

operation in the United States and two more were opened in 1776: William and Mary (1693), Yale (1701), University of Pennsylvania (1740), Princeton (1746), Washington and Lee (1749), Brown (1764), Dartmouth (1769), College of Charleston (1770), Dickinson (1773), Columbia (1774), Hampden-Sydney (1776), Savannah State (1776).

In the early part of the founding of our nation, courses in natural history began to spring up in various colleges in North America. Until the middle of the nineteenth century, however, such courses not only were meager but also were mostly theoretical and classificatory in their scope. The mode of presentation was

chiefly lecture, accompanied with an occasional demonstration, but with little or no field work or laboratory work. Louis Agassiz, at Howard, was the first teacher in zoology to break away from this practice and introduce laboratory methods in teaching. It was not until the publication of *Origin of Species*, however, that an upsurge of inquiry began. This was followed by the teaching of science at Cornell and Johns Hopkins and by the establishment of the land-grant college (1862-Morrill Act of Congress).

In closing, it seems that we may, from these few remarks, consider biology of 1776 as an embryonic science—for it had not yet truly been born.

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MEDICINE IN 1776*

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GENERAL STATE OF AMERICAN MEDICINE IN 1776

Medicine in the American Colonies was basically an extension of 18th century European medical thought and practice. Less than 10% of physicians in Colonial America had obtained medical training in Europe, but these formed an influential group. They retained close contact with their former teachers, often some of the most eminent physicians of Europe, and were aware of the latest developments in medicine. But whether educated in Europe or not, the Colonial physician read the same books and journals and attempted to practice in the same way as his European colleagues.

This transfer of European medicine to the British American Colonies was facilitated by the lack of native American diseases (only "milk sickness" might be considered an American disease, and it did not appear until the early 1800s). The American Indians were the group most vulnerable to diseases brought by the Europeans. The most common diseases so imported were at first measles, smallpox and malaria; later came tuberculosis, typhoid and typhus fevers. The result was catastrophic: entire tribal groups were wiped out. Such unintentional biological warfare was more effective in "clearing the woods" of Indians than were military operations. Opposition to European colonization was greatly reduced through this decimation of native population. With the introduction of slaves to the Colonies, African diseases were to present new dangers to the settlers, especially in the warmer southern colonies. The most widespread of these African diseases were hookworm, dengue, and yellow fever.

But American Colonial medicine was not exactly the same as European medicine in at least two respects.

First, there were limited opportunities for medical education, since the American Colonies lacked the capacity to duplicate European resources for medical schools, hospital experience, and publication of medical books and journals. Second, the rapid westward expansion populated new areas and created an urgent need for more physicians and medical institutions. These conditions tended to modify European medicine: the less educated American physician tended to become more dogmatic than his European counterpart and to extend therapeutic methods to irrational extremes through oversimplification of sophisticated European theory. These tendencies toward dogmatism and simplification became more pronounced as the distance from urban centers increased—often resulting in the rise of irregular schools of medical thought or even blatant quackery, especially when blended with folk medicine. Moreover, the rigorous separation of medicine and surgery, especially as seen in Britain, did not cross the Atlantic. From the beginning, physician and surgeon were one; this unification continued until the era of specialization entered in the late 19th century.

Medical Systems

Until the beginning of the 18th century, European medical thought was based on theories handed down from ancient authors, mainly Graeco-Roman, with some additions from Arabic and Persian writers. The Galenic theory of the humors was dominant. With the rise of the scientific method in the 18th century, physicians became concerned with the formulation of scientific medical theories. But humoralism hardly disappeared; rather, it was blended into later systems of medical thought. Humoralism, with the concept of general diseased states (fevers and fluxes) implying an excess of

* Highlights of a presentation made at the General Session of the Tennessee Academy of Science, November 1976.

