Computers, Electronic Data, and the Vietnam War

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> *The government are very keen on amassing statistics. They collect them, raise them to the nth power, take the cube root and prepare wonderful wonderful diagrams. But you must never forget that every one of these figures comes in the first instance from the village watchman, who just puts down what he damn pleases.*[1]

With so many superlatives, one might see the Vietnam War as unique. It was the most documented war in military history. It was the longest war in American history. It was the war with the greatest public coverage. It was the most visible war to the American and Canadian public, if not the entire world.[2] No previous war deluged military and civilian alike with so much information.

Historians will highlight discussion of computer use by the American military establishment during this period. The Vietnam War was the first war in military history to be run with the full-scale assistance of electronic data. Computers were in place in the White House and the Pentagon in time for large-scale application for war in 1965. By 1968 the American high command had installed computers in Saigon and military data originated thereafter from South Vietnam.

The effect of these data on the propagation of the war touched the highest levels of the Office of the President. It affected infantry brigades on the battlefield.[3] The effect was felt by the South Vietnamese government and its citizens from scores of data systems dedicated to their well-being. It was noticed in the press media who reported stories of "body count."

Since the data was used to analyze every facet of the war effort, it seems logical that the data would be used by researchers to tell the story of the war. However, one of the ironies of the historical analysis of the war in Vietnam has been an almost complete absence of computerized inquiry.

Early Military Uses of Microdata

The decision to use computers in the Vietnam War was new, but by no means novel. Their use in the armed forces of the United States, and in many other agencies of the

American federal government, began much earlier in the nineteenth century. By 1965 there was a substantial government involvement in computing.

The processing of data can be traced back to the beginning of the nineteenth century, when Joseph-Marie Jacquard invented a punched card that provided instructions to a knitting machine to weave textile patterns. In 1884 Herman Hollerith, an MIT professor and former employee of the United States Census Bureau, filed a patent request for a machine that counted and sorted cards in which holes had been punched to represent census data. The system so facilitated the Census Bureau's processing techniques that the 1890 Decennial Census was completed in seven years, whereas the 1880 Decennial Census had taken nine years.

The United States Army used the Hollerith machine during the First World War to process wide-scale psychological testing of inductees. These were intelligence quotient tests "A" and "B," forerunners of today's Armed Forces Qualification Test. The Social Security Administration became a major user of punch cards in the 1930s, processing as many as five hundred thousand cards each day with the Hollerith machine. This made the American federal government a major processor and user of social science data, since it was necessary to maintain employment records for some thirty million persons in the United States.[4]

The utility of these techniques was not lost on the War Department during and after the Second World War. The Army Provost Marshal General kept track of Americans taken prisoner in both the European and the Pacific Theaters of Operations by the use of punch cards. During the Korean War, casualty figures were maintained by the Army Adjutant General not only on prisoners of war and persons missing in action, but on those wounded and killed in action as well. During the Second World War, the War Department Plans Division conducted a series of psycho-social studies of officers and enlisted personnel. These studies were designed to inform high Army brass about the opinions of the soldiers about themselves, their buddies, their officers, the Women's Army Corps, overseas/United States duty, death, the fear of combat, and the future. The field workers eventually published these studies in the postwar years, and *The American Soldier* became a behavioral studies classic.[5]

Late in the Second World War the American military replaced the Hollerith card sorter with new machines which processed mathematical and electrical engineering data. The Moore School of Electrical Engineering at the University of Pennsylvania, encouraged by a government grant, built two "differential analyzers," one at the university and another at the Aberdeen Proving Ground in Maryland for the Army's Ordnance Corps. This machine produced trajectory tables for the artillery. By later adding vacuum tubes, the resulting machine, the Electronic Numerical Integrator and Computer (ENIAC), worked ten times faster than the differential analyzer and one hundred times faster than humans with mechanical calculating machines.

The American Eckart Naval Observatory used a machine to produce the American Air Almanac for flyers. IBM developed a "Pluggable Sequence Relay Calculator" and installed it at the (Navy) Dahlgren Proving Ground in 1944. Another computer, the WHIRLWIND, based on analog computing but later converted to the digital process, solved the computations of an airplane stability-control analyzer, a device conceived by the Special Devices Center of the Navy to build a number of aircraft trainers. This device solved equations of motion and aerodynamics of an aircraft in flight. After the war the

Army Signal Corps encouraged the development of electronic machines for cryptologic work for the Army Security Agency, and the WHIRLWIND was applied in a countrywide environment by the Air Force's Continental Air Command to direct American fighter aircraft to intercept enemy bombers. The system was known as Semi-Automatic Ground Environment (SAGE).

Throughout the 1950s the Office of Naval Research and the Office of the Chief of Army Ordnance supported the development of machines which eventually produced the electronic digital computers we know today. Moreover, these two offices encouraged graduate training at the Moore School of Electrical Engineering and the development of Computer Business Oriented Language (COBOL).[6] The Commerce Department's Bureau of Standards formed the National Applied Mathematical Laboratory which eventually, under the sponsorship of the United States Air Force, produced two other machines, the Standards Eastern Automatic Computer (SEAC) and the Standards Western Automatic Computer (SWAC).

McNamara, Computers and the War

The experience of the 1940s and the 1950s made it apparent that the computer could be applied to war in a number of ways: processing text; keeping track of personnel actions, scientific and mathematical problems; and guiding aircraft and weapons. However, it was not until the appointment in 1961 of Robert S. McNamara as Secretary of Defense that computer-based quantitative business analysis techniques offered new and ingenious procedures for the collection, manipulation, and analysis of military data.

