The Link

BULLETIN OF THE NATIONAL CRYPTOLOGIC MUSEUM FOUNDATION, INC.

VOLUME 4, NUMBER 1 Spring 2001

DIRECTOR COMMENDS, RE-AFFIRMS SUPPORT FOR FOUNDATION WORK

CITES MUSEUM AS "ONE OF NSA'S MOST PRECIOUS ASSETS"

In an 11 April 2001 meeting with key officers of the National Cryptologic Museum Foundation (NCMF), the Director, NSA, Lt. Gen. Michael V. Hayden, USAF, received an informal briefing on Foundation plans for a new, replacement facility for the present Museum and indicated his hearty support for the prospect. He designated Agency representatives to work with the NCMF and pledged to continue Agency improvements in the existing museum for the interim. Gen. Hayden stated that, in his view, the museum is, and will continue to be, "NSA's principal educational and research gateway to the public." Affirming that, he announced that NSA was planning to expand the services offered at the museum's research library. New computer workstations are to be installed that will automate manual searches and a CD-ROM indexing system will put literally thousands of documents, released by NSA through the Freedom of Information Act, at the researchers' fingertips. He also commented that the proximity of the existing museum to NSA headquarters fosters a multitude of diverse uses, and expressed concern that the museum would not enjoy the same diverse utilization if placed anywhere other than the present location.

Subsequent to the meeting, the Director sent the following letter, dated 27 April 2001, to Gen. Morrison as President and Board Chairman of the NCMF:

"When the National Cryptologic Museum was first opened in 1993, its purpose was to share a bit of the Cryptologic Community's rich, albeit little-known, heritage with the public. No one would have suspected that less than a decade later tens of thousands of people from around the globe would visit the museum to learn about NSA and the art and science of cryptology. The museum has provided NSA and the American public a great service by telling the untold stories of our past.

"With the formation of the National Cryptolgic Museum Foundation four years ago, a dynamic, strategic alliance was created. The Foundation has provided invaluable contributions in support of the museum, and on behalf of the men and women of NSA, I thank you. Now, with your most recent undertaking of a construction program, we are entering a new stage of partnership.

"I applaud the National Cryptologic Museum Foundation's efforts to ultimately provide a new, state-of-the-art facility to house our nation's cryptologic treasures. This is a significant step in our mutually desired goal of taking our current museum to the next level.

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IN THIS ISSUE

OVERVIEW

Having moved fully into my eighth decade (six of which have been spent in cryptology or cryptologic-related activities) I decided to shift my attention from a most rewarding "retirement" position with the Security Affairs Support Association (SASA) and devote more time to our Foundation. That is now the case, and we have realigned responsibilities sightly. I will be concentrating much of my time and energy on development and the realization of our plans for the museum of the future.

It seems that museum building and museum improvements are going on all around us, responding to growing tourism, curiosity, and educational opportunities. You have read about the studies we commissioned by graduate students at the University of Maryland's School of Architecture (*The Link*, Spring, 1999). Our general approach is to work closely with the National Security Agency and be able to deliver to them for operation a suitably large, modern facility to replace the remodeled motel which has housed the National Cryptologic Museum to date. I noted recently the opening of the Port Columbus National Civil War Naval Museum, said to be the nation's only museum dedicated to naval history during a pivotal (and ever popular) period of our history. It comprises 40,000 sq. ft. and had a price tag of $8 million. You've probably read about the "Spy Museum" planned for the Washington, D.C. area. Other new museums have been opened or are underway at various locations: all of them carry hefty price tags. So we go in with our eyes open. What we have in our favor is the uniqueness of the role and holdings of the National Cryptologic Museum. It embraces both the protection of American information carried or held electronically and the exploitation for intelligence purposes of such information involving foreign nations. This dual mission had its origins in our nation's historic struggle for independence. It was maintained and developed into a modern profession through the largely unsung actions of anonymous men and women, in war and in peace, all for the benefit of our nation. On a selective, deliberated basis, much of their past story can now be told and the "tools" of their craft can be displayed in public. That's what the NCM is all about, and it serves as a monument and a tribute to them and the efforts they represented. Located "outside the fence" near the National Security Agency, it gives the visitor an appreciation of why the Agency exists, what it does, and why it contributes to our freedom. It informs the Agency's personnel, their families and visitors, and serves to inspire them. That's a pretty heady thought – good to contemplate and guide us as we get serious about fundraising for a new, even more appropriate, facility. That's why we're involved as a support foundation. That's why I'm putting my shoulder to the wheel. And that's why I invite you all to join with me.