one humor over others, indicated bleeding or other depleting procedures to restore the normal balance of health. The theoretical foundations of the "system" of medicine that exerted the greatest influence on America prior to and after the Revolution were those of Hoffman (of Halle, 1660-1742), Boerhaave (of Leyden, 1668-1738), Cullen (of Edinburgh, 1710-1790) and Brown (of Edinburgh, 1735-1788). Hoffman postulated that an ether-like fluid acted through the nervous system upon the muscles, keeping them in a state of partial contraction (tonus), thereby keeping the humors of the body in motion and balance. Acute diseases were due to excessive tone (spasm) and chronic diseases due to inadequate tone (atony). Boerhaave was an eclectic thinker, drawing upon humoralism in some instances, nervous and vascular states in others. Cullen placed more emphasis upon nervous tone and advocated remedies supposed to stimulate or relax this tone. John Morgan introduced Cullen's teaching into Philadelphia in the 1760s. Brown pushed these ideas to an absurd limit. He grouped diseases as "sthenic" or "asthenic;" diagnosis consisted in determining the level of "excitement" present, and treatment involved either stimulating or depressing the given state. Out of this arose the Brunonian practice of providing "Scotch" or laudanum for many patients. Benjamin Rush, a student under Cullen and a fellow-student of Brown, based his practice in Philadelphia on the theories of Cullen; but after the Revolution, he came more and more under the influence of Brown. Rush maintained that all fevers are due to a spasm of the distal arteries (or capillaries) and advocated bleeding and/or purging as effective ways of relieving this vascular tension. Eventually, Rush claimed that all diseases are due to capillary tension; thus, there really is "only one disease in the world." The influence of Rush introduced the age of "heroic medicine" in the United States after the Revolution; it did not wane significantly until after the Civil War. Oliver Wendell Holmes summarized his thoughts on such therapeutic excesses in these words:

... I firmly believe that if the whole materia medica, as now used, could be sunk to the bottom of the sea, it would be all the better for mankind, —and all the worse for the fishes.

Nosology (science of classification of disease)

As medicine and botany were closely interrelated in the 18th century, and most eminent botanists (both European and American) were physicians, it is reasonable to discern a common pattern of thought between efforts to classify diseases and the search for an orderly grouping of plants. Carl von Linné (Linnaeus, 1707-1778), a physician-naturalist, published his influential *Systema naturae* in 1735 (10th ed., 1758). He also published a classification of disease (*Genera morborum in auditorum usum*, 1763). As scientific knowledge of causes (etiology) was largely speculative, the most useful classifications were based on the symptoms of disease. Since fever was the major manifestation of disease, a classification of fevers emerged that was widely used in the American Colonies. This classification continued to be used until the last half of the 19th century, when

scientific research established the basis for an etiological classification and medical technology provided the means of precise diagnostic testing. Fevers were grouped into three classes: 1) *Continued Fever*: a continuous or unbroken fever, including most endemic fevers, as well as typhus and typhoid fever. Continued fevers were particularly common in cities, where people lived under crowded conditions. 2) *Periodic Fever*: occurrence of distinct paroxysms or exacerbations; this class embraced two subdivisions: *Intermittent Fever* and *Remittent Fever*. For the most part, *Intermittent Fever* can be equated with malaria, in that this state was characterized by fever, absence of fever, and a return of fever at a specific time (*quotidian*, every 24 hours; *tertian*, interval about 48 hours, or fever returns on 3rd day; and *quartan*, interval about 72 hours, or fever returns on 4th day). In the American Colonies, the periodic fevers were a major concern of the people living in rural areas. In *Remittent Fever*, there was no complete absence of fever—merely a partial remission followed by exacerbation. Translation of the remittent fevers into modern medical terminology is treacherous, since the characteristics of fever do not suffice to establish etiology with accuracy. 3) *Eruptive Fever*: the exanthemata, or fevers accompanied by a skin rash (smallpox, measles, scarlet fever, etc.).

