, each did represent a focal point for the common defense of an occupied neighborhood. So necessary were these stations to frontier survival, that one can safely assume all districts not so defended were, in fact, unoccupied. With the approach of open hostilities, isolated communities hastened to fortify as described in a letter written to George Washington by a neighboring landowner on the Pennsylvania frontier:³⁴

I have, with the assistance of some of your carpenters and servants, built a very strong blockhouse, and the neighbors, what few have not run away, have joined me and we are building a stock-

³⁴ Montgomery, *op. cit.*, footnote 7, p. 353.

ade fort at my house. Mr. Simpson, also, and his neighbors have begun to build a fort at your bottom; and we live in hopes we can stand our ground till we can get some assistance from below.

Salt's influence on the Pennsylvania frontier came not as a site factor underlying the specific positioning of fortified stations, but as a permissive factor. Settlements were necessarily located in areas of salt availability, *i.e.*, in districts served by trade routes. Most of the region's salt licks were peripheral to areas of settlement concentration suggesting that settlers did, in fact, obtain their salt supply through the commercial trade structure and not through subsistence-production efforts focused at local salines.

Kentucky

Fortified stations were particularly important to the defense of Kentucky, for the Virginia government initially proved reluctant to subsidize a large western garrison such as Fort Pitt. Stations came to provide a collective defense against Indian attack and were, therefore, closely oriented to the principal traces since mutual aid was based upon ease of interaction (Fig. 3). However, the quality of land was also a prime consideration when sites for settlement were chosen. The Kentucky stations, in contrast to Pennsylvania, represented initial settlement forms as they were not erected to defend already developed agricultural districts. Land improvement proceeded from the safety of the stockaded enclosures.

Prior to 1783, most Kentucky settlers came by way of Cumberland Gap which was not, unlike the Ohio River route, harassed by the Indians. On reaching the rich soils of the Blue Grass Basin, most of these early migrants located their settlements along the Wilderness Road and its several extensions. Hesitant to risk the farthest frontier, most chose land behind the buffer populations of Lexington and Harrodsburg (the district's two largest stations) thus fostering the large population concentration at Danville, later chosen as Kentucky's first capital (Fig. 3).

With the reopening of the Ohio River, settlers came increasingly by flatboat. Taking advantage of the superior landing at Lime-stone, many utilized the buffalo trace to gain access to the interior. Accordingly, settlements were closely oriented to the eastern por-

tion of the "Alanant-o-wamiowee." An important clustering of settlements also developed near Louisville which had emerged as an entrepot for the growing agricultural surplus which moved via the Ohio River to New Orleans. Numerous stations were erected along the old buffalo trace which now served as the principal trade route connecting the Blue Grass with the river. Settlements south of the Falls were oriented to Bullitt's Lick on the Salt River which had emerged as Kentucky's prime salt supplier. Only in this instance, however, did salt-making, as such, directly stimulate the concentration of a large pioneer population.

Salt influenced settlement distribution primarily through the derived mechanism of the buffalo trace system. The roads which became the major axes of settlement in Kentucky were created by the great herds of bison recently arrived in the Valley. It should be noted, nonetheless, that many buffalo traces did not appreciably affect the region's course of settlement. Even as late as 1790 few stations had been erected along the traces in the north for settlers were understandably reluctant to settle in areas highly vulnerable to Indian attack. In addition, the buffalo paths in this district took a north-south orientation. The Kentucky migration, however, was essentially a westward movement and only the east-west traces could provide the basic road network conducive to Kentucky's rapid growth.

Virginia, Tennessee, and the Northwest Territory

Buffalo traces did not strongly influence the positioning of settlement elsewhere in the Ohio Valley. In Pennsylvania, military roads laid the foundation for early settlement. Although a buffalo trace roughly paralleled the Kanawha and Greenbrier rivers in present-day West Virginia, that region's relative isolation, mountainous terrain, and less fertile soils discouraged large-scale settlement there. In the Territory north and west of the Ohio River, where buffalo traces also survived, the principal migration came by river; earliest settlement was oriented to water and not land routes. Only in Middle Tennessee did buffalo traces appreciably reinforce the initial settlement pattern; the concentration of stations in the rich Nashville Basin partially reflected

the high degree of accessibility provided by the buffalo paths which focused at the French Lick (Fig. 3).

SALT AND TOWN GROWTH

In addition to fortified stations, urban centers were important on the Valley's early settlement landscape. Towns developed to serve both the agricultural population concentrated along the traces and new settlers moving along these principal migration routes. Towns emerged at the major vertices of the trace system, at principal river crossings, and at sites along the Ohio River connected to the interior by the former buffalo roads. Although most towns began as stations, their evolution into urban centers proved most rapid. Thus by 1790, in addition to Lexington, Harrodsburg, Danville, Limestone (Maysville), and Louisville previously mentioned, Losantiville (Cincinnati), Washington, Paris, Frankfort, Stanford, Bairdstown, and Nashborough (Nashville) had also developed as urban places located along the Ohio Valley's former buffalo paths (Fig. 3).

Towns should be considered, therefore, an essential element in the Valley's early settlement fabric, as Wade has so persuasively argued.³⁵ Referring to the largest centers of Pittsburgh, Cincinnati, Lexington, and Louisville, he noted that "... the towns were the spearheads of the frontier. Planted far in advance of the line of settlement, they held the West for the approaching population."³⁶ Most urban centers in the Ohio Valley, however, developed only as focal points within a system of occupation generally characterized by historians as agricultural and thus rural. With the improvement of transportation, agriculture in the Valley became increasingly commercial in its orientation; farm products moved to distinctively urban places to be exchanged for imported commodities. To debate which was more important, the rural or urban settlement apparatus, is to obscure the basic point that both were mutually dependent. In real measure the town insured the success of the pioneer farmer whose efforts pointed toward commercial economy.

Salt played an important role in relating the

rural and urban economic sectors. Although most frontier settlers initially pursued a subsistence agriculture supplemented by the hunt, cattle-raising as a commercial endeavor was equally important. Indeed, the early Trans-Appalachian West was, in essence, a "cattleman's frontier" where the sale of beef or pork, either salted or on the hoof, enabled purchase of powder, lead, iron goods, and other necessities, and payment of annual tax bills and land obligations as well. Without an adequate salt supply frontier livestock could not survive nor, for that matter, could animals deprived of the vital dietary element be slaughtered, for such activity necessitated salt-curing. As salt was made available by merchants located in the towns where livestock and salted-meats were also marketed, commercial agriculture and urban growth are seen to have been mutually related through the mechanism of the salt trade.

THE SALT TRADE PRIOR TO 1783

Diagrammatic representation of the movement of salt within the Ohio Valley, at ten-year intervals between 1770 and 1820, indicates both well-established corridors of movement sustained by a permanent marketing apparatus and commercial ties, and lines of intermittent movement responsive to unstable patterns of demand lacking commercial ties (Fig. 4). The diagrams also depict changes which reflect both new sources of supply and new consumer markets.

The initial salt movement into the Ohio Valley came by way of the Illinois Country where French colonists manufactured salt at the several salines located near present-day Ste. Genevieve, Missouri. The French, unlike the English, recognized early the full resource value of the western salt springs and salt-making became a popular economic pursuit during the summer months. The French fur trade, military, mining, missionary, and agricultural establishments required large quantities of salt impossible to import owing to high transportation costs. Thus, a salt-making enterprise proved vital to French interests. When, after 1763, Spain took control of the Upper Louisiana salt springs, the English, as masters of the Ohio Valley, began to import their salt supply, finding it economically feasible to do so, having tied salt importation to the fur and hide

³⁵ R. C. Wade, *The Urban Frontier* (Chicago: The University of Chicago Press, 1964).

³⁶ Wade, *op. cit.*, footnote 35, p. 1.

trade. The exploits of George Morgan and his Philadelphia associates in moving salt to the interior have already been mentioned. Most of this foreign product originated on Tortuga and Turks Islands in the West Indies and although the Mississippi River was, perhaps, the logical trade corridor for its importation, Spain controlled the port at New Orleans forcing the English to ship the commodity across the Appalachian Mountains.