John E. Morrison, Jr.
President

NEW FOUNDATION "SPONSORS"

In March 2001, COL Lawton C. Rovegno, USA (Ret'd), a former Army Security Agency (ASA) officer, presented the Foundation with a check for $1,000, making him our newest Sponsor. On the corporate front, the Freedom Through Vigilance Association (Mike Feldblum, President) was very helpful in time and effort in support of Foundation membership and has become a sponsor. Many thanks, Colonel, and FTVA!

MATCHING FUNDS?

And, while we're on the subject of donations, one of our members has generously offered *three grants of $10,000 each*, to be used for our building fund – **IF** matching funds can be raised. Would you be moved to respond to this challenge? Perhaps you've been meaning to contribute to a new facility. Here's an opportunity to increase the value of your contribution. If you can help liberate this money, just send your check to NCMF, Post Office Box 1682, Ft. George G. Meade, Maryland 20755-9998, made out to "NCMF." Note on the check or by accompanying note, "Matching Funds."

"SPY PLANE" VS. "ROUTINE SURVEILLIANCE"
Eternal Vigilance the Price of Liberty

Adjacent to the National Cryptologic Museum stands the National Vigilance Park, an Air Force initiative, designed to commemorate the air crews and "back-end" specialists who served during the Cold War. In his dedicatory remarks on 2 September 1997 (*The Link*, Spring, 1998) the then-Director, NSA (DIRNSA), Lt. Gen. Kenneth A. Minihan, USAF, said that:

. . . [W]e are taking a major step to publicly recognize and remember the sacrifices and dedication of aerial reconnaissance servicemen and women from all branches of the armed forces throughout the Cold War. As we strived to better understand the intentions and character of the post World War II global threat, and to deal with it, aerial reconnaissance was a critical source of information for our decision-makers. In the era before satellites, space-based systems, and worldwide interconnected communications, service members flying aerial reconnaissance missions answered the call, writing a history of bravery and honor.

At that ceremony, a C-130 was presented, configured to recall one shot down over Soviet Armenia in 1958. Soon the Army followed suit, dedicating an RU-8D "Seminole" of the type used in Viet Nam in a tactical reconnaissance role (*The Link*, Summer, 1998.) Seeing the tiny Army craft alongside the "Hercules" continues as a silent but visible reminder of the importance of both strategic and tactical recon from the air.

As members of the Foundation are aware, since 1998 we have explored every avenue to assist in locating an EC-121 "Constellation" reminiscent of the U.S. Navy plane shot down over the Sea of Japan by the North Koreans with a crew of Navy and Marine specialists – believed to be the largest loss of life in such an incident. It would complete the interservice nature of the park. But "Connies" have virtually disappeared from the inventory, it seems.

All of this came to memory on 1 April 2001, when a Chinese fighter pilot, harassing a routine Navy reconnaissance flight over international waters in the southwest Pacific, miscalculated and hit the props of the lumbering EP-3. The smaller plane was destroyed. But for incredible skill by the Navy pilot, the EP-3 might have gone down, "lost at sea; no survivors." Instead, a forced landing took place at the Chinese naval air base on Hainan Island, and the American people – and the world – suddenly awoke to the realization that, while the Cold War may be over, American men and women still maintain the watch, the routine, often monotonous watch, for us. "Spy plane" was the term seized on, not just by the Chinese, but by many in the sensationalist American media. Patiently, the administration in Washington tried to clarify what it saw as the distinction between spying and routine surveillance, often getting a "yeah, sure," reaction from skeptics. Attempts were made to place the mission in the context of peacetime training and operational routine, and amid the revelation that many nations – including China – were doing the same thing. As press time for this issue of *The Link* approached, the final chapter in the incident had yet to be written, but some observations may be in order.