If one is to understand the value and potential use of those computer records generated during the Vietnam War, one must first have some sense of their context — why and how they were generated — as well as some understanding of the heated controversies concerning their validity and use.

McNamara's early applications of computers to war were ground-breaking. Using computers as an analytical tool, he soon made fundamental changes in the department's reporting techniques, as well as in the use of computer-generated data for decision making. McNamara's contribution was a further step in the process leading from the Hollerith machine which manipulated social science data, to the use of early analogue analyzers performing mathematical calculations, and ultimately to digital computers dealing with military operational data.

McNamara's experience was almost exclusively with the use of statistical evidence to motivate and control management decisions. A former professor at the Harvard Business School, he was a strong-willed manager who served his apprenticeship during the Second World War as a civilian and temporary captain in the Army Air Forces, assisting in the management of the production of B-17 and B-29 bombers. Later, as one of the original "whiz kids" at the Ford Motor Company, he applied this experience so successfully that he was eventually promoted to president of the company. Although there was sufficient precedent in business for the statistical approach to management, the idea was foreign to the military and was not the style of any previous Secretary. Nevertheless, McNamara believed that information (analyzed data) supported critical decision-making and policy formulation, and he needed more sophisticated information in the areas of military objectives, force requirements, and costs.

McNamara's concern was not new. Winston Churchill, upon assuming authority in the British Admiralty, put together a staff of statisticians, "whom we could trust to pay no attention to anything but realities ... It was most helpful in forming a just and comprehensible view of the innumerable facts and figures which flowed out upon us."[8] In the 1950s political scientist Samuel P. Huntington called for "proper staff assistance for the Secretary" which would remedy the "greatest single deficiency" in the Department of Defense.[9] To meet this critical need McNamara established the new position of Assistant Secretary of Systems Analysis, and appointed Alain Enthoven as its first incumbent. Eventually this office did for McNamara what the statistical department did for Winston Churchill in the Second World War, and it filled the void in the Office of the Secretary of Defense (OSD) which Huntington identified in 1957.[10] Enthoven assembled a staff of bright but relatively inexperienced personnel to institute a new programme in the OSD called the Planning, Programming, Budgeting System (PPBS), which called for broad use of statistical evidence as the essential characteristic of operational research and as the basis for decision-making. This required the installation of new computers. Hereafter no decision was seriously considered without computer analysis to support it.[11]

McNamara introduced these innovative techniques at the beginning of the Kennedy years and continued them through the Johnson Administration, but during his tenure they were viewed with mixed feelings both in and out of the Department of Defense. Introduced by civilians, the techniques were opposed by the military, who were angry about the analytical approach to the management of war. It should be said that the military schools and promotion system had not prepared any officer for such a radical change. Officers found themselves unprepared to cope with the Secretary's methods. Their feelings ran deep. One military writer said that McNamara's analysts "had an educated incapacity to see war in its true light," and the PPBS had dismissed the principles of war as "a set of platitudes that can be twisted to suit almost any situation."[12]

Officers could accept the use of statistical evidence to acquire money and materiel during the annual budgetary fights with Congress. Efficiency cuts such as closing naval bases, mothballing ships, and standardizing aircraft production could be excused if it meant trade-offs in other areas. But it was quite another thing to analyze friendly casualties, enemy troop movements, and bombs dropped on Hanoi. The military felt it was madness to initiate military action in reaction to these statistics. After all, they said, war is an art, not a science. Having devoted their entire adult lives to the study and conduct of military affairs, military careerists felt they could better advise the Secretary of Defense and the President on these matters than McNamara's civilians.

Using the ever-increasing mass of field data coming from Vietnam, McNamara initiated a monthly periodical in Washington starting in January 1967 called the *Southeast Asia Analysis Report*. This publication set about to monitor trends over time and patterns across space in the forces, the military operations and activities, the casualties, and the security and economic welfare of the South Vietnamese population.[13] Figures in the *Report* immediately became the focus of criticism from the military. In fact, its conclusions so agitated the Chairman of the Joint Chiefs of Staff that at one point he requested its distribution be limited to the Office of the Secretary of Defense, so as not to unduly influence members of the Service staffs.[14]

Part of the fallout from the widespread dissemination of the *Southeast Asia Analysis Report* was that high ranking military leaders perceived (at least indirectly) that their own personal performance was monitored by McNamara's computers. Whatever was entered

into the computer in Assistant Secretary Alain Enthoven's Systems Analysis Office at the Pentagon had a profound influence on running the war. Many officers imagined the Secretary keeping a report card leading to future promotions, dismissals and transfers simply by counting enemy bodies, trucks destroyed, sorties flown, and bombs dropped. One officer bitterly complained that his local analysts were generating data exclusively for the computers in Washington. "I hope that we never repeat that. The conduct of the war is an art form. It is not something that is quantifiable and I hope we never again revert to a practice that almost crippled us."[15]

One of the best known of all the statistical reporting systems was the body count. It originated even before the American buildup when American advisors tried to justify the claims of South Vietnamese units that a certain action had been successful. Reporters wanted to see that dead enemy bodies were counted, not estimated. Everyone wanted to please the press. After a while the practice became just another statistic and units were apparently judged by General Westmoreland's headquarters on the basis of body counts and kill ratios. After 1965, the figures were aggregated in reports by month and year. Critics of the practice, aside from the moral issues, felt that these measurements told very little, particularly in light of the Viet Cong's willingness to sustain such staggering losses. Douglas Kinnard reported the following criticisms by Army generals:

> The immensity of the false reporting is a blot on the honor of the Army ... They were grossly exaggerated by many units because of the incredible interest shown by people like McNamara and Westmoreland. I shudder to think how many of our soldiers were killed on a body-counting mission — what a waste ... Gruesome — a ticket-punching item ... I had one Division commander whose reports I never believed or trusted ....[16]

Even Assistant Secretary Enthoven's staff was critical of body count. In mid-1967 Enthoven was told that General Westmoreland's intelligence chief reported his search of seventy captured documents confirmed the 1966 body count to within 1.8 per cent. But Enthoven found the documents far from convincing. A re-analysis of the same documents by his staff suggested that the enemy body count was overstated by at least 30 per cent.[17]

McNamara's system was not without considerable support, although arguments against statistical analysis by Congress, the uniformed military, and the media appeared to be overwhelming. General William C. Westmoreland's enthusiastic use of analysis during the greater part of American combat participation proved that not all generals were adverse to basing operational decisions on statistical evidence. Westmoreland, like McNamara, was a Harvard Business School graduate, very much at home with figures and statistics. Indeed, Westmoreland's interest in statistics served as a catalyst for a close and harmonious relationship with the Secretary, and a common regard for statistical evidence and analyzed data accounts for the strong bond between these two leaders.

Thus armed with support from General Westmoreland, his principal commander in the field, Secretary McNamara persisted in the use of statistics from computers, despite many objections. What did he intend to do with this information? The best argument in support of the *Southeast Asia Analysis Report* came from Thomas C. Thayer, who served for more than three years as Chief of the Operations Analysis Division in the Advanced Research Projects Agency's research and development field unit in Saigon, South Vietnam. He later returned to the Office of the Secretary of Defense in Washington as

head of a team studying intelligence and force effectiveness in Vietnam. He contributed to the *Reports* and later indexed and compiled all articles into a set of twelve volumes.

Thayer stated that quantification, a duty best performed by the computer, was only the first step. One needed to analyze the quantified data to make any sense of it. Analysis revealed persistent patterns and cycles. The body count, often criticized as being excessive and misleading, was an example of quantification without analysis. What was important, Thayer explained, was not that the data be precisely accurate because data from a live war seldom are, but that they show consistent patterns reflecting opposing strategies and progress in winning the war by either side. "The problem was that quantification became a huge effort but analysis remained a trivial one. This was unfortunate because the limited analysis that was done produced much useful insight into the war and lots of questions during the war about the prospects for winning, given the way it was being fought."[18]

The war was fragmented and atomized, Thayer continued. There were 44 provinces, 260 districts, 11,000 hamlets, and 3500 VC/NA actions and 35,000 tactical air sorties per month. Quantitative analysis was essential to understand what was going on. The patterns and trends had to be identified and followed closely, since the thousands of small, scattered events were so slow, that without monitoring them, they would escape the commander. But, Thayer went on, the quantification should not have crippled anyone. Indeed it was the lack of systematic analysis and misunderstanding of the basic patterns and movements of the war that had an adverse effect on the American and South Vietnamese war effort.[19]

Alain Enthoven also defended the practices of the staff. According to Enthoven, military professionalism is largely in the conduct of military operations, not in the analysis and design of broad strategies. And while many distinguished strategists are military men, not all strategists are military men, and most military men are not strategists. Both civilian and military men can bring discussions of strategy and force planning elements that the other can bring only with great difficulty, if at all.

> Because of the limitations and strengths of *both* civilians and military men, there is a need for both in such situations[20] ... Analysis is no substitute for judgment, and analysts cannot do the final judging ... but judgment can be a poor substitute for fact and analysis ... policy should result from a combination of judgment and analysis.[21] The problem was not overmanagement of the war from Washington; it was undermanagement. The problem was not too much analysis; it was too little.[22]

Whether too much or too little analysis was subsequently performed, McNamara's efforts created a huge cache of military data. Collectively this data provides evidence of what was available to decision makers just as any other record of the war. It is, therefore, important to investigate which data was preserved, how it was saved and under what circumstances it came to be placed in the National Archives.

Records Disposition and the Vietnam War Electronic Data

These data must be placed within the context of the total Vietnam War documentation. Typical bibliographical aids to the secondary literature are Edward Eckart's "The Vietnam War: A Selective Bibliography," concerning all phases of the conflict; Christopher Lovett's "We Held the Day in the Palm of Our Hand: A Review of Recent

Sources on the War in Vietnam," which concentrates on the military conflict; Fox Butterfield's "The New Vietnam Scholarship," a revisionist effort; Christopher Sugnet's *Vietnam War Bibliography,* selected from Cornell University's collections; Gettleman et al's *Vietnam and America: A Documented History;* Merritt Clifton's *Those Who Were There,* which specializes in eye-witness accounts; Edward J. Marolda's *Select Bibliography of the U.S. Navy and the Southeast Asia Conflict,* and the Army equivalent to Marolda, Ronald Spector's *Researching the Vietnam Experience.*[23] On the other hand, an even more enormous primary documentation, the records created by the military themselves, is just now beginning to be available.