With the approach of open rebellion the American colonists placed an embargo on trade with England. This, coupled with the retaliatory British naval blockade, greatly reduced American salt imports. Merchants turned to privateering for salt whereas many plantation owners turned slave labor to boiling sea water. Prior to trade restrictions, salt sold on the coast at fifteen shillings per bushel, but by October, 1775, its price ranged from five to nineteen pounds sterling.³⁷ Great distress characterized the frontier as a letter written from Fort Pitt in 1777 indicates:³⁸

We have now about 5000 head of horned cattle in the neighborhood of this City which are daily growing poorer and cannot be killed for want of salt, of which we cannot get a Bushel. . . . The greatest part I think will die this winter.

It is not surprising that many frontier communities organized regulator movements and openly raided the dwindling coastal salt stores. Edmund Pendleton, chairman of Virginia's Committee of Correspondence, wrote in April, 1776, requesting ". . . the approved method of making it [salt], as we have suffered in other cases by setting out wrong."³⁹ He proposed ". . . to risque even a loss of Public money to secure an Article without which our own people will break through all restraint."⁴⁰

By late 1777, state-subsidized salt works along the coast had come to meet Virginia's minimal salt needs except that of the far-dis-

tant Kentucky Country. Whereas salt moved through Cumberland Gap, the Kentucky settlers lacked sufficient specie to sustain this overland trade connection indefinitely. Yet with the rapid growth of Kentucky's population a large demand for salt had been created. Conditions were ripe for the introduction of an American salt-making technology into the Trans-Appalachian West. As in the East, however, the real initiative which led Kentucky's pioneer element to tap the local salt resource came from the Virginia Government. In October, 1777, the House of Delegates recommended that a salt works be established at Bullitt's Lick and that a fort be erected at the Falls of the Ohio to offer the Kentucky settlers (the salt-makers included) protection against Indian attack.⁴¹ Profit from the sale of salt in western Pennsylvania and Kentucky was intended to support the proposed garrison housed eventually at Fort Nelson, around which the town of Louisville quickly evolved.

In November, 1779, Colonel William Fleming, head of the Virginia Land Commission, journeyed from Harrodsburg to the Falls. In his journal he described the salt-making operation introduced at Bullitt's Lick:⁴²

Bullitt's Creek as it is cald [sic] is perhaps the best Salt Springs in the Country. . . . They have a trough that holds very near 1000 gallons which they empty thrice in 24 hours. They have 25 kettles belonging to the Commonwealth which they keep constantly boiling . . . filling them up as the water waistes [sic] from the trough first into kettles which they call fresh water kettles and then into others. After this management . . . they put the brine into a Cooler and let it stand till cold and [then] draw off the clear brine into the last boilers underwhich they keep a brisk fire . . . till [the salt] grains. They then put it to drain. 3000 Gallons of water boiled down yields from 3 to 4½ bushels.

Although scores of salt licks had been discovered in Kentucky, only the largest and most accessible were actually developed, *i.e.*, Bullitt's Lick on the Wilderness Road and the Lower Blue Saline on the "Alanant-o-wamio-wee." Since salt was easily distributed along these traces, two corridors of high salt availability may be said to have existed. We have

³⁷ L. Morton, *Robert Carter of Nomini Hall* (Williamsburg, Virginia: Colonial Williamsburg, Incorporated, 1941), p. 183.

³⁸ J. Reed, letter of September 28, 1777, to the Continental Congress, in "Notes and Queries," *Pennsylvania Magazine of History and Biography*, Vol. 11 (1887), p. 502.

³⁹ E. Pendleton, letter dated April 28, 1777, to R. H. Lee, in D. J. Mays, *Edmund Pendleton 1721-1803, A Biography* (Cambridge, Massachusetts: Harvard University Press, 1952), p. 47.

⁴⁰ Mays, *op. cit.*, footnote 39, p. 47.

⁴¹ J. W. Wayland, *The Bowmans* (Staunton, Virginia: the author, 1943), p. 68.

⁴² W. Fleming, "Journal of Travels in Kentucky, 1779-1780," in N. D. Mereness (Ed.), *Travels in the American Colonies* (New York: MacMillan and Co., 1916), p. 620.

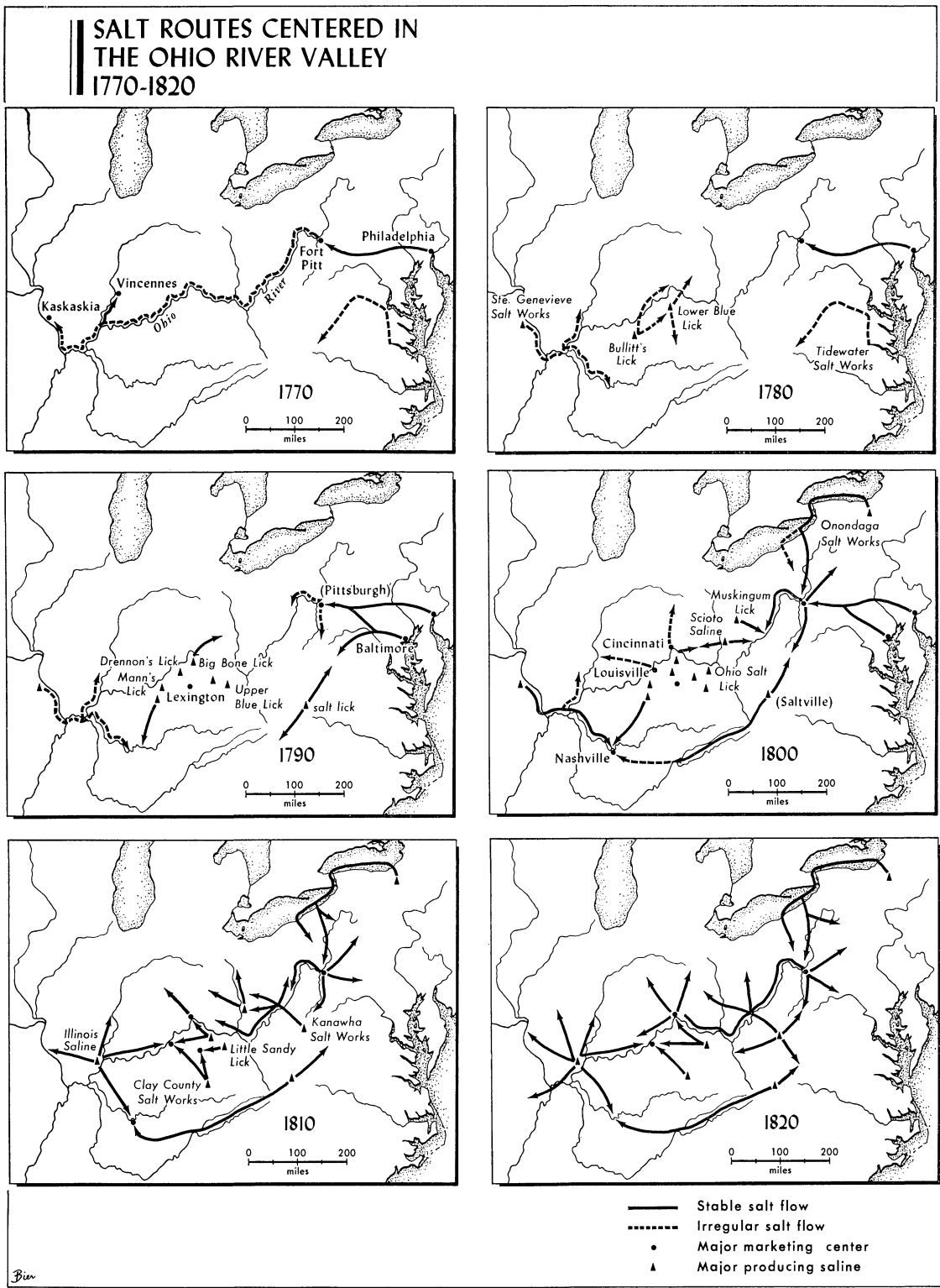


Fig. 4.