The battered EP-3 was still sitting on the ground on Hainan. Norms for emergency had been ignored by the reluctant host, and bickering over release was well underway. But the crew had been returned to their home base after a short detention. More than one of us must have been struck by the youth of those filing from the airplane that returned them: The interservice composition. The presence of women among their ranks. And by the American flag under the pilot's arm, as he returned home. Pondering the incident, a serious observer must recognize that satellites do not stimulate the same reaction as a peripheral airplane, that despite the end of the Cold War, we still send our young men and women out to exercise their special training and hone their skills. We may not have been aware of it, but we have profited by the fact that they were out there, constantly patrolling the perimeter, protecting us for whatever use we may have been making of the benefit they afforded us.

And we renew our hope that one of these days a worthy representative of the "sea service" will take its place among the "relics" of airborne reconnaissance memorialized in National Vigilance Park.

CITES MUSEUM AS "ONE OF NSA'S MOST PRECIOUS ASSETS"

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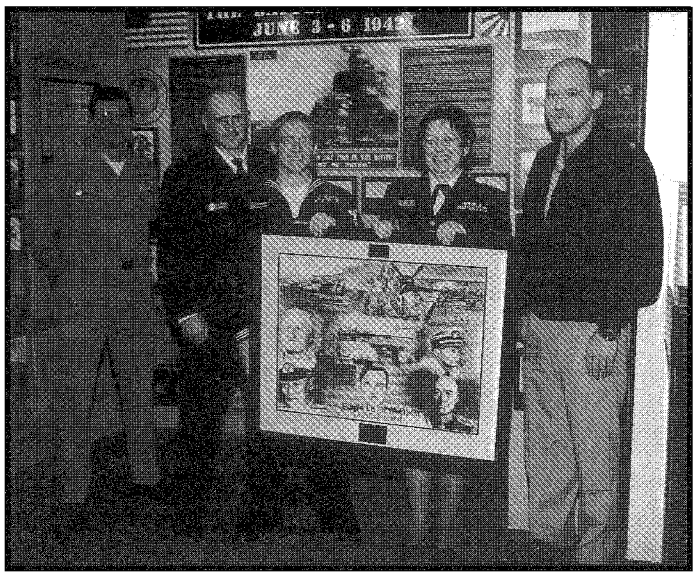
"As we look to our future, it is vitally important that we draw on the lessons of the past to help us chart the road. With assistance from the Foundation, and the appropriate level of support and counsel from Agency leadership we can ensure the future existence and growth of what has been, and will continue to be, one of the NSA's most precious assets."

The Director's enthusiastic endorsement of the Foundation initiative, his continuing commitment to interim improvements, starting with the library, and his characterization of the museum as "one of NSA's most precious assets" were heartening to the Foundation representatives, as they surely will be to our membership. Such an expression of commendation and support renews our own commitment and strengthens our conviction of the worth of our largely voluntary efforts to NSA and the public.

"THE PASSING OF A FRIEND"

Even as this issue was being "put to bed," we learned with great regret of the death on 1 June 2001 of John Larkin, 86, a retired cryptologist, who had made his home in Florida. Well known among NSA retirees, John was reluctant to be identified in his contributions to the Foundation, but he was one of our strongest supporters. He was the one who inspired the idea of a Memorial Register recounted on page 9, and he had been generous in other anonymous donations. Consistent with that record, his wish, honored by Mrs. Larkin, was that any memorial contributions in his name be sent to the Foundation. We shall miss John and his generous spirit, and gratefully acknowledge his final wish.



Battle of Midway Commemorated

As noted in the Winter issue (page 5 "Museum Happenings") this is the drawing presented by NAVSECGRU members to Gen. Morrison and the Museum.
(L-R) CPO Thomas W. Roskelly, Jr. (honcho of the Midway display), Command Master Chief James D. Wilson (initiator of the portrait project), CTTZ Jeremy Boudreaux (one of the two artists), CDR Stephanie Markham (C.O., NAVSECGRU, Norfolk), CAPT Andrew Singer, Actg Dep Commander, COMNAVSECGRU.

"CLASS OF 2001" HALL OF HONOR NAMES ANNOUNCED

As press time neared, the Director, NSA announced the names of the third group of individuals to be honored for cryptologic service. In a radical departure from earlier selections, living persons are now to be eligible. A ceremony of induction is set for 14 June 2001 at the National Cryptologic Museum and will be covered in the Summer issue of The Link.