Even in 1776, consistency in the diagnosis of fevers was handicapped—clinical thermometry was in its infancy, and the physician based his opinion on pulse rate, color of the skin (signifying cutaneous blood flow, usually increased in febrile state), and palpation of skin temperature. These are hardly an adequate basis for accurate quantitation of the febrile state. As there were overlapping or "gray areas" in the classification of the fevers, the modern medical historian must be cautious about precise identification of 18th century diagnoses.

Public Health in 1776

Accurate statistics on morbidity and mortality were not kept until a century or more later, but painstaking historical research makes it possible to present a few generalizations. Birth and death rates were high. About 50% of deaths occurred in the first 10 years; most of the remaining 50% occurred in young adults (ages 20-40). As a result, the population was heavily weighted toward a lower age group (the majority of white males in 1789 were under 16 years of age). The high infant mortality made for a low life expectancy. The average life expectancy in 1789, as derived from data collected from the records of some 60 Massachusetts and New Hampshire towns, was 34.5 years for males and 36.5 years for females (compare with 1965 U.S. life expectancy at birth: males, 66.9 years; females, 73.9 years). It is interesting to note that the sexual mortality differential (SMD) has increased from 2 to 7 years over this period of about 175 years. Bad as these figures are, there is no indication that the corresponding statistics for Europe were better; indeed, the mortality rate for London at this date was considerably higher. There is some indication that mortality was beginning a slow decline in the American Colonies on the eve of the Revolution, probably due to improved sanitation and a

better standard of living. By the early 1800s, this improvement was clearly discernable. Personal cleanliness might be cited as an example of improved sanitation. Bathing became a lost art after public baths were closed, in the 1500s, because of immorality. Colonists brought this prejudice with them to the New World. The proposal to open baths in Philadelphia in 1761 met with opposition from religious societies on moral grounds. Nevertheless, private bathing houses became available in the early 1770s; by the end of the century, a few families had installed home shower baths or tin-lined wooden bathtubs. In 1799, after taking a shower bath, one Quaker lady noted in her diary: "I bore it better than I expected, not having been wet all over at once, for 28 years past." If such were the bathing habits of the well-to-do, it is best not to attempt to describe the state of cleanliness of the rank and file.

It is difficult for us to imagine the high mortality of the 18th century. This statistic might help: in 1793, a yellow fever epidemic caused the death of about 10% of the population of Philadelphia. If such an episode were to occur in 1976 in Philadelphia with the same mortality rate, it would mean the death of over 200,000 persons in the brief period of about 3 months. Compare this with all the publicity over the recent mysterious "legionnaires disease" of Philadelphia, during which 29 persons died. That population increase occurred despite the high mortality rate is explained by 1) the high birth rate (e.g., Benjamin Franklin was the last of 17 children) and 2) immigration. The only development in medicine that could have improved the mortality rate was the introduction of vaccination in 1798 (by Jenner) to protect against smallpox. It would be beyond the scope of this paper to discuss further the causes of the decline in morbidity and mortality rates in the U.S.

EDUCATION OF THE AMERICAN COLONIAL PHYSICIAN

It is estimated that in 1775 about 3,500 physicians were involved in the care of the sick in the American Colonies. Fewer than 400 of these practitioners were graduates of or had studied at a medical college. These constituted the elite class of "regular" physicians. The term "regular" connoted a combination of formal medical study, conduct in accordance with a system of medical ethics, and demonstrated success in medical practice. The most prestigious "regular" physicians had M.D. degrees from Edinburgh, Leyden, or Philadelphia; the next group were those who had attended a course of medical lectures but had not taken a degree; the lowest were those who had served only a preceptorship under a well-known "regular" physician. Regular physicians extended their influence through becoming organized into medical societies, often for the purpose of establishing the right of licensure (as did the Royal College of Physicians in London). The influential Philadelphia Medical Society was started in 1766; the first state medical society, the New Jersey Medical Society, was also organized in 1766; and next came the Litchfield County (Conn.) Medical Society in 1767.