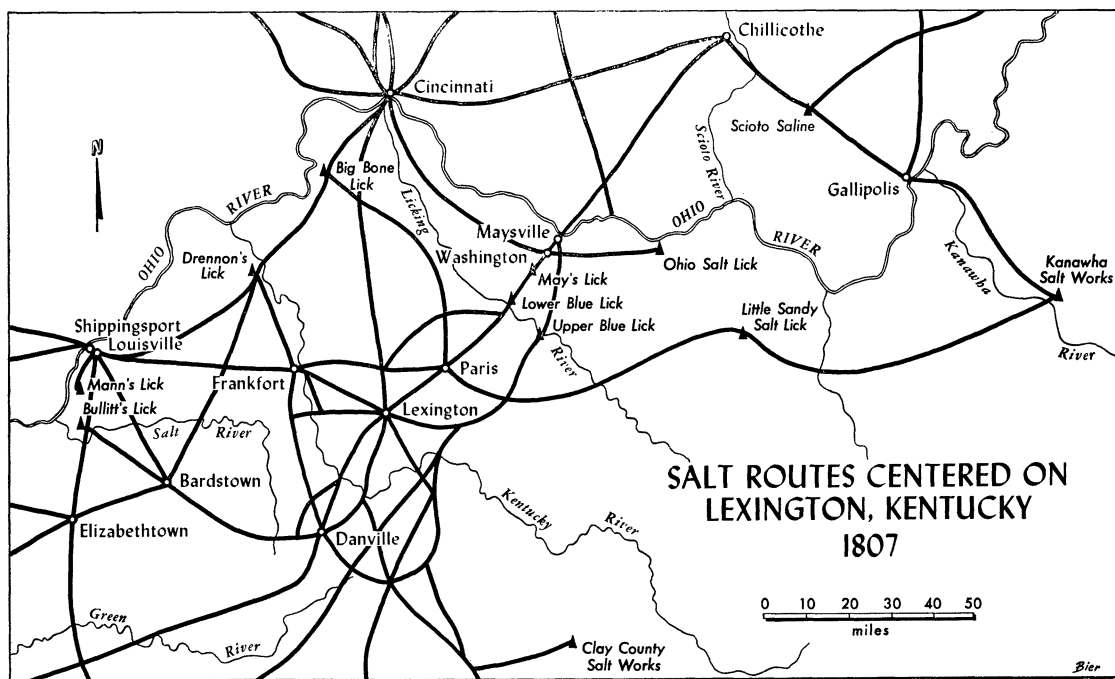


Fig. 5.

already observed the manner in which subsequent settlement came to concentrate along those major axes: a concentration reinforced, no doubt, by the salt convenience.

THE SALT TRADE 1783 TO 1820

Kentucky

By 1790, commercial salt manufacture had been established at most of the larger salt springs in the Blue Grass and the new salt-making technology had diffused to salines in Ohio and the Great Valley of Virginia as well. In Kentucky, nine salines became important salt producers, *i.e.*, the Bullitt's, Mann's, Lower Blue, Drennon's, May's, Big Bone, Little Sandy, Ohio, and Clay County licks (Fig. 5).

The Bullitt salt works was probably the most advanced as well as the largest salt operation. There the western salt industry first developed its salt-making technology as methods of operation, principles of furnace construction, and procedures of well-digging were perfected. The furnaces were comprised of long trenches walled with slate held by a clay mortar. The kettles, which contained about twenty-two gallons each, sat atop these excavations with as many as sixty kettles to a

pit. Each furnace was fired from the front and the flame and smoke was drawn beneath the row of kettles and out through a stone chimney at the far end of the trench.⁴³ Initially, the brine was obtained from shallow wells located near the original salt lick and supplied to the nearby furnaces in wooden troughs or flumes, but as the supply of fuel wood grew scarce the furnaces were moved to the remaining timber and brine was conveyed in pipelines made from gum or sassafras logs buried beneath the frost line.⁴⁴ A wildcat town, Saltsburgh, developed near the furnaces, for upwards to 800 laborers were employed at the saline.⁴⁵

In 1782, a salt station was established at nearby Mann's Lick and a company formed to regulate the salt trade of both salines.⁴⁶ By storing salt in large warehouses, thus withholding it from public consumption, the company successfully inflated prices. At the turn of the century production was shut down com-

⁴³ McDowell, *op. cit.*, footnote 6, p. 256.

⁴⁴ McDowell, *op. cit.*, footnote 6, p. 256.

⁴⁵ McDowell, *op. cit.*, footnote 6, p. 256.

⁴⁶ Deposit Station formed the urban nucleus for Newtown, Kentucky.

TABLE 1.—ESTIMATED PRODUCTIVE VALUE OF
SELECTED OHIO VALLEY SALT BRINES
PRIOR TO 1815

Saline	Brine required for one bushel of salt (in gallons)
Kentucky:	
Bullitt's Lick	1,000 ^a
Lower Blue Lick	1,000 ^b
Ohio:	
Scioto Salt Works	500 ^c
Illinois:	
U. S. Saline	180 ^d
West Virginia:	
Kanawha Salt Works	100 ^e

^a W. Fleming, "Journal of Travels in Kentucky, 1779–1780," in N. D. Mereness (Ed.), *Travels in the American Colonies* (New York: MacMillan and Co., 1916), p. 620.

^b V. Collet, "A Journey in North America [1810]," *Transactions of the Illinois State Historical Society*, Vol. 13 (1909), p. 290.

^c J. Cutler, *A Topographical Description of the State of Ohio, Indiana Territory, and Louisiana* (Boston: J. Belcher, 1812), p. 33.

^d Report of W. Prince to the Secretary of the Treasury [1803], in C. E. Carter (Ed.), *The Territorial Papers of the United States*, Vol. VII (Washington, D.C.: Government Printing Office, 1939), p. 109.

^e D. Ruffner, "The Kanawha Salt Works," *Niles Weekly Register*, Vol. 8 (April 22, 1815), p. 135.

pletely and the price of salt rose to a high of three dollars a bushel.⁴⁷ Competition from newly erected salt works in eastern Kentucky, western Virginia, and southern Illinois, however, prompted resumption of salt-making operations and, by 1805, fourteen furnaces with sixty kettles each were in service producing an average of 1,400 bushels of salt weekly.⁴⁸

At the Lower Blue Lick, salt was produced commercially for more than two decades, but the small furnaces which operated under a succession of owners and lessees could not compete effectively with the Saltsburgh operation, for the local brine was weak and thus the fuel and labor costs greatly inflated. Table 1 offers ready comparison of selected Ohio Valley salt works according to the strengths of their respective brines. Salt-making slowly declined and by 1820 only the small hotel, which then functioned as a spa, survived from the salt-making period. An Englishman penned the following tribute:⁴⁹

⁴⁷ McDowell, *op. cit.*, footnote 6, p. 256.

⁴⁸ H. Bartlett, "Diary of a Journey to Ohio and Kentucky, 1805," *Virginia Magazine of History and Biography*, Vol. 19 (1941), p. 76.

⁴⁹ Faux, *op. cit.*, footnote 12, p. 337.

Passed the creek at Blue Lick, belly deep, with sulphurous water running from a sulphur spring, once a salt spring. The water stinks like the putrid stagnant water of an English horse-pond, full of animal dung. This is resorted to for health.

Drennon's, May's, and Big Bone licks were hardly as successful as the Lower Blue salt operation; indeed, these salines were also developed as health resorts once salt-making ceased shortly after 1800.

The Ohio Salt Lick enjoyed a greater prosperity as we read from the journal of Andrew Ellicott who visited the site in 1796:⁵⁰

The salt works . . . are about one mile from the [Ohio] river in the State of Kentucky . . . 300 gallons of the water produce one bushel of salt . . . they had 170 iron kettles and made about 30 bushels of salt per day, which sold for 2 dollars cash per bushel or 3 dollars in trade, as they term it.

Cuming recorded the following impression in his journal for 1807:⁵¹

A furnace requires eight men to do its work, whose wages are from twenty to twenty-five dollars per week each. The proprietors of each furnace pay a year's rent from three to five hundred bushels of salt to the proprietors of the soil. The valley in which the springs are [located] is small, and surrounded by broken and rather barren hills, but [produces] wood enough to supply the furnaces with fuel constantly. . . . There is a wagon road of seventy miles from hence to Lexington, through a country settled the whole way. The road passes the Upper Blue Licks where are also salt springs and furnaces, not nearly however, so productive as these.

