

CRYPTOGRAPHY

The "Black Chamber" of 1776

Patriots of Revolution Used "Sympathetic Ink" to Hide Military and Diplomatic Secrets From Watchful Foe

By DR. FRANK THONE

1 1776. A warm summer day in Philadelphia. Flies buzzed through the open windows, annoyed the delegates as they crowded forward nervously to sign the document in support whereto they pledged "their lives, their fortunes, and their sacred honour."

At last the task was finished. "Well, gentlemen," said one delegate, "we must all hang together now."

"Yes, or we shall all hang separately," spake the sententious voice of Poor Richard, through the lips of Franklin.

Which had too much of grim truth in it to make a jest of the laughing kind. Legally every one of them had with a stroke of the pen signed himself guilty of high treason. And if His Majesty's forces could have caught any of them, they well knew how swift and certain the penalty would be.

Battles of the Pen

Not many of the men who signed the Declaration of Independence bore arms afterwards to make it good. They were for the most part civilians, businessmen, landowners, men of affairs. They fought their fight for the new nation by exerting themselves to strengthen morale and finances at home, by patiently and diplomatically seeking friends and allies abroad.

How well they succeeded, in many European lands, is well witnessed by the array of brilliant foreign names that figure in the first pages of our history as a nation: Lafayette, von Steuben, De Kalb, Kosciusco, Kossuth, Paul Jones, and many another besides. And at last the French King's fleet, and his troops, and the bastions of Yorktown. Truly, these neck-risking men of the pen proved that even in war their weapon could deal telling blows to match any sword.

When used in war, the pen is always a two-edged weapon; if any of your writings fall into the hands of the enemy they will surely be used against you and your friends. So the Revolutionary generals of the pen had to exercise the greatest discretion.

This was less easy than it is today, for most of the elaborate methods for the

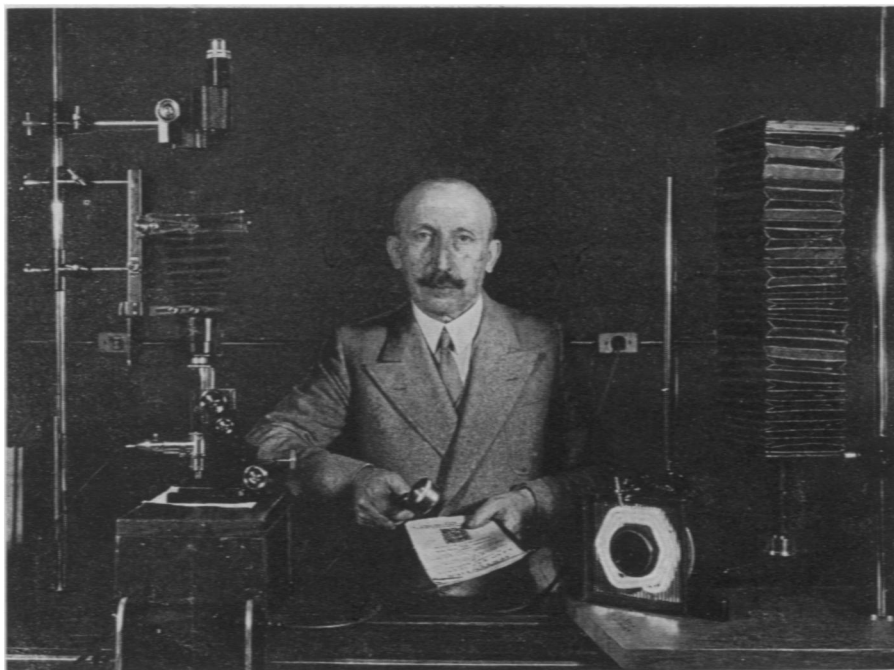
secret and safe transmittal of written messages known to the "black chamber" of a modern government had not yet been invented, or at any rate were not available to the Revolutionary ambassadors and secret agents serving abroad. There was a counterbalance to this handicap, however, in the apparent ignorance or carelessness of the British War Office in the matter of secret writings. Invisible inks of such chemical simplicity that they wouldn't escape detection five minutes in a present-day censorship laboratory apparently "got by" in those days with no difficulty at all.