The four individuals in the "Class of 2001" are:

Mr. Howard Barlow - information security

Mr. Mahlon Doyle - cryptomathematician

Dr. Sidney Jaffe - cryptolinguist

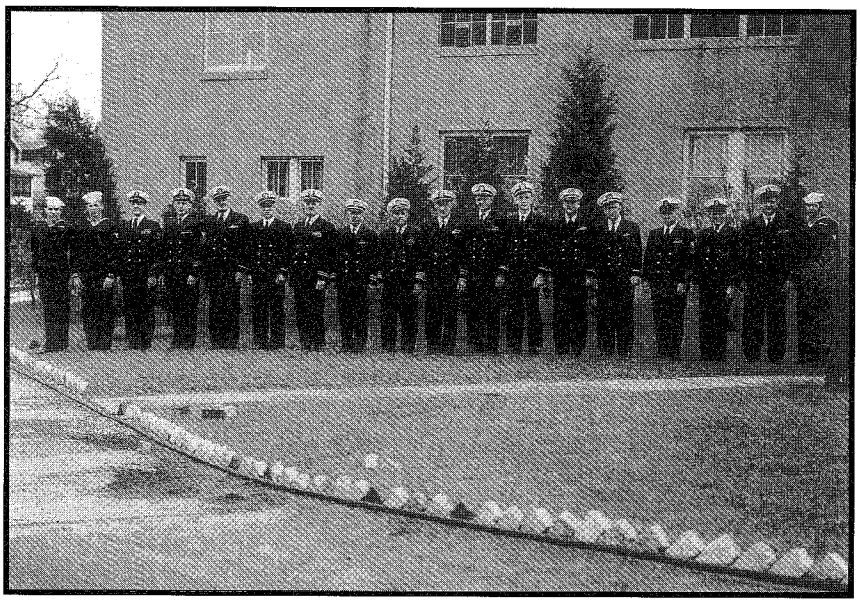
MajGen John E. Morrison, USAF (Ret) - leader in Air Force, NSA, and the National cryptologic efforts (as well as our own Foundation leader).

ATLAS AND THE EARLY DAYS OF COMPUTERS

By Harlan Snyder, LCDR USNR, Ret.

Some personal reminiscences about ATLAS Project 13, and the subsequent Engineering Research Associates (ERA) 1101 Computer and the Naval Computing Machine Laboratory (NCML) at St. Paul, Minnesota in 1949 and 1950:

As a newly minted Ensign from the Navy V-12 and NROTC program at Iowa State College, I was ordered in the summer of 1948 to the Navy Department in Washington, D.C. to a function designated as OP-20 in Naval Communications. At the time we were known as a part of Communications Supplementary Activity (CSA), then for a while Armed Forces Security Agency (AFSA), and finally NSA (National Security Agency). My studies had been in Communications/Radio Engineering and Russian language. I was also a radio amateur. After checking in at the old Navy buildings on the mall I was sent to 3801 Nebraska Avenue for training and clearance with several others. Some of our routine duties included the daily incineration of burn-bag material; escort of hundreds of pounds of punched cards to a location in Georgetown where they were reduced to pulp; and courier duty to the Army Security Agency at Arlington Hall, the State Department and certain foreign embassies. While on courier or escort duty we were armed with a Colt .45 service pistol and were accompanied by a senior petty officer as driver. Upon clearance I was to be assigned to the ATLAS project which was underway at NCML. The Naval Computing Machine Laboratory at 1902 W. Minnehaha Avenue in St. Paul, was part of an industrial site which had originally been a factory for heating radiators and then converted to glider manufacturing in WWII. NCML shared the site with ERA. (The original Naval Computing Machine Laboratory had been at National Cash Register in Dayton, Ohio during WWII as part of the Navy Communication Supplementary Activity (CSA) and OP-20.) I transferred to St. Paul in April of 1949 along with Ensign Roy Howard, who was assigned to another project. My orders were to learn the system and to be responsible for maintenance and training after installation back at Nebraska Avenue. Upon arrival at St. Paul I found that the system design was essentially complete and that "breadboarding" and prototyping were well along. By the summer of 1950 final de-bugging and testing were underway.