After 1810 sophisticated well-drilling techniques enabled salt production at many licks whose surface waters had previously been totally nonproductive as in Clay County. James Collins, a hunter and the county's first settler, discovered salt brine by following a buffalo trail; there he built a cabin and manufactured the first salt in 1798.⁵² In 1810 there were four establishments in the district producing at a capacity of over 70,000 bushels a year.⁵³ This, coupled with the equal production of the

⁵⁰ A. Ellicott, *The Journal of Andrew Ellicott* (Philadelphia: T. Dobson, 1803), pp. 14–15.

⁵¹ F. Cuming, *Sketches of a Tour to the Western Country* (Pittsburgh: Carner, Spear, and Eichbaum, 1810), p. 143.

⁵² White, *op. cit.*, footnote 6, p. 240.

⁵³ M. Verhoeff, "The Kentucky River Navigation," *Filson Club Publications*, Vol. 28 (1917), p. 153.

TABLE 2.—ANNUAL PRODUCTION OF SALT IN BUSHELS, 1810 AND 1829

Area	1810	1829 ^a
Kanawha County, Virginia	740,000	925,000
Western Pennsylvania	no data	750,000 ^b
Ohio	24,000	426,350
Kentucky	324,870	137,320
Illinois	150,000	138,000
Indiana	no data	no data
Tennessee	no data	no data

^a The Census of 1820 gives only capital invested.

^b Estimate.

Source: U. S. Census 1810, 1830.

Little Sandy Lick also located in the eastern mountains, accounted for over half the state's total salt output⁵⁴ (Table 2). Thus, the salines of eastern Kentucky came quickly to exert an influence on the Ohio Valley salt market aided, no doubt, by the attempted Bullitt's Lick salt monopoly.

At the close of the American Revolution, salt was in such great demand that customers were not only obliged to pay inflated prices, but were also required to absorb transportation costs by purchasing directly from the salt producers. As the salt supply increased, however, merchants began to speculate in the commodity and it became increasingly plentiful in the merchantile houses of Lexington, Louisville, Frankfort, and other towns. Indeed, surplus salt which entered the Ohio River trade was shipped to Nashville, Cincinnati, and, on occasion, even as far east as Pittsburgh.

James Wilkinson, whose attempt to tie Kentucky to Spanish Louisiana later brought accusations of treason, became Kentucky's first salt merchant. Wilkinson's political intrigues were firmly anchored on the economic fact that Spanish New Orleans at the mouth of the Mississippi River remained Kentucky's logical market outlet. Salt played an important role in his attempt to develop this trade connection. From Danville in December, 1786, Wilkinson wrote the following letter to his agent Nathaniel Massie, later famous as a merchant and land speculator on the Ohio frontier:⁵⁵

I beg you to proceed with all possible dispatch to the falls. You will call by the lick, and urge the

provision of salt; and prepare some way to Nashville, and there dispose of it for cotton, beaver furs, raccoon skins, otter, etc. . . . when you have completed your sales, you will yourself move with the horses etc., by land, and commit the other articles, with the barge of Capt. Alexander. . . . The goods which . . . Alexander carries down to the falls, I wish you to sell . . . for cash, peltry, or cotton. One Smith is preparing to go down with two or three hundred bushels from the lower lick. Endeavor to get off before him.

Salt was the one commodity readily converted into cash and the one commodity readily accepted in barter. Participation in the salt trade, therefore, proved requisite to assembling goods for shipment, either down the Mississippi River or elsewhere. On September 6, 1788, Wilkinson advertised that he had received a quantity of salt which he desired to exchange for tobacco.⁵⁶ Tobacco cost \$2.00 per hundredweight in Kentucky, but sold for \$9.50 at New Orleans.⁵⁷ Wilkinson obtained tobacco in excess of 35,000 pounds and shipped it down the Ohio and Mississippi to the Spanish port, greatly stimulating the cultivation of tobacco in the Blue Grass area.⁵⁸

The increasing supply of salt and the development of the river trade fostered the Valley's livestock industry, placing it on a commercial level. For example, one James Morrison advertised in 1795 for 30,000 pounds of salt pork for the southern trade.⁵⁹ Similarly, in 1800, another enterprising merchant sought several thousand pounds of pork for which he intended to exchange salt.⁶⁰ In 1801 the *Kentucky Gazette* contained a list of commodities which were shipped from Louisville in the preceding year; 92,300 pounds of pork, 91,300 pounds of bacon, 14,860 pounds of dried beef, 2,587 pounds of butter, and 8,718 pounds of biscuit were included.⁶¹

The salt trade also stimulated Kentucky's early iron industry. The Old Slate Furnace (also called the Bourbon Furnace) was the first iron works west of the Appalachian Mountains. Christopher Greenup of the Ohio Salt Lick advertised in 1790 for stonemasons, carpenters, quarriers, woodcutters, and other

⁵⁶ *Kentucky Gazette*, September 6, 1788.

⁵⁷ C. R. Staples, *History of Pioneer Lexington* (Lexington, Kentucky: Transylvania Press, 1939), p. 55.

⁵⁸ Staples, *op. cit.*, footnote 52, p. 55.

⁵⁹ Clark, *op. cit.*, footnote 6, p. 45.

⁶⁰ *Kentucky Gazette*, February 6, 1800.

⁶¹ *Kentucky Gazette*, May 18, 1801.

⁵⁴ Verhoeff, *op. cit.*, footnote 53, p. 153.

⁵⁵ R. H. Collins and L. Collins, *Collins's Historical Sketches of Kentucky* (Louisville: J. P. Morton and Co., 1924), p. 370.

laborers to erect this facility east of Lexington where iron ore, lime, and timber were readily available and where the steep gradient of Slate Creek proved adequate to the powering of the mill's machinery.⁶² This and the other early pioneer furnaces were frequently called "salts" because their iron product was usually cast in forty inch pots used for evaporating salt.⁶³

As a stimulus to commercial economy, the salt trade fostered urbanization, as previously discussed. Salt, absolutely essential to the Valley's growing livestock industry, was in constant demand. When a fluctuating business cycle curtailed the trade of other goods, the salt exchange kept trade routes open and the region's early commercial structure intact. As we have seen, the commerce in salted meat, iron goods, and tobacco was clearly related to salt's availability; indeed, salt used as a medium of exchange figured in a wide range of trade activities centered in urban places. Frequently salt-centered commercial success was directly translated into urban development as in the case of Kentucky's second capital, Frankfort. The town, laid out in 1786 by James Wilkinson, developed at the site of his principal warehouse.

Salt commerce also fostered road and river improvement which further strengthened the region's urban structure. In 1810 the Kentucky legislature subsidized road construction connecting the newly established Clay County salt operations with the Wilderness Road.⁶⁴ In actions initiated at the local level, many counties had already constructed so-called "salt roads." Many followed former buffalo traces, as the Mann's Lick Road which led south from Shippingsport. Kentucky's internal improvement act of 1811 established a lottery whereby \$10,000 was to be raised to clear and straighten the Kentucky River together with its tributaries as far as the Clay County salt works of James Garrard, son of the governor.⁶⁵ The improved highways and rivers meant

lower transportation costs and consequently lower salt prices; at least, that was the reward that vested interests held before the public.

Western Pennsylvania

Although Kentucky produced a domestic salt product after 1778, settlers in western Pennsylvania continued to import their salt supply. Initially, the high cost of transporting salt forced most frontier communities to purchase the vital article in eastern markets, thus absorbing the costs of shipment through the expenditure of labor. Turner attached great importance to the annual "salt pilgrimages," as he termed them, for they kept westerners in contact with eastern society and the annual trek across the mountains opened new opportunities for trade.⁶⁶ Cuming commented as late as 1810 that "Countrymen, sometimes alone, sometimes in large companies carry salt from McConnelstown and other points of navigation on the Potomack and Susquehanna."⁶⁷

After 1800, however, Pennsylvania's salt came increasingly from the Onondaga salt springs located at Salina, New York (present-day Syracuse). The New York product first entered the Ohio Valley in large quantities when James O'Hara, the Army's quartermaster general, having obtained a government contract to supply barrels of salt to the federal fort at Oswego, realized the value of the empty containers for shipping the desired commodity into Pennsylvania. From Salina, barrels of salt intended for Pittsburgh and other points moved to the lake port at Oswego. Placed aboard schooners, the salt was shipped to Queenstown in Ontario, hauled by oxcart around Niagara Falls, again packed aboard ships at Chippawa, and sent across the southern lake to the port at Erie. From thence the salt moved by pack-animal (later by wagon) to the waters of the Allegheny River where, loaded onto flatboats, it proceeded downstream (Fig. 6).