Now, a century and a half after those stirring days, the methods of modern science are being used to make legible again some of those long-forgotten war messages. Ultraviolet, infrared, special cameras, microscopes, analytical chemistry, are among the means invoked—laboratory magics that would have made glisten the eyes of "the ingenious Dr. Franklin," could he have seen them.

Most recent to yield their secrets to the attack of science working in the aid of history are four letters from the correspondence of John Jay, later the first Chief Justice of the United States. Three of them were written to Mr. Jay, one was a letter of his own writing.

These letters have been subjected to the ingenious scrutiny of Dr. L. Bendickson of the Henry E. Huntington Library at San Marino, Calif. A report of the technical methods used and the results obtained is published in the quarterly, *The Franco-American Review*.

Dr. Bendickson found himself confronted with two quite distinct problems. One was the recovery of the messages written in secret or "sympathetic" ink, which had been developed and read, but which had faded to invisibility again, this time beyond reach of chemical recovery. The second problem was presented in plain black ink: Mr. Jay, the discreet, had scratched out certain possibly embarrassing passages by simply making wiggly up-and-down lines over them with heavy strokes of a pen. Parts of letters stuck out of this mess on both



SCIENCE'S AIDS TO DECIPHERING

Dr. L. Bendickson, with the microscope, cameras, ultraviolet lamp, and other apparatus with which he deciphered the revolutionary letters.

sides, but the over-strokes distracted the eye and baffled all attempts to read.

Dr. Bendickson attacked the first problem partly with ultraviolet and infrared photography, partly with a reconstruction of eighteenth-century chemistry.

The method of writing in invisible ink used by John Jay's correspondents was naively simple. The writer would first pen an ordinary, chatty, casual letter about family and friends, telling nothing important at all, and appearing very innocent. This message would occupy only a small portion of a large sheet. The remainder, ostensibly blank, would carry the really significant message, written in invisible ink.

On receipt, the blank part would be sponged with a chemical solution that would react with the chemical in the invisible writing, bringing it out clear and black. The yellowed tint of the large sheets Dr. Bendickson examined showed clearly that it had had some kind of chemical treatment. In places brushstreaks were left from the swabbing with the developing solution. But the letters had all faded into invisibility again.