The best medical education available in 1776 consisted of:

1. a college education (devoted to classical subjects with little or no emphasis on science)
2. three or more years as an apprentice to a learned and reputable physician for the purpose of securing a practical knowledge of medicine, beginning with menial tasks and ending with assumption of responsibility for patient care
3. attendance at and graduation from a medical college, to provide a theoretical basis for medical diagnosis and therapy; followed by a postgraduate tour of study in London, Leyden, Paris, or Vienna

Favored Medical Colleges of the American Medical Student

EDINBURGH. During the period 1750-1800, a total of 117 Americans took an M.D. degree from Edinburgh (15 during the period 1750-1765). There were many more who attended medical lectures at Edinburgh but did not take a degree. The Medical Faculty of Edinburgh consisted of six professorships: Chemistry, Anatomy, Botany, Practice, Theory, and Materia Medica. The most eminent professors in 1776 were Dr. Black, esteemed as one of the first chemists of Europe; Dr. Monro (Alexander Monro, *secundus*, probably the most talented of the three Monros who held the chair of anatomy at Edinburgh for 126 years); and Dr. Cullen, whose medical system has been referred to previously. There were also three medical societies at Edinburgh open to medical students. George Logan, an American medical student, wrote in 1778, "I have the honor of being a Member of these three Societies from which I assure you I have received as much improvement as from any one Professor." At society meetings the different doctrines and opinions of the Great Men were presented and discussed with candor; students often wrote and read their papers in Latin.

Study in London was frequently a part of the Edinburgh experience. Between terms, students migrated to London for dissections under William or John Hunter and walking the hospital wards under an eminent physician or surgeon. The hospitals of London offered clinical experiences superior to those of Edinburgh.

LEYDEN. Boerhaave (the "medical teacher of all Europe") established the reputation of the medical faculty at Leyden and made it a mecca for foreign medical students. The methods of instruction that Boerhaave introduced at Leyden became a model for all European medical schools and provided the foundation of modern clinical teaching. Although Boerhaave died in 1738, his reputation kept Leyden in the forefront of the continental European medical schools. Next to Edinburgh, Leyden attracted the largest number of American medical students before and immediately following the Revolution.

PHILADELPHIA. A few American students, the fortunate recipients of the best medical education Europe could provide, returned to the Colonies imbued with the High Idea of establishing a medical school.

John Morgan, who received an M.D. in 1763 from Edinburgh, returned to Philadelphia in 1765; within a fortnight, he was elected professor of theory & practice of physick at the College of Philadelphia (founded in 1749). A month later, Dr. Morgan delivered his memorable "Discourse Upon the Institution of Medical Schools in America." Morgan had written his address while in Paris and had submitted the manuscript to the criticism of several of his eminent teachers. In it, he called for standards of medical education so high that they have only now been realized, in part, in the 20th century. Dr. Morgan's address still offers an ideal for excellence in medical education worth striving to achieve. William Shippen, Jr., who received an M.D. from Edinburgh in 1761 and who also studied under William and John Hunter in London, was the second professor appointed to the Medical Faculty. In 1762, shortly after his return to Philadelphia, Shippen started a series of private lectures on anatomy and midwifery (obstetrics) and also provided an occasional opportunity for his students to dissect a human cadaver. In September 1765, Shippen was elected to the chair of anatomy and surgery. The first session opened 18 Nov. 1765. During the first two years, Drs. Morgan and Shippen constituted the entire faculty. In 1768-69, the faculty was enlarged by the appointment of Dr. Adam Kuhn to teach materia medica and botany and Dr. Benjamin Rush to teach chemistry. The first class was graduated 21 June 1768 with 10 students receiving the M.B. degree (following the English custom, four of these graduates received the M.D. degree later, in 1771). The faculty for the session of 1769-70 was zealous and youthful: Dr. Morgan (theory & practice of medicine) was 34; Dr. Shippen (anatomy, surgery, midwifery) was 33; Dr. Bond (clinical medicine) was 50; Dr. Kuhn (materia medica and botany) was 28; and Dr. Rush (chemistry) was 24. The school grew and by 1774 had conferred 34 medical degrees. The influence of William Cullen, of Edinburgh, was considerable on this first medical school in the American colonies. Cullen sent his "respectful and affectionate compliments to all my old pupils in Philadelphia," adding: "I shall always hold it my highest honour that the founders of the Medical College of Philadelphia were all of them my Pupils and if it can be known I think it will be the most certain means of transmitting my name to a distant posterity for I believe that this School will one day or another be the greatest in the world." Cullen's prediction was not far off the mark, for the fledgling medical school of 1765 became the University of Pennsylvania School of Medicine, still a prestigious and influential center for medical education.