Along the Pennsylvania salt-route towns developed at Erie and at Waterford to perform the necessary break-of-bulk functions. A turnpike was constructed between the two centers to further facilitate the salt movement.

⁶² *Kentucky Gazette*, May 3, 1790.

⁶³ Federal Writer's Project, *Kentucky, A Guide to the Blue Grass State* (New York: Harcourt, Brace and Co., 1939), p. 235.

⁶⁴ Kentucky General Assembly, *Acts*, December 18, 1810, p. 93.

⁶⁵ Kentucky General Assembly, *Acts*, January 10, 1811, p. 113.

⁶⁶ Turner, *op. cit.*, footnote 2, p. 17.

⁶⁷ Cuming, *op. cit.*, footnote 51, p. 46.

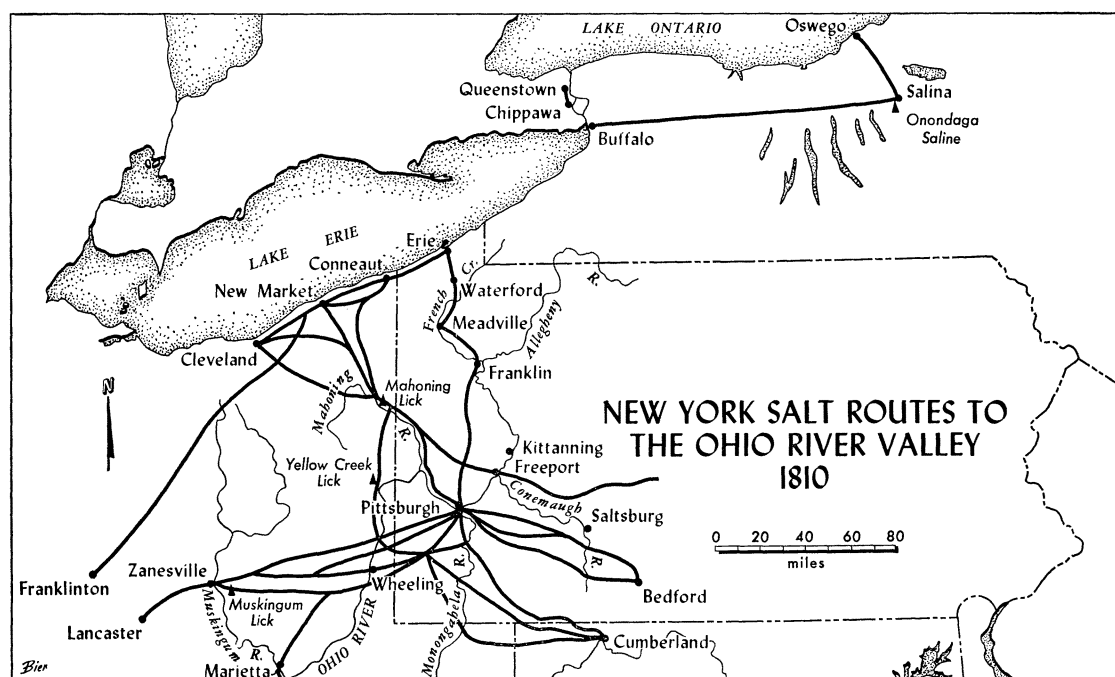


Fig. 6.

A Meadville newspaper reported in 1805 that:⁶⁸

Eleven flat-bottomed and six keel-boats loaded with salt passed by this place during the last fresh in French Creek the former carrying on an average 170, and the latter 60 barrels each, making in the whole 2,230 barrels. This computed at 11 dollars per barrel at this place amounts to 24,530 dollars; the selling price in Pittsburgh is now 13 dollars, which will make it amount to 28,990 dollars. [One barrel was equal to approximately five bushels.] During the preceding summer, spring, and winter more than double the foregoing quantity has been brought across the carrying place between Erie and Waterford, which was either consumed in the country bordering on the Allegheny and Ohio Rivers, or in this and the neighboring counties amounting in the whole to upwards of 80,000 dollars.

With the opening of the Waterford route the price of salt in western Pennsylvania fell. Originally sold at eight to ten dollars per bushel, the Pittsburgh Gazette in 1803 advertised "lake salt of a superior quality" at \$2.75 per bushel.⁶⁹ In 1798 some 59,000 bushels of

salt were manufactured at the various Onondaga salt works with six percent of this total passing through the port at Erie.⁷⁰ Twelve years later the New York saline produced over 500,000 bushels of salt with fourteen percent, or 57,000 bushels moving to Pennsylvania.⁷¹

The influence of the salt trade on town growth is well illustrated in Pennsylvania's Northwest. In addition to Erie and Waterford, a string of towns, including Meadville, Franklin, Kittanning, and Freeport, developed along the Allegheny corridor. Although commerce was not limited to salt alone, it is clear that urbanization in the region would not have been as rapid without the catalytic salt trade. Keelboat traffic, sustained by the salt commerce, offered two-way connection with Pittsburgh; thus the Allegheny towns functioned early both as assembly points from which the region's farm surplus moved to market and as points for the distribution of manufactured goods and other imported commodities.

⁶⁸ *Crawford Weekly Messenger* (Meadville, Pennsylvania), December 12, 1805.

⁶⁹ J. N. Boucher, *Old and New Westmoreland* (New York: American Historical Society, 1918), p. 520; *Pittsburgh Gazette*, December 16, 1803.

⁷⁰ New York Assembly, *Journal*, Twenty-Second Session, 1799, p. 171; L. D. Baldwin, "The Rivers in the Early Development of Western Pennsylvania," *Western Pennsylvania History Magazine*, Vol. 16 (May, 1933), p. 94.

⁷¹ Baldwin, *op. cit.*, footnote 70, p. 94.

In southwestern Pennsylvania urban centers developed at vertices in the trace system in areas of highest population density where previously the fortified stations had been most highly concentrated. Prior to 1820, however, only one town, Saltsburg, had evolved in direct response to salt commerce. There, along the Conemaugh River, one William Johnson successfully drilled for salt about 1810, having first established a grist mill to sustain his salt exploration; the mill and salt works formed the nucleus around which the town emerged.⁷² Salt-making in Pennsylvania was not a pioneer activity but was, to the contrary, the outgrowth of a well-established commercial economy. At Saltsburg, for example, Johnson enjoyed a mature transportation structure and an already large and well-defined salt market upon which to base his own salt-making endeavor.

The Northwest Territory

Settlers in southeastern Ohio initially secured Onondaga salt by way of Pittsburgh and the Ohio River (Fig. 6). In 1809 the Meadville, Pennsylvania, newspaper again reported that at Waterford there were "... upwards of fourteen thousand barrels of salt, containing five bushels each ... waiting the raise of those waters in order to descend to Pittsburgh, Wheeling, and Marietta."⁷³ In southwestern Ohio Judge Symmes, the region's principal colonizer, intended initially to import salt from Kentucky; indeed, he engaged one Isaac Taylor to establish a road to Lexington for purposes of salt importation. Taylor marked the existing buffalo trace southward from Cincinnati (Fig. 5). Symmes then advertised for settlers in the East:⁷⁴

Salt is now made to any quantity in Kentucky, opposite this tract on the southeast side of the Ohio, where seven counties are already considerably settled and where any number of neat-cattle may be had very cheap.

With the development of local salt works along the Scioto and Muskingum rivers and along Yellow Creek, however, settlers came to lean increasingly on a locally produced commodity.