At this writing, the creating services have placed traditional records on the shelves of the National Archives, in the several historical collections of the Air Force, the Navy and the Marine Corps, and in the manuscript collections at Carlisle Barracks and Maxwell Air Force Base. In fact, one person has named Vietnam "the most exquisitely documented war in history."[24] Although impressive in terms of sheer volume, most researchers have found the paper records of the conflict to be extremely uneven. During the early years before 1964 the records are plentiful and well organized; during and immediately after the buildup of 1965, the records are skimpy; in the main years of American ground involvement the records get better; and finally, after 1970, there is a flood of documentation which came back to the United States. Thus, at the field level, one finds some of the best paper documentation after 1970. This is because in 1968 the Adjutant General, the Army's records administrator, suspended all delegation of authority to destroy records created by Army units in South Vietnam. Starting in 1968, all records from the combat zone were retired directly to the United States.[25] This programme was so successful that when these records were first perused at the Washington National Records Center in Suitland, Maryland, "One [found] side by side boxes of traffic violations and other ephemera [with] important operational and planning files and documents of enduring value."[26]

Nevertheless the research community has voiced considerable concern about the adequacy of the military documentation of the war. Lt. Gen. William R. Peer's Army Board of Inquiry investigating the My Lai massacre found so many deficiencies in the Army's record keeping system that it added an appendix to its report noting that there was "a tendency among units to destroy records rather than to retire them."[27] Probably realizing this inadequacy, Guenter Lewy's monograph on the war included a "Note on Military Records," in which Lewy spelled out in detail where to find the material.[28] The Army's Center of Military History also found it necessary to publish an account of the state of the documentation.[29]

Now housed in the National Archives, but not yet open to the public, the Army's collection of unit records plus the headquarters records of the Military Assistance Command Vietnam (MACV), the Military Assistance Command Thailand (MACTHAI) and the United States Army, Vietnam (USARV) at one time totaled almost 60,000 cubic feet. The Army culled the collection to a more manageable 30,000 cubic feet and deposited it with the National Archives.[30] By September 1987 only about 6,000 cubic feet of the total amount had been arranged and described by the archives personnel working with the records. The first opening of records to researchers should occur in the spring of 1988; the entire collection is expected to be available to the public by 1993. There are also collections at various presidential libraries, and in private collections at Berkeley, California; Chapel Hill, North Carolina; and Ithaca, New York.
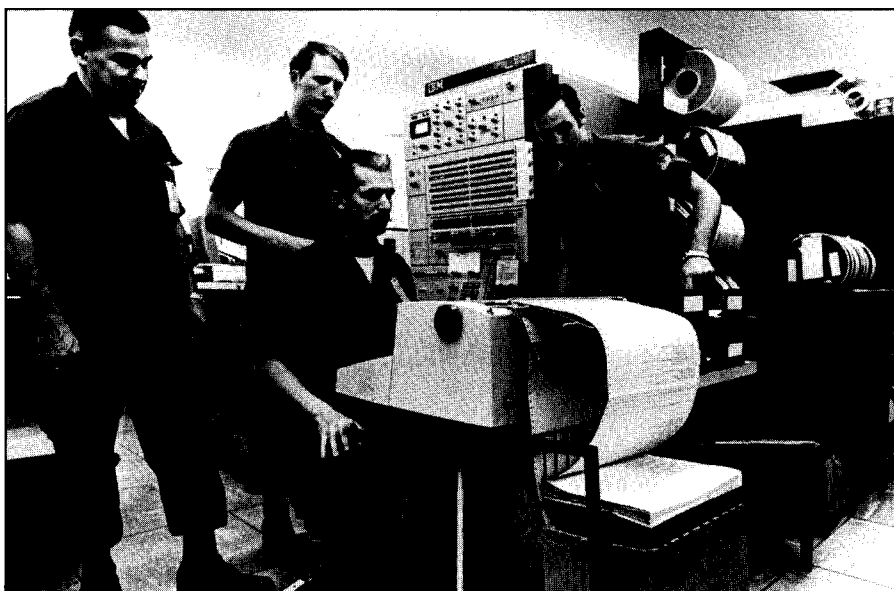
Figure 1: *Conducting a War by Computer, Vietnam, ca. 1968. Photo by Philip Jones Griffiths.* Courtesy: Philip Jones Griffiths/Magnum Photos Inc., New York City.

In the age of computers, it is not enough to speak in terms of paper records, when in fact large amounts of this paper have been produced from data bases as computer output. One needs, therefore, to examine the electronic data bases created by McNamara's computers. One can conveniently group the accessioned Vietnam electronic data into five subject areas. The first concerns the Saigon government and its population. There are eighteen data sets which have relevance to the South Vietnamese civilians and paramilitary forces and for the most part were created by the Civil Operations and Revolutionary Development System (CORDS) under Robert Komer between 1967 and 1972. The subjects include terrorist incidents, casualties, rural development, hamlet security, military readiness and performance and statistical surveys. This grouping includes well-known files such as the Hamlet Evaluation Survey and the Phoenix file.

Military operational data exist in four other subject areas: air, ground and naval subjects and information on enemy base areas in Cambodia and allied efforts to neutralize them. The ground operations data include the subjects of military readiness and effectiveness, casualties, and target and other data. The air operational data are extensive. They include combat and noncombat air missions in North and South Vietnam, damage and losses to South Vietnamese and American (Navy, Air Force, and Marine Corps) fixed and rotary wing aircraft. While most of the data have to do with combat mission results, military operational data include the crucial subject of herbicide spraying of the jungle canopy. The naval files include such subjects as the blockade of the Vietnamese coast, the mining of key North Vietnamese harbors and naval gunfire support to ground operations.