Dress Blues Photo at USNCML
St. Paul, Minnesota - 1950

(L-R) Unknown, PO; C.T. Cooke, PO; Unknown, CPO; A.R. Mix, CPO; R. (Rudy) Soland, CW04; R.A. (Roy) Howard, ENS; J. W. Sotak, LT; J. G. Holland, LCDR; E.C. Hawk, CAPT; L. A. (LeRoy) Lankford, LCDR; C. F. (Charlie) Jarrett, LT (JG); H. C. (Harlan) Snyder, ENS; ____ Hackman, CW04; Unknown, CW04; H. N. Harris, CPO; Unknown, CPO; Unknown, CPO; Unknown, PO. Note: This photo may have been taken at the change of command ceremony when Capt. Hawk relieved Capt. P. S. Creasor.

ATLAS/1101/Project 13 was a large-scale, general purpose octal architecture computer/system funded through the Navy Bureau of Ships. It was designed and built by Engineering Research Associates of St. Paul, (which also had a Washington D.C. office.) Design and build took place from 1947-1950, under technical direction of OP-20: Dr.'s

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Joe Eachus, Howard Campaigne, and George Cramer, all mathematicians. The contract price was rumored to be $700,000. It contained some 2,000 vacuum tubes, a large magnetic drum storage, paper tape reader and punch and IBM Electromatic typewriter for I/O. Tubes were in pluggable modules, some twenty tubes per module. There were some five cabinets, all painted battleship grey, perhaps five feet in height, and connected together with a central operator's console for a total length of some 40 feet. Cooling was by a chilled water heat exchanger to an air plenum under the system. At Nebraska Avenue the chilled water control valve servo caused electrical noise interruption from time to time until identified and corrected by the facility/building personnel.

Dr.'s Eachus and Campaigne made periodic visits to St. Paul and I remember in 1950, when the system was more or less operational, Joe ran a program which calculated the sine function and plotted it on the output typewriter. We were all elated!

During my assignment in St. Paul there were approximately twenty navy personnel, including commissioned officers, warrant officers, and senior petty officers. The commanding office was Capt. Philip Creasor, later relieved by Capt. Earl Hawk. At least two of the officers were from the original "OTRG" gang – LCDR LeRoy Lankford, and CWO4 Rudy Soland. (At the time I knew nothing of OTRG and don't recall it ever being mentioned). The number of civilian employees at ERA for NCML projects was perhaps 100 or so. ERA also had other business and employees not involving navy contracts.

The number 1101 (binary 13) came from the Navy project number 13, as there were several different projects, each identified by a decimal number and code name. One of the large storage drum projects was called "SATYR". Other NCML projects included one of the first TTY demodulators using a Lissajou figure-tuning display. The first commercial version of ATLAS by Remington Rand (after purchase of ERA) was called the 1101 and became the precursor of a family of machines, i.e. 1101-1108.

ERA personnel included Project Engineers Frank Mullaney and Jack Hill. Frank had been a television engineer at KSTP, St. Paul; Jack was from 3M. Other engineers and technical staff were Warren Burrell (who years later made headlines in a Federal age discrimination law-suit), Arnold Cohen from the University of Minnesota and RCA, Arnie Hendrickson, Sid Rubens (magnetic drums), Dave Noble (who had been at the original NCML in Dayton, Ohio in WWII and later was a key inventor of the floppy disk at IBM), Joe Keller (who had been at RCA and was experimenting with CRT "high speed" digital storage), George Hardenbergh and Bill Keye. Several eventually went on with Bill Norris (who was in upper ERA management and who had also been at Dayton) after Remington Rand took ownership to later found the Control Data Corporation as has been described elsewhere.

ATLAS was shipped from St. Paul in Pullman and Railway Express cars, with armed Naval personnel escort, to the Bureau of Ships/NSS (Nebraska Avenue) in November 1950. The individual ATLAS cabinets were loaded on a spur track which came into the ERA premises. In Washington it was transferred by truck to Nebraska Avenue, installed, and brought up and running by ERA personnel in less than two weeks. I had returned to Washington at this time and remained with ATLAS doing training and maintenance until transferring to destroyers at the end of 1951. Upon completion of my destroyer tour (USS Fred T. Berry, DDE 858) I transferred to the Naval Reserve and after two years of travel and study in Europe taught antisubmarine warfare at the San Jose, California Reserve Training Center. At the time we had a very active Naval Security Group but all officer billets were full.