TABLE 3.—FEDERAL RESERVATION OF SALINE LANDS IN THE OHIO VALLEY

State	Dates of reservation	Total reserved in acres
Ohio	1796, 1802, 1804	24,216
Indiana	1816	23,040
Illinois	1818	121,629
Kentucky	—	0
Tennessee	—	0
Virginia	—	0

Source: U. S. Public Land Commission, *The Public Domain* (Washington, D.C.: Government Printing Office, 1884), p. 217.

In the Western Reserve salt was first brought from New York State at twelve to twenty dollars a barrel.⁷⁵ Shipments were made across Lake Erie to Conneaut, New Market, and Cleveland and thence into the settled interior over "salt roads" constructed southward from the lake (Fig. 6). In 1804, by way of example, Bemis and David Niles surveyed a trace from the mouth of Conneaut Creek to connect with trails leading to the Mahoning Saline. This road was used initially to carry salt southward, but later enjoyed a reversal of the salt movement when, following the introduction of improved drilling techniques, a salt works developed at the Mahoning Spring. The town of Saltsburgh (later renamed Niles) was established adjacent to this salt operation.

As the lack of governmental control had prompted monopolistic abuse in Kentucky, Ohio's salt resources were deliberately reserved to the public good; indeed, a total of 24,216 acres were set aside assuring the State control of both the salt springs and the surrounding timber lands.⁷⁶ The acreages reserved in the various states of the Northwest Territory are given in Table 3. Laws regulating the management of the "Public Salt Works" prevented individuals from operating more than 120 or less than thirty kettles; for the privilege of making salt, lessees initially paid annual rents of twelve cents a gallon

⁷² Boucher, *op. cit.*, footnote 69, p. 521.

⁷³ *Crawford Weekly Messenger* (Meadville, Pennsylvania), November 23, 1809.

⁷⁴ *Brunswick Gazette and Weekly Monitor* (Brunswick, New Jersey), January 8, 1788.

⁷⁵ J. Badger, *Memoir of the Rev. Joseph Badger* (Hudson, Ohio: the author, 1851), p. 131.

⁷⁶ *American State Papers*, Fourth Congress, Second Session, p. 896; U. S. Public Land Commission, *The Public Domain* (Washington, D.C.: Government Printing Office, 1884), pp. 217–18.

based on the capacity of their kettles.⁷⁷ Rents were quickly reduced (first to four cents and then to two cents), for the Ohio brines were generally weak and the state's surcharge only heightened the Ohio producer's competitive disadvantage in the Valley's salt market.⁷⁸

The Scioto Lick was by far the most important saline in Ohio. The exact date of discovery by the whites is unknown, but it was probably located during the mid-eighteenth century by French fur traders. For several decades the Indians made salt at the lick, having adopted the European's taste for the commodity. Whereas small amounts of sodium chloride taken indirectly through the consumption of game had been adequate to the Indian diet previously, salt used in large quantities demanded sustained consumption at high levels.⁷⁹ Thus, the Shawnee and the other Ohio tribes, including the Seneca and the Delaware, were eventually trapped by an inadequate salt technology. Incapable of meeting their salt needs, they became increasingly dependent upon the white man for their salt supply. As hunters with complementary agriculture, the Indians developed seasonal migratory patterns in their search for game (including the dwindling buffalo herds) and salt, both found at the salines. The Indian pattern of migration became one of continual movement between the larger salt springs.

Although Congress had reserved a township at the Scioto Lick, as at every large salt lick in the Northwest Territory, provisions were not properly made to lease the saline until after statehood had been achieved. Thus, for many years salt production remained in the hands of squatters who came in the summer, made salt illegally for a few months, and then dispersed with the approach of winter.⁸⁰ These transients did not attempt an extensive improvement of the saline, for the common law of the camp which secured their property titles did not hold when they were absent. Following statehood this situation quickly

changed and, by 1807, twenty furnaces were in operation, producing an average of fifty to sixty bushels of salt per week; initially, five to seven hundred gallons of brine were required to make a bushel of fifty pounds weight.⁸¹

The Scioto Saline, located in Ohio's Jackson County, declined in importance as eastern Kentucky and western Virginia salt producers rose in prominence after 1810. Yet before its decline, salt-making stimulated industrial activity of a different sort. As in Kentucky, the demand for iron kettles and evaporating pans gave impetus to iron manufacture as timber, coal, iron ore, and lime were readily available along Little Salt Creek. To the east along Yellow Creek in Jefferson County, the salt industry similarly fostered iron manufacturing centered eventually at Steubenville.⁸² In addition, Ohio's salt industry encouraged coal production, for an inadequate fuel supply was a general problem wherever salt was manufactured by the evaporation process.⁸³ In 1810 the Ohio Legislature offered rent rebates to any "salt boiler" who successfully introduced "mineral coal" into his operation.⁸⁴ At the Scioto works, where two coal seams were exposed in the adjacent hills, coal began to replace wood in the furnaces as early as 1807.⁸⁵

Salt's greatest influence on the Northwest Territory's early settlement, however, came not as a stimulus to resource development, but through the Indian's growing need for salt. Following the American victory at Fallen Timbers, the federal government inadvertently pursued a land acquisition policy aimed at depriving the various tribes of their Ohio Valley salt springs thus, presumably, to weaken the Indian's economic base. Generally speaking, areas containing large salt springs were the

⁸¹ S. P. Hildreth, *Pioneer History* (Cincinnati: H. W. Derby and Co., 1849), p. 409; "Observations on the Saliferous Rock Formation in the Valley of the Ohio," *American Journal of Science*, Vol. 24 (1833), p. 48.

⁸² *History of the Upper Ohio Valley* (Madison, Wisconsin: Brant and Fuller, 1890), Vol. II, p. 393.

⁸³ T. R. Joynes, "Memoranda Made on a Journey to the States of Ohio and Kentucky, 1810," *William and Mary College Quarterly*, Vol. 10 (1902), p. 153.

⁸⁴ C. Whittlesey [Editor's report], *Ohio Mining Journal*, Vol. 2 (1883), p. 15.

⁸⁵ W. Stout, "Ohio Mineral Resources, Part I, Coal," *Ohio State University Engineering Experiment Station, Circular*, Vol. 15 (1944), p. 3.

⁷⁷ S. P. Hildreth, "Early History of Salt Manufacture," *Annual Report of the Ohio Geological Survey*, Vol. 1 (1837), p. 70.

⁷⁸ Hildreth, *op. cit.*, footnote 77, p. 70.

⁷⁹ See H. Kanitz, "Causes and Consequences of Salt Consumption," *Smithsonian Institution, Annual Report* (1957), pp. 445-53.

⁸⁰ D. W. Williams, *A History of Jackson County, Ohio* (Jackson, Ohio: the author, 1900), Vol. I, p. 66.

first to be freed of Indian claim and hence the first to be settled by American farmers.

As the Treaty of Greenville deprived the Shawnee and their allies of the Ohio salt springs, the subsequent Indian migration to the west found the tribes concentrated seasonally at the Illinois Saline, near present-day Shawneetown, and at various other licks in southern Indiana, including the French Lick.⁸⁶ In 1803 in separate negotiations at Fort Wayne and Vincennes, William Henry Harrison, Governor of Indiana Territory, successfully forced the assembled tribes to cede first the Shawneetown area and then the whole of southern Illinois in return for annual annuity payments which included a guaranteed salt supply. Harrison had written to the Secretary of War, Albert Gallatin, in March of 1802:⁸⁷

With respect to this salt spring [the Illinois Saline] which the chiefs who were at the seat of government lately expressed a desire to lease [to us], my opinion is, that it would be altogether improper to comply with their request considering both the present advantage of the Indians and the interest of white settlers, now and in time to come. The spring alluded to is perhaps the very best in the whole extent of country from the Allegheny Mountains to the Mississippi, and may, if the preservation of the wood in the neighborhood be properly attended to, give so large a supply of salt as very considerably to reduce the price of that indispensable article in all the settlements of the Ohio and the navigable branches of that region . . . the better plan appears to be to extinguish the title altogether to the spring and a small tract around it; the United States could very well afford to give each of the tribes a sum equal to one year's annuity for the spring and 10,000 acres around it.