Electronic records of the Vietnam War were retired to the United States through entirely different channels, and for completely different reasons, than the paper records. A

legal suit against the IBM Corporation provided one reason for their survival, while another arose from concern by data professionals that the data not be destroyed but be retained in order to be of use to "the analytical community and historians."[31]

Interestingly enough, the orders of a United States District Court provided the impetus for the retirement of some electronic records. In 1969 four computer manufacturers filed anti-trust suits against the International Business Machines Corporation (IBM). During the course of the hearings the presiding federal judge issued orders prohibiting IBM and all federal agencies from erasing master tapes, considering such action to be destroying evidence.[32] When news of the litigation reached Saigon, General Westmoreland's headquarters decided to use the case as an opportunity to return over one hundred electronic data files to the United States, sending them to a storage and retrieval center for Vietnam data called the Combat Data Information Center (CDIC) at Wright-Patterson Air Force Base, Ohio.[33] In part, the reasoning was that:

> [CDIC] retention will eliminate duplication in retaining this ADP system materiel at another location. This is especially important since this ADP agency in Vietnam will be deactivated in conjunction with the U.S. military withdrawal.[34]

Additional concern over the ultimate fate of the electronic records came from the data professionals themselves. The hue and cry with paper records to "destroy nothing — send everything back" was not applied to computer records. Whereas there was an orderly procedure to retire the paper records from the battlefield, there was a complete absence of instructions for the disposition of electronic records, because "machine-readable tape files..., [were] a relatively new medium and, apparently ... no set of guidelines [existed] on what to do with them once the purpose of the originator [had] been served."[35]

Most records managers within the Department of Defense were not involved in the disposition of electronic records. In fact, many had no idea these materials existed while others did not regard them as records. Electronic records were created in data centers and were controlled by data managers. Even had the records managers been more aware of their existence, they probably would have considered the data files as disposable, having neither the experience nor the training to deal with them. The National Archives, which sets policy for the creation and disposition of federal records, treated electronic records at that time as facilitative to paper printouts.[36]

The MACV data in the CDIC was just one project surveyed by the RAND and Battelle Corporations in 1973 and 1974. RAND sent a proposal for research that was accepted by the Advanced Research Projects Agency of the Office of the Secretary of Defense to "identify the data in danger of being destroyed, develop a guide and look to making the data available to researchers."[37] In addition to the CDIC (over 100 files) the survey found data at the Center for Naval Analyses (19 data files), the National Military Command Systems Support Center (26 data files), the Office of the Joint Chiefs of Staff (11 data files), the Office of the Secretary of Defense (49 data files) and the United States Army Materiel Systems Analysis Agency (48 analyses of data from Vietnam). As a result of this survey, the RAND Corporation, under contract to ARPA, published a *Guide To Southeast Asia Combat Data*, which described 69 electronic data files in seven computer centers maintained in the Defense Department.[38]

Some of these data files were later offered to the National Archives and accepted for archival retention. All data was completely declassified and cleared for public access by

the Defense Department in 1975 and 1976,[39] sooner than any paper records from Vietnam. It was, however, one thing to get the files to the National Archives; it was quite another to prepare them for researchers and to entice researchers to take advantage of this rich lode.

Secondary Research and the Vietnam War Electronic Data

Widespread agreement exists that electronic data is an invaluable resource, yet the research community has used it only in a limited fashion. Responsibility for under-utilization can be attributed to both researchers and data services staff. Archivists perceive the solution to be one of increasing user awareness. The nature of the challenge includes a consideration of the researcher's previous training in using electronic data, knowledge of the file availability, and perception of probable utility given file content and design.[40]

Statisticians and subject matter professionals with formal statistical training were few in government fifty years ago; they number in the thousands today.[41] For the most part, the Vietnam electronic records were created and used by "operations analysts," social scientists trained in the study of statistical evidence and in the use of the computer to manipulate data. Secretary McNamara encouraged, even demanded that this manipulation be performed in the day-to-day operations of the Department of Defense. Since the 1960s other social science disciplines have borrowed from these techniques and applied them to demography, sociology, political science and, to a smaller degree, to the humanities, more especially history.

Creating data to measure the war was one thing; using the data to recreate and tell the story of the war has been quite another. Researchers and archivists alike are beginning to realize that there are both advantages and disadvantages to using electronic records rather than conventional paper records. The Committee on the Records of Government, for example, brought attention to the dangers of software and hardware obsolesence, and made a strong case that if archivists, historians, and creators do not do something about the situation soon, records will not exist to deposit in archives. The committee's argument was picked up recently by Gerhard Weinberg, writing for the American Historical Association. Certain archivists have also noted the problems.[42]

This fear, probably representing the views of a large segment of historians, has been somewhat overstated, and it is ironic that the very discipline complaining about the possibility that data will be lost has among its ranks the most reluctant of electronic data users. Jerome Clubb has said that electronic data does not spell out the "death of research." The point is that computer technology and electronically encoded information promise unparalleled research opportunities. Archives will begin to make the records more available if historians find uses for them and demand them from various institutions. Vincent Demma has been one of the few military historians to appreciate the value in supplementing the mounds of paper documentation with the Vietnamese electronic records. He has suggested computer analyses to "extrapolate new and imaginative approaches to solve the war's 'many dimensions.' "[43]

It is not, however, simply a question of persuading military historians to use the Vietnam data. The electronic format has been avoided by most other historians, as well as most other researchers. Only a handful have braved the difficulties of the machine and placed their trust in the data. Members of a profession with a philosophy dedicated to preserving the past that requires reading and analytical skills to utilize the research

resources, cannot be expected to enthusiastically embrace a record format that requires additional training, innovation, application of technology, and change. This is a point of view shared by archivists of non-textual records in general.[44] Explanations put forth for underutilization of Vietnam data have ranged from unavailable or expensive computers to distrust of the data and software dependancy.