NEW YORK. The second American medical school was established in New York City in 1767 as the Medical School of King's College, with a faculty representative of the city's best physicians: Drs. Samuel Clossy (anatomy, graduate of Trinity College, Dublin), John Jones (surgery, European medical study), Peter Middleton (physiology and pathology, studied at St. Andrew's Univ.), James Smith (chemistry, a Leyden graduate), John V. B. Tennent (midwifery, Edinburgh

graduate), and Samuel Bard (theory and practice, Edinburgh graduate). The first session began 2 Nov. 1767, two graduates were granted M.B. degrees in 1769, and the school had conferred 18 medical degrees by 1774. Instruction ceased during the Revolutionary War, but after the War the school was reorganized under the name of Medical School of Columbia College and continues now as the College of Physicians and Surgeons of Columbia University.

Both of the pre-Revolutionary American medical colleges were based on the Edinburgh plan of medical education (with some London modifications): both envisioned the medical college as an integral part of the university, required three years of study to obtain an M.B. degree, and granted an M.D. degree three or more years later after an examination had been passed or a thesis publicly defended. Thus, American medical education started out on a lofty plane; but deterioration set in after the Revolution, and such elevated standards within the academic environment of a university did not emerge clearly again until the early part of the 20th century. Had the London influence prevailed, America's first medical school would have been established within the framework of a hospital, i.e., the Pennsylvania Hospital (founded 1751), with the emphasis on clinical instruction given on the wards. The academic vs. hospital environment in medical education is still a source of controversy, and a stable resolution has not yet been fully achieved.

Before leaving the subject of medical education, the point should be made that in 1776 the only academic education available to students of biology and chemistry was in medical schools. The professors of anatomy, botany and chemistry lectured on these subjects, often were themselves eminent in these disciplines, and published influential works in these sciences. There was considerable emphasis on botany, since most of the drugs prescribed by physicians were from plants (Galencals or botanicals). Because pharmaceutical houses were rare and drugstores infrequent, many physicians had their own botanical gardens and raised and prepared their own remedies. Often, the first duty of the apprentice medical student was to cultivate the botanical garden. Thus, it is not surprising that many physicians developed an interest in plants and that their activities transcended the purely pragmatic ends of preparing medical remedies. This may be the major reason that so many of the leading naturalists of Europe and America were physicians, beginning with Linné (Linnaeus) and including Boerhaave, von Haller, Sir Hans Sloane, John Fothergill, and John Hunter. Some of the American physician-naturalists were Cadwallader Colden in New York, William Douglass in Boston, and Alexander Garden in Charleston. All three became recognized as major contributors to botany in the international natural history circle. Dr. Garden received enduring recognition when Linnaeus named the gardenia for him, even though this plant was not one of his discoveries. Dr. Garden's election to the Royal Society in 1773 also added to the prestige of American science. Caspar Wistar (1761-1818), a later professor

of anatomy and author of the first American textbook of anatomy (1811-14), has been honored not only by the Wistar Institute of Philadelphia (a major research organization and publisher of several scholarly journals) but also by the familiar wistaria plant, both named for him.