With the government's attention focused on southern Illinois, large tracts of Indiana Territory adjacent to populated Kentucky and Ohio were not opened to American occupancy until well after 1810. Squatters, nevertheless, invaded these lands to precipitate Indian unrest only compounded by the Government's inability to properly arrange the annual salt payments called for by the various land treaties. Thus underlying the Indian's participation in the War of 1812 was a salt controversy mani-

fest in American land acquisition through both treaty negotiation and treaty violation.

Government control of the Indiana and Illinois salt springs began with the reservation of the Illinois Saline. Set aside was a rectangular tract ten miles wide and sixteen miles long supplemented by a strip three miles in width running to the mouth of the Saline River. Although a total of 144,669 acres were eventually reserved in the two states, numerous salines escaped detection until after land sales had been completed.⁸⁸ Thus, in 1816 a frontier traveler advised prospective immigrants to Indiana that:⁸⁹

salt springs of great value in the New Purchase . . . have been partially examined, but as the Government of the United States reserves the land which include such, if known before the sale, individuals who explore deem it prudent to be silent.

Yet no salt springs were ever discovered that could rival the Illinois Saline, which came to supply the whole of Indiana Territory and even exported salt to Middle Tennessee and Missouri (Fig. 7). Sale of the Illinois product also helped to break the salt monopoly in Kentucky. Many Kentuckians and Tennesseans, having journeyed to Shawneetown for salt, later returned bringing families to settle in southern Illinois. The salt spring, which became the focal point for roads leading to Vincennes, Kaskaskia, and Nashville, came to funnel a sizable migration into the Illinois Country; at nearby Shawneetown the federal government established a land office in 1804 to service the migratory tide.

After 1810 the district's principal salt-making operations were shifted to the Half Moon Salt Lick where the town of Equality evolved. Obtained from shallow wells, between 125 and 280 gallons of the brine produced a bushel of salt.⁹⁰ This gave the various works a definite competitive advantage in the Lower Ohio Valley salt market. From 1807 until Illinois was admitted as a state in 1818, the rentals accruing to the federal government

⁸⁸ U. S. Public Land Commission, *op. cit.*, footnote 76, p. 217.

⁸⁹ D. Thomas, "Travels Through the Western Country in the Summer of 1816," in H. Lindley (Ed.), *Indiana As Seen By Early Travelers* (Indianapolis: Indiana Historical Commission, 1916), p. 562.

⁹⁰ A. H. Worthen, *Economic Geology of Illinois* (Springfield: Illinois Geological Survey, 1882), p. 562.

⁸⁶ The Illinois Saline was also known as the "Wabash" and as the "U. S. Saline."

⁸⁷ W. H. Harrison, letter of March 25, 1802, to A. Gallatin, in L. Esarey (Ed.), "Messages and Letters of William Henry Harrison," *Indiana Historical Collections*, Vol. 7 (1922), p. 47.

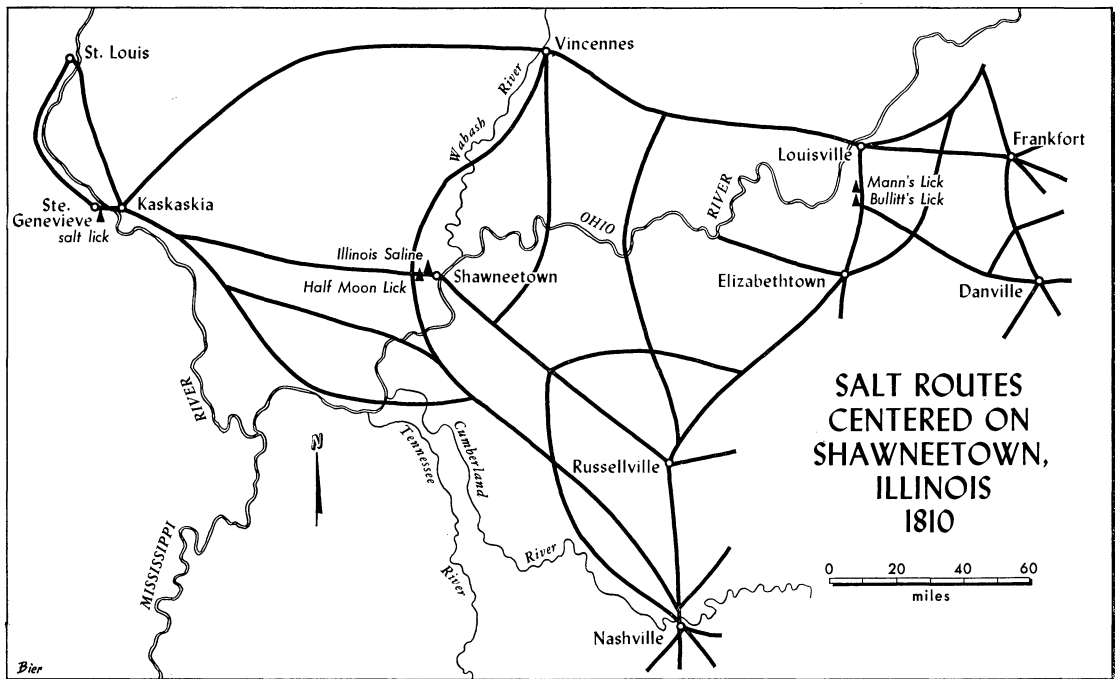


Fig. 7.

from the "U. S. Saline" totalled \$158,394, and bushels of salt turned into the treasury during the same period were valued at \$28,160 making the region's salt industry an important revenue source for the support of the Illinois territorial government.⁹¹

Tennessee and Western Virginia

The weak brines of Tennessee did not sustain commercial salt production, although pioneer salt-making did characterize the early years of settlement particularly in Middle Tennessee. As in Kentucky, private interests rushed to control the area's salt resources partially in the belief that the Cumberland Basin lay within Virginia's jurisdiction and was thus subject to that government's laissez-faire land policies. George Rogers Clark purchased the French Lick at later-day Nashville only to lose the property when North Carolina reserved the area's salines, setting a precedent for subsequent legislation in the Old Northwest.⁹²

⁹¹ G. W. Smith, "The Salines of Southern Illinois," *Publications of the Illinois Historical Library*, No. 9 (1904), p. 249.

⁹² W. A. Provine, "Lardner Clark, Nashville's First Merchant and Foremost Citizen," *Tennessee Historical Magazine*, Vol. 3 (1917), p. 115.

Clark wrote to Patrick Henry in 1778 immediately prior to his victory at Vincennes:⁹³

I learn that the government has reserved . . . lands on the Cumberland. . . . If I should be deprived of a certain tract of land on that river which I purchased three years ago, and have been at a considerable expense to improve, I shall in a manner lose my all. It is known by the name of great French Lick on the south or west side containing three thousand acres. If you can do anything for me in saving it, I shall forever remember it with gratitude.

Salt was first carried to the Tennessee settlements from salines in Missouri. The younger Michaux wrote:⁹⁴

Although this country [Middle Tennessee] abounds with saline springs, none are yet worked as the scarcity of hands would render the salt dearer than what is imported from the salt pits of Ste. Genevieve which supply all Cumberland.

⁹³ G. R. Clark, letter to P. Henry, in A. Henderson, *The Founding of Nashville* (Henderson, Kentucky: the author, 1932), unpagged.

⁹⁴ F. A. Michaux, *Travels to the West of the Allegheny Mountains in the States of Ohio, Kentucky, and Tennessee and Back to Charleston, By the Upper Carolines* (London: B. Crosby and Co., 1805), in R. G. Thwaites (Ed.), *Early Western Travels, 1748-1846* (Cleveland: A. H. Clark, 1904), Vol. III, p. 280.