First there is a reluctance to master the process. Researching electronic records up to now has required the use of a mainframe computer and a programmer to plan the manipulation, and can be expensive as well as confusing to researchers who are not computer-literate. Occasionally researchers do their own programming; official researchers, as a general rule, do not. Private researchers cannot afford the process. But academic users, with a university mainframe supporting their research, have been successful. "In short, [military] historians [who are generally official researchers] have not developed the skills to work with such records or to analyze their importance."

The second reason is skepticism over the usefulness and the reliability of the Vietnam data. Researchers have been slow to realize that the greatest value of electronic microdata is their ability to be linked to other data in electronic form. All files produced in the Civil Operations and Revolutionary Development Section of MACV Head-quarters, for example, have a common data element at the beginning of the file which is a geographic indicator fixing the action in or near a specific village or hamlet. Conse-quently, all CORDS data can be linked together, causing the value of each individual data file to grow exponentially.

In spite of this, users have demonstrated their preference for computer printouts in the paper collections (the fruits of the manipulation of these data by the original creators) because they are easier and faster to use than the data from which they came. This raises questions about the varying uses of quantifiable data by the several academic disciplines. Social scientists, for example, manipulate historical electronic data. By linking two or more files, it is possible to describe a scenario which might have happened if that data were interpreted differently today, as if the investigation were over the shoulder of the actors. For example, why did President Johnson decide to initiate a bombing raid on the North Vietnamese city of Hanoi on the basis of the evidence presented to him? Historians would reject this approach as not being legitimate historical inquiry. Historians see print-outs as evidence that the President was given specific data with which to make that decision, not what the President was denied, which would support a different decision.

Intertwined with this reasoning is the bad reputation of Vietnam data not only with its creators, but also with researchers who must muddle through claims and counterclaims. After-battle body counts, for example, have been thoroughly discredited. For example, the Center of Military History of the Department of the Army has advised researchers that "periodic, recurring documents involving quantitative reporting, such as enemy casualties ("body counts"), must be viewed with some degree of skepticism simply because of the difficult conditions under which the data was developed and the con-flicting pressures involved."[45]

A third reason has to do with accessibility. About half of all the Vietnam military records reaching the National Archives were written in a software-dependent mode, a data base management system called the National Information Processing System (NIPS). NIPS caused serious problems in access and handling and a considerable backlog in the accessioning workload of the archives. The presence of the NIPS files also

suggested serious difficulties in providing a uniform reference service to researchers and brought up the whole question of software-dependent files. This made the data initially accessible only to a few researchers who could use the software until the National Archives could transform the files into a software-free format. Since researchers by and large preferred to use their own utility software, the National Archives decided to eliminate the presence of NIPS. Moreover, transportable files would afford a range of options that encoded files would not.[46]

Archivists have sought solutions to enhance software independence, deal with perceived duplication and assist the user who has no access to mainframes. Some solutions have been very slow in coming, if at all. Those files written in NIPS have not, for the most part, been "de-NIPS'd."[47] Although the technology exists to rewrite the data into a software independent mode, the funds to do so have not surfaced. The National Archives is now planning a third serious attempt to eliminate the problem. Early prognosis is very encouraging. If this prognosis proves correct, the files should be rewritten independent of software in a few years. Meanwhile the reader is cautioned that many Vietnam electronic data continue to be in the NIPS format.

Accessioning files with identical titles from varied locations has given one the impression of duplication of accessioning. But this has not proven to be the case. Data maintained in the field might differ from the data passed upwards to the Pentagon and the White House. The National Archives has accessioned the Hamlet Evaluation System from the Office of the Secretary of Defense as well as the Military Assistance Command, Vietnam. It has accessioned National Police data having to do with the Phoenix Programme from Saigon as well as Washington. The data is found to be in varied formats. There is a consensus that the data from the two physical locations, Saigon and Washington, are different. With different versions, users will have the option of choosing data, just as they would versions of the same event, recorded on paper.[48]

The most difficult problem for scholars of the Vietnam War has been mastering the mainframe computer. This has posed an overwhelming obstacle. Future researchers at the National Archives may not face this problem. Since 1980 the computer industry has perfected the microcomputer. New and innovative techniques are under development by data archivists and librarians who maintain data on mainframes to download data to microcomputer media for the convenience of researchers. This new tool will revolutionize methods for using electronic records. Several federal agencies already download data to floppy disks for their users. The National Archives is considering such procedures, as well as electronic bulletin boards and other ways to transfer data to users electronically. Records can be written on microcomputer media for about the same or less than on reels of magnetic tape for mainframes. Flexible diskettes are inexpensive, hold comparatively little data and are an unreliable storage medium. However, the "write once-read many" (WORM) compact disk has a good chance to be the next standard for access, costing approximately $100 per disk and holding 115 megabytes of data per side.[49] It might be possible in the future for anyone with a microcomputer and a modem to access the Vietnam files and manipulate the data using off-the-shelf commercial and business programmes available today.[50]

Conclusions

The widespread use of computers by the Department of Defense during the Vietnam War fundamentally changed the nature and the availability of information to war managers.

McNamara, Enthoven, Westmoreland, Thayer, and others changed for all time the way military forces collect, review, and analyze military information. Computers have also profoundly affected the world of archives and military history. Not only has there been more information saved from the Vietnam War as a result of the new technology, but there are more usable formats available to researchers than for any other period of history. There is a challenge to archivists and researchers alike to take adavantage of this new technology.

Notes

*   The opinions expressed in this paper are solely those of the author and do not necessarily reflect the official position of the United States National Archives and Records Administration.