Education of the Irregular Practitioner of Medicine

About 3,000 (90%) of those concerned in health care in 1776 had either served only a brief preceptorship under another practitioner (usually located in the same community) or were self-taught. As there were no licensure laws, anyone could offer medical assistance. The practice of medicine for most of these individuals was not a full-time occupation. Medical assistance was offered by many persons having other occupations, most frequently persons who were well educated, intellectually curious, and in a position to relate to people. Thus college presidents, ministers, teachers, governors, plantation owners, etc., often felt qualified to practice medicine on a limited scale. Colonial medicine often benefitted greatly from the contributions of these well-read and intelligent persons. An outstanding example of this type of "physician" is Benjamin Franklin. Bell has written a thoughtful essay on "Benjamin Franklin and the Practice of Medicine." Franklin was closely associated with medicine both in his experimental studies and in his public career. Many of his personal friends were outstanding physicians of America and Europe; medical societies in London, Paris, and Edinburgh elected him to membership. Franklin encouraged and guided a whole generation of American medical students in their studies abroad. As a printer, Franklin published numerous medical texts. Franklin was an early advocate of smallpox inoculation and, despite the acrimonious debate, he never wavered in his support. Receptive to new medical ideas, Franklin was ever willing to give them a hearing. He also collected and compiled medical statistics. Franklin was a great advocate of fresh air, exercise, and temperance as the basic means of preventing disease, recognizing clearly the precarious state of medical therapy at this time. Franklin practiced medicine by prescribing and treating the sick—often in consultation, but also alone. Naturally, being interested in electricity, Franklin became a pioneer in the use of electricity in the treatment of disease. Franklin played a major role in the establishment of the Pennsylvania Hospital in 1751. In all that Franklin did, both as a publicist and as a practitioner of medicine, he revealed an inquiring intelligence, a broad understanding, and sound sense in assessing medical theories and practice.

But it should also be mentioned that others in this category were not well-educated; whatever medical knowledge they possessed was derived from readily available books on domestic medicine such as:

John Tennent's *Every man his own doctor: or, The poor planter's physician* . . . 1730, 1734, 1736, 1751. Benj. Franklin published the 4th ed. (Phila. 1736).

John Wesley's *Primitive physick: or, An easy and natural method of curing most diseases* . . . 12th ed., Phila., 1764; 14th ed., Phila., 1770.

William Buchan's *Domestic Medicine: or, The family physician* . . . Phila., 1771. Also printed 1772, 1774. (One of the most popular and influential of the domestic medical books).

These domestic medicines represent an early do-it-yourself effort that became necessary as the population increased, physicians were few, and rural dwellers often had no physicians at all. The books were, for the most part, well written and offered sound advice; undoubtedly, they provided much comfort and reassurance to the head of a household or the irregular practitioner in need of counsel and guidance. Another group, largely self-taught, was the quacks. Quacks could be recognized by these characteristics: usually they were itinerant practitioners (both to locate new patients and to avoid the unmasking of their false claims of cures), their specialization was limited to one organ (e.g., the eye) or to one group of diseases (e.g., venereal diseases, kidney disease, etc.), and they widely advertised their extravagant claims for cures (in newspapers, handbills, etc.). Quackery is still with us, and false or undocumented claims for cures is still a major characteristic. The persistence of quackery in spite of laws against it suggests that society has not yet resolved the question of whether the public has the right to choose bad medical care.

TRANS-APPALACHIAN MEDICINE

The first physicians to enter the region beyond the Appalachian Mountains came as explorers. In 1748, Dr. Thomas Walker joined Col. James Patton and his company for an extensive tour of unexplored territory west of the Allegheny Mountains. Dr. Walker returned in 1750 for the purpose of exploring the 800,000 acre grant to the Loyal Company. Walker is believed to have been the first man of English descent to travel in the region that is now Kentucky. He probably was also the first physician to enter the Kentucky-Tennessee region. A reading of Dr. Walker's journal for the 1750 trip reveals that he had numerous opportunities to use his medical knowledge and skills. Dr. Walker returned for further explorations in 1760 and 1768 and was involved in the survey of the northern boundary of Tennessee in 1790 and 1792.