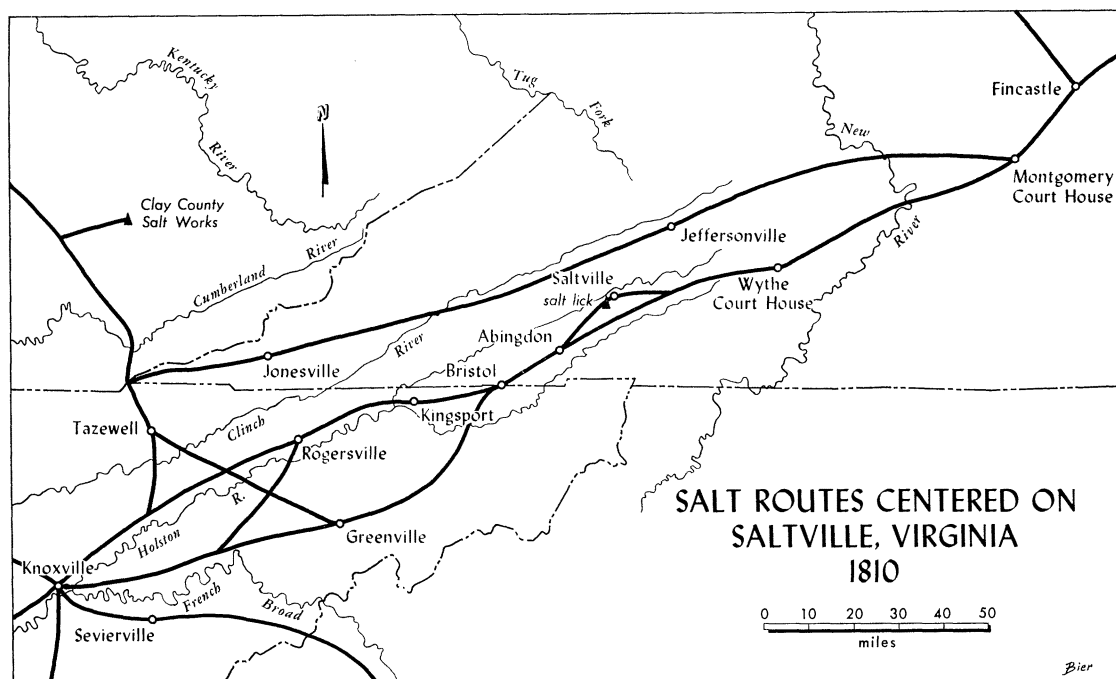


Fig. 8.

After 1803 the salt makers at Shawneetown and Equality displaced the Missouri producers, taking advantage of stronger brines and more advanced production techniques as well as the shorter distance to the Tennessee market.

Whereas the Nashville area obtained salt from the north, East Tennessee imported the commodity from Saltville in the Great Valley of Virginia (Fig. 8). First developed for commercial production in 1782, this saline did not become an important producer until 1795 when one William King began salt-making operations.⁹⁵ King built a wagon road from the salt works to the Holston River at Kingsport, Tennessee, a town which he developed as a real estate speculation. There he erected a warehouse from which salt moved by river to Knoxville. By 1800 King was producing over 200 bushels of salt a day and vigorously pursuing a host of business schemes designed to increase salt profits.⁹⁶ In 1803 he was appointed by the Virginia General Assembly "... to mark out and let to contract the build-

ing of a turnpike road from Kingsport to Saltville," and in 1805 he was appointed to oversee the opening of the Holston's North Fork for navigation.⁹⁷ Finally, King erected an iron works at Bristol, Virginia, midway between Kingsport and the salt works, where he manufactured salt kettles and pans.

However, the real impetus to the Ohio Valley's salt economy came not from Virginia's populated Valley and Ridge province in the east, but from the remote Kanawha district to the west where isolation from established markets encouraged technological innovation. In an attempt to obtain an undiluted salt brine in order to reduce production costs and thus offset high transportation expenditures, David and Joseph Ruffner in 1807 drilled the first deep-well in the United States at what had been the marginally productive Buffalo Lick at present-day Charleston, West Virginia. From this well came the strongest brine yet discovered in North America, for as little as

⁹⁵ E. Lonn, *Salt As a Factor in the Confederacy* (New York: Walter Neale, 1933), p. 27.

⁹⁶ Lonn, *op. cit.*, footnote 95, p. 27.

⁹⁷ L. P. Summers (Ed.), *Annals of Southwest Virginia, 1769-1800* (Abingdon, Virginia: the author, 1929), p. 1227; S. C. Williams (Ed.), "The Executive Journal of Gov. John Sevier," *East Tennessee Historical Society Publications*, Vol. 7 (1935), p. 147.

one hundred gallons produced a bushel of salt.⁹⁸ The new drilling technology not only offset transportation costs, but enabled the area's producers eventually to dominate the Valley's salt trade.

The Ruffner's first furnace of forty kettles, placed into operation in February, 1808, was capable of producing twenty-five bushels of salt per day.⁹⁹ In the second year of operation, when the well was deepened to fifty-eight feet, the brine was sufficient to supply four furnaces of sixty bushels daily.¹⁰⁰ Initially sold at two dollars a bushel, the price had fallen to one dollar by 1810.¹⁰¹ As might be expected, the success of the drilling experiment inaugurated a boom in salt manufacture along the Kanawha. In 1815 David Ruffner informed the *Niles Weekly Register* that "... fifty-two furnaces were in operation (and many more erecting) containing from 40 to 70 kettles of 36 gallons each—all which make from 2500 to 3000 bushels of salt per day."¹⁰² By 1817 over 700,000 bushels of salt were being produced annually near Charleston.¹⁰³

The well-drilling technology of the Kanawha diffused rapidly to other portions of the Ohio Valley, but only those wells which tapped the affluent Pottsville sandstone of western Virginia, eastern Kentucky, and eastern Ohio produced brine equal that of the Charleston district; one important exception was, of course, the U.S. Saline in Illinois. At most of the established salt works elsewhere in the Valley, drilling failed to improve the quality of the salt brine and, with increasing competition from successful drillers, a widespread abandonment of marginal salt works ensued, although a few continued to function as spas.

CONCLUSION

The development of revolutionary well-drilling techniques along the Kanawha River was but the culminating phase of the Ohio Valley's frontier salt experience. Since the historic Indian occupied the region, management of the Valley's salt resource had changed dramatically. The Indian initially perceived the Valley's salt licks as hunting grounds and encouraged the buffalo's salt consumption through the creation of prairie enclaves attractive to the migrating herds. Anglo-American settlers, in following the bison's traces into portions of the region, initially oriented their settlements to the well-defined migration paths. However, unlike the French in Illinois, they failed to recognize the salt-making potential of the western salines and preferred to import their vital salt supply from coastal markets. Only with the severance of eastern trade connections during the Revolutionary War did American settlers undertake to manufacture their own salt. Trade in domestically produced salt greatly stimulated and, indeed, sustained the Valley's early commercial economy focused in urban places. Merchants replaced the pioneer hunters and farmers as the primary instruments of spatial organization; towns and cities replaced the fortified stations as the dominant settlement forms.

Viewed in this context the salt thesis offered by Frederick Jackson Turner nearly three-quarters of a century ago is seen to require revision. Whereas settlers were tied to the coast by a lack of salt, discovery of the western salines did not stimulate a rapid trans-Appalachian expansion, for the licks were known only as hunting grounds. Instead, fortification of the West during the American Revolutionary War and the subsequent establishment of supporting trade routes fostered frontier movement. Whereas the buffalo paths did exert a definite influence on the initial settlement fabric in portions of the Valley, particularly in Kentucky, salt's greatest influence came during the period of early urbanization. It is on the urban sector, therefore, that students of the Ohio Valley salt economy should, perhaps, focus future attention.

⁹⁸ P. H. Price, et al., "Salt Brines of West Virginia," *West Virginia Geological Survey*, Vol. 8 (1937), p. 7.

⁹⁹ S. P. Hildreth, "Observations on the Bituminous Coal Deposits of the Valley of the Ohio," *American Journal of Science*, Vol. 29 (1836), p. 117.

¹⁰⁰ Hildreth, *op. cit.*, footnote 99, p. 117; Joynes, *op. cit.*, footnote 83, p. 151.

¹⁰¹ Joynes, *op. cit.*, footnote 83, p. 151.

¹⁰² D. Ruffner, "The Kanawha Salt Works," *Niles Weekly Review*, Vol. 8 (April 22, 1815), p. 135.

¹⁰³ Price, et al., *op. cit.*, footnote 14, p. 7.