1   A statement by the economist, tax expert and banker Josiah Stamp (1880-1941), who was an advisor to the British government during both World Wars and whose many publications include *British Incomes and Property* (1915), *Fundamental Principals of Taxation* (1919), and *Wealth and Taxable Capacity* (1922).

2   Although not directly involved in the fighting, the Government of Canada was a member of the International Control Commission set up by the Geneva Conference of 1954, and later the International Commission of Control and Supervision which resulted from the Paris Accords of 1973. As individuals, some 50,000 Canadians served in the American armed services, of whom 30,000 reached Vietnam. Of these, 57 died as result of their Vietnam service. Today the names of these men are enshrined at the Vietnam War Memorial in Washington, DC. See Harry G. Summers, Jr., *Vietnam War Almanac* (New York, 1985), p. 108; U.S. National Archives, Record Group 330, Records of the Office of the Secretary of Defense, Machine-readable Records, "Combat Area Casualties File."

3   See Julian J. Ewell and Ira A. Hunt, Jr., *Sharpening the Combat Edge: The Use of Analysis to Reinforce Military Judgment* (Washington, 1974).

4   Stan Augarten, *Bit By Bit: An Illustrated History of Computers* (New York, 1984), pp. 69-77. See also Nancy Y. McGovern, "An Overview of the Federal Government's Involvement in the History of Data Processing," National Archives and Records Administration, 1987. Unpublished typescript.

5   Samuel A. Stouffer et al., *The American Soldier* (2 vols; Princeton, 1949). The data that Stouffer and his associates created during the Second World War and used to write this classic in 1949 were entered originally into punch-card format and later entered into computer form in the 1970s and have been accessioned by the National Archives.

6   One of the original inventors of COBOL, Grace Hopper, rose in the ranks of the U.S. Navy to become an Admiral.

7   David Halberstam, *The Best and The Brightest* (New York, 1969), pp. 228-48.

8   Winston Churchill, *The Gathering Storm* (New York, 1946) pp. 467-68.

9   Samuel P. Huntington, *The Soldier and the State* (Boston, 1957) pp. 449-50.

10   Alain C. Enthoven and K. Wayne Smith, *How Much is Enough? Shaping the Defense Program, 1961-1969* (New York, 1971), p. 88.

11   Gregory Palmer, *The McNamara Strategy and the Vietnam War: Program Budgeting in the Pentagon 1960-1968* (Westport, 1978), pp. 78ff. See also Robert S. McNamara, *The Essence of Security: Reflections in Office* (New York, 1968) pp. 93-95.

12   Harry G. Summers Jr., *On Strategy: A Critical Analysis of the Vietnam War* (Navato, CA, 1982), pp. 46-47, 159.

13   These subdivisions roughly correspond to the subjects in the machine-readable data bases from the war in Vietnam, which have been accessioned by the National Archives.

14   Fifty issues of the *Report* were published from January 1967 through January 1972. OSD distributed 350 copies of the *Report* each month to a worldwide address list. There was positive as well as negative reaction. All articles printed in the fifty issues have been collected, rearranged and indexed into twelve volumes, and are available as a group or individually from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161 U.S.A. entitled Thomas C. Thayer, ed., *A Systems Analysis View of the Vietnam War 1965-1972.*

15   Scott Thompson and Donaldson D. Frizzell, *The Lessons of Vietnam* (New York, 1977), p. 195. Major General George Keegan speaking.

16   Douglas Kinnard, *The War Managers* (Hanover, N.H., 1977), p. 73.

17   Enthoven and Smith, p. 295.

18   Thomas C. Thayer, *War Without Fronts: The American Experience in Vietnam* (Boulder, Colo., 1985), p. 5.

19   Thompson and Frizell, p. 196.

20   Enthoven and Smith, p. 91.

21   Enthoven and Smith, p. 307.

22   *Ibid.*

23   Edward Echart, "The Vietnam War; A Selective Bibliography," *Choice* (September 1986), pp. 51-71; Christopher Lovett, "We Held the Day in the Palm of Our Hand: A Review of Recent Sources on the War in Vietnam," *Military Affairs* (April 1987), pp. 67-72; Fox Butterfield, "The New Vietnam Scholarship," *The New York Times Magazine,* 13 February 1983. pp. 26-61; Christopher Sugnet, *Vietnam War Bibliography* (Lexington, 1983); Marvin E.Gettleman, Jane Franklin, Marilyn Young, and H. Bruce Franklin, eds., *Vietnam and America: A Documented History* (New York, 1985); Merritt Clifton, *Those Who Were There: Eyewitness Accounts of the War in Southeast Asia, 1965-1975 and Aftermath: Annotated Bibliography of Books, Articles, and Topic-related magazines, covering writings both factual and imaginative* (Paradise, CA., 1984); Edward J. Marolda, *A Select Bibliography of the United States Navy and the Southeast Asian Conflict, 1950-1975* (Washington, DC, 1982); Ronald Spector, *Researching The Vietnam Experience (Washington, 1984).*

24   Quoted from Sterling Slappery in Vincent H. Demma, "Dimensions of Conflict: Some Problems in the Use of Official Records of the Vietnam War," a paper presented at the annual meeting of the Society of American Archivists, 27 September 1979. Unpublished.

25   Vincent H. Demma, "Military History and Army Records," *A Guide To The Study and Use of Military History,* John E. Jessup and Robert W. Coakley, eds., (Washington, DC, 1979), p. 385.

26   Thomas A. Trudeau, "Records Managers Victorious in Vietnam," *Records Management Quarterly,* 17, no. 1 (January 1983), p. 42.