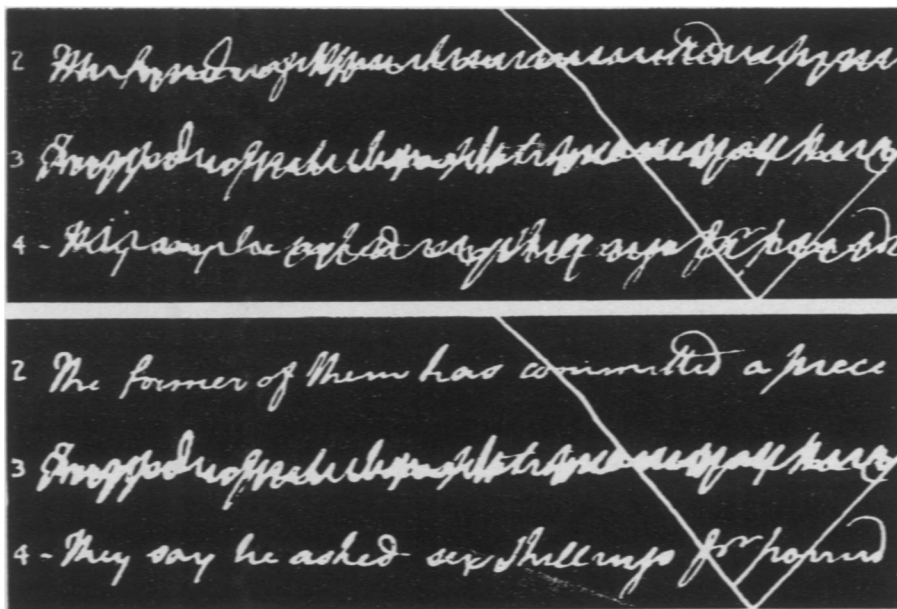
Written in Fire

Dr. Bendickson placed one of these sheets under ultraviolet radiation. From the blank page the lost words leaped at him as though written in fire. The chemical salts, still impregnated in the paper, were caused to glow, or fluoresce, with visible rays by the impact of the ultraviolet. It was easy to get a photograph of this ultraviolet-induced glow.

A second letter proved more obdurate. When the ultraviolet lamp was turned on it, the whole sheet glowed purple, masking whatever writing was present. Unbaffled, Dr. Bendickson turned to the other end of the spectrum, and used infrared light, at an angle, to make a photograph. This time the lost writing came out.

With the aid of George D. van Arsdale, Pasadena chemical engineer, Dr. Bendickson discovered the ingredients of the invisible ink. The writer used a solution of tannic acid. The addressee sponged the paper with ferrous sulphate, or copperas. The iron in the copperas (which despite its name has no copper in it) combined with the tannic acid to form a dark compound, easily visible against the white paper.

The second problem, that of the writing crossed out with ordinary black ink, had to be solved in a different way. Through his microscope, Dr. Bendickson could see how the crossing-out strokes rode over the strokes of the writing. But



OBLITERATIONS CLEARED AWAY

Above: part of one of Jay's scratched-out letters as it appears when first photostated. Below: after painstaking removal of the obliterating lines. The text uncovers a minor wartime scandal of long ago.

photographing the whole letter through the microscope, almost stroke by stroke, would have been an exceedingly long, tedious, and expensive process.

Dr. Bendickson thought out a much easier way. First he made enlarged photostat copies of the troublesome passages. In photostating, the colors are reversed, so that the copies came out white on black, like chalk writing on a blackboard. The scientist now blacked out all the crossing-out strokes with a crayon or a brush and India ink. Then, with the original under the microscope to guide him, he pieced together the fragments of the original letters. He was able to rebuild the hidden sentences with very few gaps.

The messages from the long-gone past show that, then as now, trifles sometimes weighed importantly in the winning of a cause. One of the letters was from Benjamin Franklin to John Jay, when the latter was working for the Colonial cause in Spain. Mr. Jay had scratched out one passage, which Dr. Bendickson restored with his photostat process.

Benjamin Franklin was at that time in Passy, France; Jay, apparently, was not finding Spanish society too agreeable, at least personally. Franklin's deleted passage runs:

"This thought occurred to me on hearing from the Princess Masserano that you and Mrs. Jay did not pass your time agreeably there and I think you would

find this people of a more sociable turn besides that I could put you immediately into the society I enjoy here of a set of very amiable friends. In this case Mr. Carmichael might succeed you in Spain."

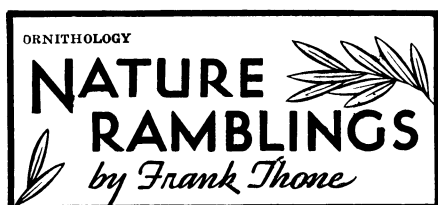
Outside of Spain, this was harmless enough. In Spain, its hint that the American representative didn't really like the people would certainly have "spilled the beans," had it come to official eyes. So the discreet Mr. Jay crossed it out.

Another deletion was of only two words, as it turned out, a man's name, Beverly Robinson, who had evidently played false to the Continental cause. The context reads:

"That vile, infamous, rascally, hypocritical Friend to America, . . . , was their principal guide and assistant at P. Kill. I think it may be depended on, because several of the inhabitants say they saw him on the spot."