The second group of physicians to cross the Appalachians was medical officers attached to military forces. In 1776, Dr. Patrick Vance was "third surgeon with pay as assistant" in Col. Christian's campaign against the Cherokees and had been present at the Battle of Island Flats (Kingsport, Tenn.). Dr. Vance remained with the troops at Long Island of the Holston in 1777 and was there when Frederick Calvatt, a soldier in Col. Christian's forces, was shot and scalped but not killed. As James Robertson wrote in his published report of 1806, "Doctor Vance was sent for and staid several days with him. The skull-bone was quite naked, and

began to turn black in places, and, as Doctor Vance was about to leave Calvit, he directed me, as I was stationed in the same fort with him, to bore his skull as it got black, and he bored a few holes himself, to show the manner of doing it."

Biographical information about Dr. Patrick Vance is scanty and sometimes uncertain. He was born either in Scotland or Ireland. Though he claimed to be a medical graduate of Edinburgh, his name does not appear in Edinburgh records. It is possible that he attended medical lectures at Edinburgh but did not graduate; or he may have moved on to Leyden and gotten his degree there. Dr. Vance emigrated to Pennsylvania about 1754, moved on to Virginia, and settled in Bristol, Tennessee. He is considered to be the first physician to practice in Tennessee. It is not certain, however, whether Dr. Vance remained in Tennessee after Col. Christian's 1777 campaign or left Tennessee and did not return to Bristol until after the end of the Revolutionary War. As several descendants of Dr. Patrick Vance practiced in the Bristol area, this is probably Tennessee's oldest medical family.

The method of treatment that Dr. Vance taught James Robertson in 1777 at Long Island of the Holston can be traced back to the 5th century B.C. (where it appears in the Hippocratic treatise, *Injuries of the head*). The concept is still being applied to surgical treatment of loss of portions of the scalp (now usually from accidents or surgical removal because of malignancy). As outlined in a recent paper (1976), the application of this concept involves removing the outer table of the skull and then covering the area with a skin graft. Though it is not known how Dr. Vance learned of the method, perhaps his knowledge came 1) from medical lectures he attended at Edinburgh or Leyden; 2) from reading published versions of Boerhaave (who described the method); or 3) from an itinerant French surgeon in the western territory, who had the idea from Augustin Belloste (who published his version of the method in 1696). This last suggestion, and all known references to this treatment in surgical books and journals published in the U.S. and Europe in the 19th and 20th centuries, derive from Robertson's paper of 1806.

Folk and Indian Medicine

Since the early settlers comprising the Holston Settlements (now the tri-cities area of Tennessee) were without physicians, they relied on the wisdom of folk medicine—on the premise that the natives of an area know the best way of treating diseases of that region. This meant a blending of their own folk medicine with the native medicine of the Cherokees. The Cherokees had an ancient myth that the plant kingdom took pity on man and promised him assistance in counteracting the animal-sent evils, such as disease. This myth implies that there is a plant antidote for every disease. Thus, through knowledge and experience, it is possible to select the appropriate plant to provide the correct remedy for a particular disease. Cherokee herbalists could identify as many as 200 plants in the East Ten-

nessee-North Carolina area believed to have medicinal value, and Tennessee pioneer settlers drew heavily on this Cherokee medical experience. The first medical publications in the area were family or domestic medicines (1810, Richmond, Ky., Ruble's *The American Medical Guide for the use of families*; 1830, Knoxville, Tn., John C. Gunn's *Domestic Medicine, or Poor Man's Friend* . . .) and such books became the best-sellers of that period. These self-help books usually were a sound blend of the best of "regular" medicine with folk medicine and Indian medicine. Thus, the heritage of early Tennessee medicine is rich both in rational concepts derived from Graeco-Roman sources and in the ancient folk component, thereby blending myth and mysticism with scientific thought.

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