27   Department of the Army, *Report of the Department of the Army Review of the Preliminary Investigations into the My Lai Incident,* vol. I: "The Report of the Investigation." (Washington DC, 1970). Annex B: Peripheral Issues, "Records Management and Disposition," pp. B-1-B-2.

28   Guenter Lewy, *America In Vietnam* (New York, 1978), pp. 461-62.

29   Spector, pp. 3-5.

30   Author's interview with Dr. John Hatcher, the Archivist of the Army, at Records Management Division, The Adjutant General Center, Washington, D.C. 2 July, 1980. See also Trudeau, p. 42.

31   G.A. Carter, J.W. Ellis Jr., E.F. Harslem, A.H. Peterson, and J.S. Reiley, "Southeast Asia Combat Data Project: Symposium Proceedings, Program Review and Status Report, Defense Advanced Research Projects Agency (hereafter DARPA) Working Note WN-9036-ARPA," March 1975, p. 95. Published by the RAND Corporation.

32   *Facts On File,* 1969-1972.

33   "Combat Data Information Center, Second Data Summary," July, 1974, typescript brochure, in Reference Files of the Machine-Readable Branch of the National Archives.

34   National Archives, RG 349, Records of the USMACV, "TINDERS" (documentation package), Letter, Headquarters United States Military Advisory Command, Vietnam (USMACV), 6 February 1973; Subject: "Disposition of ADP System/Requirement for Data in Support of the United States vs. IBM 1969, Civ, 200. and related telegrams."

35   DARPA Working Note WN-9036-ARPA, p. 95.

36   As late as 1961, a preliminary study at the National Archives recommended that magnetic tape be designated only as interim storage medium and that paper or microfilm continue to be the medium of permanent storage. It was not until 1968 that the National Archives reversed its previous advice to federal agency management officials. See Charles M. Dollar, "Computers, the National Archives, and Researchers," *Prologue* (Spring 1976), pp. 31-32.

37   DARPA Working Note WN-9036-ARPA, p. 95.

38   G.A. Carter, J.W. Ellis, Jr., A.H. Peterson and J.S. Reiley, "An Interim Guide to Southeast Asia Combat Data," DARPA Working Note WN-8718-ARPA, June 1974. Published by the RAND Corporation.

39   Project Files of the Machine-Readable Branch of the National Archives.

40   Donald P. Trees, "Increasing Archival Data Usage: An Adoption-Diffusion Model," *The Impact of Computerization on Social Science Research; Data Services and Technological Developments* (Grenoble, 1980), pp. 91-93.

41   William C. Shelton, "Revolution in United States Government Statistics, 1926-1976," *Statistical Reporter* (January 1979), p. 109.

42   Ernest R. May, et al., Committee on the Records of Government, *Report* (Washington, DC, 1985), pp. 86-88; Gerhard L. Weinberg, "The End of History," *Perspectives* 25, no. 2 (February 1987),

pp. 16-19; Donald Fisher Harrison, "An Archivist's Challenges: Adapting to Changing Technology and Management Techniques," *IASSIST Quarterly* 10, no. 1 (Spring 1986), pp. 8-13.

43 Jerome W. Clubb, "On the 'Death of Research': A Quantitative Historian Looks to the Future," a paper prepared for presentation at the Annual Meeting of the American Historical Association, December 1983, p. 20; Vincent H. Demma, "Dimensions of Conflict."

44 By "non-textual," the author refers to any record other than text written on paper, including photographs, motion pictures and video recordings, aural records, maps, charts, and architectural drawings. Of course, the most recently created "non-textual" records are electronic records. The author, a trained historian, has over fifteen years archival experience with electronic records. The author's views regarding historians' use of electronic records have emerged as a result of discussion over several years, but more especially in August 1987, with Dr. Frank P. Evans of the National Archives.

45 Spector, *op. cit.,* p. 5. Since Vietnam War electronic data systems involve batch-processed, periodically-updated, mainframe-based information management systems, Spector's remark would eliminate consideration of many systems in the data bank.

46 Donald Fisher Harrison, "An Archivist's Challenges", pp. 8-13.

47 Electronic data files which exist encoded only in NIPS (and which therefore would be extremely difficult for researchers to work with) are:
Records of the Air Force: Airlift Operations History files (two systems);
Records of the Joint Chiefs of Staff: combat air activities of all services (three systems);
Records of the Secretary of Defense: ground combat activities and records of South Vietnam civilians (five systems);
Records of the Military Assistance Command, Vietnam: ground combat activities and actions of South Vietnamese military and civilians (three systems).

48 Four sets of systems with identical titles are currently under consideration for duplication of data. All have information pertaining to South Vietnamese civilians.

49 Another way to measure the future prices of compact disk technology is the prediction that the CD recording devices will dramatically drop from a price of $2,000 in 1987 to $75 in 1991. Compare this to a similar price drop of electronic hand-held calculators in the 1970s. These figures are from the author's interview with Mr. John Gale of Information Workstation Group of Alexandria, Virginia, 24 April 1987.

50 Donald F. Harrison and W. Jon Heddesheimer, "Downloading for PC Users; Part I: The U.S. Government Experience," *IASSIST Quarterly* 11, no. 1 (Spring 1987), p. 9. As microcomputer technology increases the capacity for storage of data and user-friendly software makes complex data manipulation easier for the novice user, downloaded data from archives will become more popular. The method of accessing the data will also shift. Future researchers will probably look for data from electronic bulletin boards, or some other method of electronic data interchange by way of telephone hookups.