Here, the deletion of only the name left the passage without any possibly embarrassing significance. The general "cussing," left unobliterated, might have been applied to anybody.

John Jay himself sometimes burst through his bounds of caution and expressed himself pretty forcefully—and then made the record safe by getting the file of his own letters and censoring them. Dr. Bendickson has restored one paragraph in a letter from Mr. Jay to James Duane, in (*Turn to page 14*)



The Real Eagle

PROUD emblem of America's might, the noble eagle seeks the height, or something to that effect in the good old-fashioned Fourth-of-July orations. We learned from them that the bald eagle is a fierce, courageous bird of prey, that builds its nest ("eyrie" in orator-nithology) on a lofty cliff in the heav'n-kissed mountains of the Greeeat West, and will defend that home, sir, with its very life.

Impartial scientific investigations of real live bald eagles deflate that account quite a bit. Not that our eagle is debunked, exactly, but we learn that a lot of things we knew about the eagle consisted of "facts that weren't so."

Results of long study of eagles, and compilation of the studies of other scientists, are presented in a new Smithsonian Institution book, written by Arthur Cleveland Bent of Taunton, Mass.

True, the bald eagle is a bird of prey. But he is also not fond of the hard work involved in preying, and lives mostly on fish cast ashore dying or dead, or taken away from a smaller fish-catching hawk,

the osprey. He can do his own fishing, but not so cleverly as the osprey, so he prefers to rob him.

When fish are scantily available, as in winter, the eagle does turn to true bird-of-prey tactics. He takes any bird or mammal that he can handle, and that runs up as big as Canada goose. Despite his size, he is an athlete in the air, often turning upside down and diving under his victim to strike from beneath.

He does not build his home on a cliff nearly as often as on top of a tall tree, even in the Rockies. And there are far more bald eagles in Florida, least cliffy of states, than anywhere else in the Union. Eagles have even been known to build their nests right at ground level.

And when a human intruder comes, says Mr. Bent, the bald eagle does not defend his nest. He just plain vacates.

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From Page 7

which he details a wartime business transaction on the part of a certain Messrs. Aslop and Lewis that rather looks like profiteering. At any rate, the patriots of the time were wroth enough about the affair.

Some of the letters written in invisible ink were affairs of more than ordinary danger, for they kept John Jay advised of efforts on behalf of the Colonies in London itself. His own brother was a rather notable English physician, Sir James Jay. Letters from him, and from other relatives and friends in England, were passed, open, through the British Post Office, where apparently no suspicion was aroused of possible secret writing. These were often sent to fictitious addresses, where Mr. Jay picked them up. Extreme caution had to be observed at that time, because although the French were willing to aid in the

discomfiture of their old enemy, England, the two governments were still formally at peace.

Thus, a letter from Silas Deane, then secret American agent in Paris, to John Jay, was mailed from a fictitious Thomas Johnson to an equally fictitious Thomas Smith. The visible part was, as usual, casual and innocuous. The part in secret writing went into some details about the delicate arrangements, all the more dangerous because they still had to be kept secret, for stirring up French aid for the struggling Colonies.

Plenty of Callers

Part of the secret message reads: "Let me entreat you to send me some instructions and powers in proper form, if you design I shall represent the United States in any tolerable character. I am, my dear friend, in a most critical situation and the anxiety, I daily undergo thro want of intelligence, will neigh distract me and the more so as everybody here has taken it into their heads I am plenipotentiary. In consequence of which I have a levee of officers and others every morning as numerous, if not as splendid, as a prime minister.

"Indeed I have had occasionally dukes, generals and marquises and even bishops, and comtes and chevaliers without number, all of whom are jealous, being out of employ here or having friends they wish to advance in the cause of liberty.

"Good people in this country expect the new regulation of your government's universal toleration in religion will be one of the cornerstones of your building. This will endear you to all the good people in Europe and be one of the most noble and just steps that can be taken."

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