Back to ATLAS: Assembler language had not been "invented". Coding was in binary(!), and I/O had to be coded *character by character.* As there was no operating system, the operations group queued up on each shift for run time. There were a lot of "expletives deleted" as each program was run for the first few times. An attempt was made in spare evening time to calculate π (pi) to several hundred places, however it was eventually abandoned as storage of intermediate results was difficult. (I'm not sure of the algorithm used – as I recall, it made use of an arctangent formula, but "fast" convergence was required. There was concern that release of any

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ATLAS AND THE EARLY DAYS OF COMPUTERS

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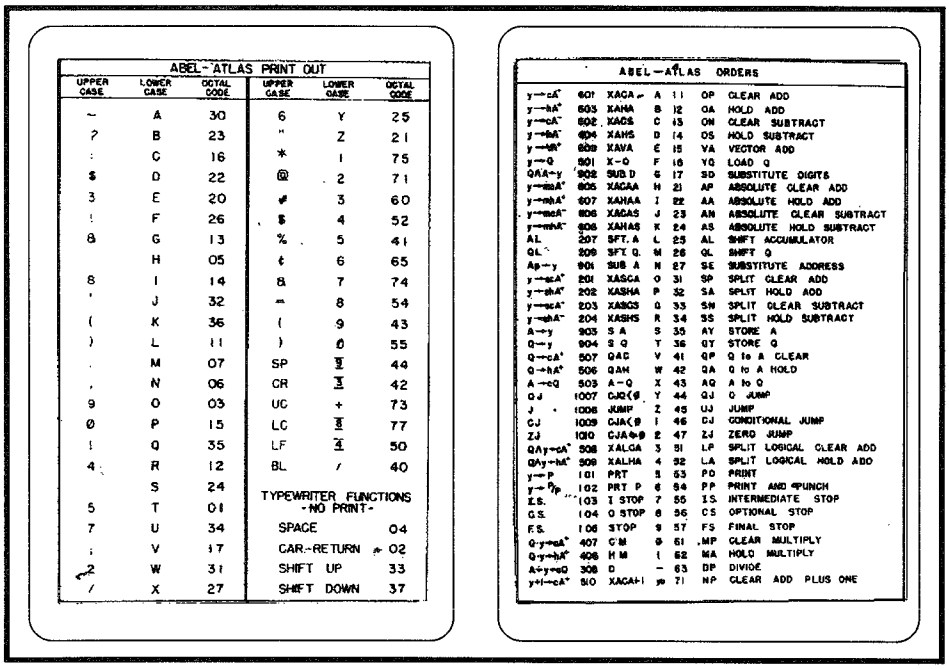
results could be a security problem as it would raise questions as to how such a result had been calculated, and by whom, even though we were not trying to beat the latest value for Pi.)

At the time ATLAS may have been the most powerful fully operational general purpose computer in the world. It ran "24/7" most of the time. "Competition" (which was snickered at by some of us) included the Harvard Mark I, Remington Rand Univac, SEAC, IBM 604, and others. Of these, only the Univac reached commercial status as a system. (The IBM 604 was a punched card calculator). ATLAS reliability was very good. Tube failures were insignificant, contrary to many dire predictions. (It was part of my duty to keep track of tube failures.) Some Western Electric tube types had almost no failures, while the 2D21 thyratrons had the poorest reliability. However, I don't remember that we ever had a tube fail in normal operation. Low filament voltage tube-testing was utilized extensively, and we were probably able to avoid most tube fails by this. Head adjustments on the magnetic drum were critical and properly read signal amplitude was verified with an oscilloscope. Spare tracks were available in cases of track damage. Lt. (jg) Charlie Jarrett invented a pluggable interlacing scheme which significantly speeded up certain programs. Several different interlaces (for drum addressing) were used. Operational programs specified an interlace which had been determined to be optimal in run time for the particular program. Bill May, Don Ream and many others were in the operations crew at Nebraska Avenue. Reserves (Navy) were being recalled since the outbreak of the Korean war in June. Many, like Don Iacaboni, went home in civilian clothes one day, and came back the next in uniform – doing the same job. One of the up and coming enlisted people, Charles Blair, was assigned to ATLAS.



