

ENGINEERING

Washington the Engineer

Planning of the National Capital, Canal to Ohio Valley And Draining Dismal Swamp Were Among His Projects

By DR. FRANK THONE

GEORGE WASHINGTON'S chief claims to fame rest on his accomplishments as soldier and statesman. Few of us think of him as belonging to the scientifically minded group of the Founding Fathers whose brightest shining lights were Benjamin Franklin and Thomas Jefferson.

Nevertheless, Washington did have a scientifically directed mind, and he practiced quite successfully one of the most exacting of the scientific professions—engineering. So declares George F. Bush, assistant professor of mechanical engineering at George Washington University, the educational institution at the national capital named in honor of the Father of His Country. Prof. Bush has devoted considerable study to this relatively neglected phase of Washington's career.

Elementary school histories do mention the fact that in his youth George Washington worked for a time as a surveyor, running boundaries in the wilderness tracts of the vast Fairfax estate. But this is usually treated as a temporary and unimportant part of Washington's life.

Led to Military Career

It was anything but that. Washington's familiarity with the "Wild West" that then lay just over the Alleghenies led to his earliest public commissions, first his unsuccessful mission to warn the French away from Fort Duquesne (now Pittsburgh), then his command of the body of Virginia militia that covered the retreat of the British forces after Braddock's disastrous defeat. And that, in turn, made his reputation as a military man and set him up as logical choice for commander-in-chief of the Colonial forces when the War for Independence began.

However, Prof. Bush emphasizes, Washington had more than just a surveyor's training. He really learned the engineer's profession. There were no engineering or other technical schools in the Colonies at the time, so he received his first instruction at the hands of

tutors on his ancestral estate. The rest of his engineering subjects he had to dig out for himself, from imported books. His success is well attested by a declaration on record, by the authorities of the College of William and Mary, for whom he ran some survey lines when he was only 17 years old. They said his surveys "were the only ones they could depend on."

Military Engineering

Washington's early military experience was not confined to marching his troops and commanding them in battle. During the French and Indian War he had to lay out roads, plan fortifications, build bridges. Still on file in the Library of Congress are sketches made with his own hands, of Forts Loudon, Cumberland and Necessity, which served as bases of defense for the frontier during that struggle.

Later, as commander of the Colonial armies, his engineer's habits of accurate thinking and thorough organization stood his cause in good stead. Prof. Bush cites his occupation of Dorchester Heights overlooking Boston, which compelled the British to withdraw without firing a shot, as well as many strategic dispositions in the long war that followed, as basically the work of an engineering type of mind.

Washington's work as an engineer, however, was not solely, or even mainly, in the military field. It was as a civil engineer that he especially shone. The city on the Potomac that bears his name is to a considerable extent his own handiwork. He supervised the laying out of its fundamental plan; the house which was his headquarters during those days still stands as a historic monument in Georgetown, the town older than the Capital which has since been absorbed into it. The famous French city planner, L'Enfant, who gave the District of Columbia its characteristic pattern of streets and avenues, was Washington's personal choice for the job.

Washington saw major engineering projects through the eyes of what might be called grand civil strategy. With Jefferson and other eminent Virginians of his

day, he saw the importance of communication over the mountains to the still-unopened hinterland and all its unrealized riches, and he conceived the scheme of a canal connecting the Potomac and the headwaters of the Ohio as the best means available.

Work was actually undertaken in 1786 on such a canal, and remains of its well-built masonry walls are still to be seen on the Virginia side, near the Great Falls of the Potomac. Some stretches of the abandoned canal still hold water.

The Virginia side of the Potomac did not prove a practicable route for the projected waterway, and later, when the Chesapeake and Ohio Canal was built, it went through on the Maryland side. Events proved the rightness of the engineering vision that projected this canal venture, for although the invention of the railroad robbed it of much of its pas-



SURVEYOR WASHINGTON

Artist's conception of what Washington looked like when as a youth of 17 he was a successful surveyor.



ENGINEERING ACHIEVEMENT

There is still water in the George Washington Canal, near the Great Falls of the Potomac.

senger traffic almost as soon as it was built, it carried freight for almost a century before it was finally abandoned.

Like most other engineers, Washington didn't always guess right; his judgment was in error at least once—and rather expensively so for him, too. With five partners, he promoted a promising-looking project for draining Dismal Swamp in Virginia. He didn't succeed in draining it—and neither has anybody else, to this day.

Washington's keen interest in farming has often been cited as another evidence of his science-mindedness. This is true enough; neatly bound sets of leading English agricultural journals of his day are still to be seen on the shelves of his library at Mount Vernon. His own notes on plant breeding, soil analysis,

fertilizer use and other agricultural subjects occupy a considerable part of his later papers. He had a personal hand in all the multifarious business of a great farm of the late eighteenth century: milling, distilling, tanning, blacksmithing, wagon-making, brickmaking, spinning and weaving. He completely renovated the old mansion house, making the drawings for the job himself. And he invented a horse-drawn barrel-plow that furrowed the soil and planted the seed in one operation.

The encouragement which technology and invention later received in this country bear forever the Washington imprint. He advocated the passage of a patent act, and the first such law framed by Congress for the protection of American inventors bears his signature.

Science News Letter, February 21, 1942

65 cases of meningitis scattered throughout the entire nation with no concentration in any one place to suggest an epidemic brewing. The total number of cases is slightly above the five-year median of 55 cases.

The federal health service, however, points out, as do Dr. John H. Dingle and Dr. Maxwell Finland, of Boston, in their report to *War Medicine*, that conditions are favorable right now for a meningitis outbreak. The cold weather still prevalent in most parts of the country which keeps people indoors in close association with each other favors the spread of this disease.

"An outstanding feature of the disease has been its occurrence during wartimes in epidemics involving both military and civilian populations. During World War I there were 5,839 cases of meningococcal meningitis in the United States Army, with 2,279 deaths, a case mortality rate of 39%. Although the attack rate and the military noneffectiveness rate have usually been low, the sudden way in which the disease strikes, its mysterious manner of spread and its high mortality may have a serious effect on the morale of civilian and military personnel.

"These features, the unprecedented incidence of the disease in England since the outbreak of the present conflict—a total of 12,500 cases occurred during 1940—and its occurrence on this continent in Nova Scotia all point to the possibility that this country may be confronted with outbreaks of this disease in the near future."

The sulfa drugs, these doctors point out, have improved the outlook in this disease considerably, and "may offer a useful prophylactic measure in the prevention of its epidemic spread."

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PUBLIC HEALTH

Meningitis Epidemic Warning Issued in AMA-NRC Report

No Evidence At Present of Outbreak But War Medicine Points to Possibility of One in Near Future

WARNING that an epidemic of meningitis, also called cerebrospinal fever, may occur in this country in "the near future" appears in *War Medicine*, published by the American Medical Association acting in cooperation

with the National Research Council.

No evidence of an epidemic now or in the immediate future appears in the weekly reports to the U. S. Public Health Service. Latest figures available, for the week ending Jan. 31, showed a total of

PSYCHIATRY

Worry During War Normal But Shouldn't Harm Work

IF YOU'RE worried and depressed about the war, don't feel that you are abnormal—everybody is reacting the same way. This is the advice contained in a bulletin just released by the Association for the Advancement of Psychoanalysis in New York.

However, the bulletin goes on to say, if you are so worried that you can't do your job properly, then your anxiety probably has nothing to do with the war and represents a personal problem for which you should consult a psychiatrist.

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