ABEL-ATLAS PRINT OUT

UPPER CASE	LOWER CASE	OCTAL CODE	UPPER CASE	LOWER CASE	OCTAL CODE
~	A	30	6	Y	25
?	B	23	"	Z	21
:	C	16	*	1	75
$	D	22	@	2	71
3	E	20	#	3	60
!	F	26	$	4	52
8	G	13	%	5	41
	H	05	¢	6	65
8	I	14	&	7	74
'	J	32	=	8	54
(	K	36	(	9	43
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.	M	07	SP		44
,	N	06	CR		42
9	O	03	UC	+	73
0	P	15	LC		77
1	Q	35	LF		50
4	R	12	BL	/	40
	S	24	TYPEWRITER FUNCTIONS -NO PRINT-		
5	T	01			
7	U	34	SPACE		04
;	V	17	CAR.-RETURN		02
2	W	31	SHIFT UP		33
/	X	27	SHIFT DOWN		37

ABEL—ATLAS ORDERS

y→cA'	601	XACA	A	11	OP	CLEAR ADD
y→hA'	603	XAHA	B	12	OA	HOLD ADD
y→cA"	602	XACS	C	13	ON	CLEAR SUBTRACT
y→hA"	604	XAHS	D	14	OS	HOLD SUBTRACT
y→hV'	609	XAVA	E	15	VA	VECTOR ADD
y→Q	601	X→Q	F	16	YQ	LOAD Q
QAA→y	902	SUB D	G	17	SD	SUBSTITUTE DIGITS
y→cA'	605	XACAA	H	21	AP	ABSOLUTE CLEAR ADD
y→hA'	607	XAHAA	I	22	AA	ABSOLUTE HOLD ADD
y→cA"	606	XACAS	J	23	AN	ABSOLUTE CLEAR SUBTRACT
y→hA"	608	XAHAS	K	24	AS	ABSOLUTE HOLD SUBTRACT
AL	207	SFT. A	L	25	AL	SHIFT ACCUMULATOR
QL	209	SFT Q.	M	26	QL	SHIFT Q
Ap→y	901	SUB A	N	27	SE	SUBSTITUTE ADDRESS
y→cA'	201	XASCA	O	31	SP	SPLIT CLEAR ADD
y→hA'	202	XASHA	P	32	SA	SPLIT HOLD ADD
y→cA"	203	XASCS	Q	33	SN	SPLIT CLEAR SUBTRACT
y→hA"	204	XASHS	R	34	SS	SPLIT HOLD SUBTRACT
A→y	903	S A	S	35	AY	STORE A
Q→y	904	S Q	T	36	QY	STORE Q
Q→cA'	507	QAC	V	41	QP	Q to A CLEAR
Q→hA'	506	QAH	W	42	QA	Q to A HOLD
A→cQ	503	A→Q	X	43	AQ	A to Q
CJ	1007	CJR(¢	Y	44	CJ	C JUMP
J	1006	JUMP	Z	45	UJ	JUMP
CJ	1009	CJA(¢	!	46	CJ	CONDITIONAL JUMP
ZJ	1010	CJA→¢	¢	47	ZJ	ZERO JUMP
QAy→cA'	508	XALCA	3	51	LP	SPLIT LOGICAL CLEAR ADD
QAy→hA'	509	XALHA	4	52	LA	SPLIT LOGICAL HOLD ADD
y→P	101	PRT	5	53	PO	PRINT
y→P/p	102	PRT P	6	54	PP	PRINT AND PUNCH
I.S.	103	I STOP	7	55	IS	INTERMEDIATE STOP
O.S.	104	O STOP	8	56	OS	OPTIONAL STOP
F.S.	106	STOP	9	57	FS	FINAL STOP
Q·y→cA'	407	C M	@	61	.MP	CLEAR MULTIPLY
Q·y→hA'	406	H M	(	62	MA	HOLD MULTIPLY
A÷y→Q	308	D	-	63	DP	DIVIDE
y+1→cA'	310	XACA+1	¤	71	NP	CLEAR ADD PLUS ONE

Input/Output Coding Card for Wallet
(Enlarged for readability)

According to colleagues at the time, after service at NSA ATLAS would up in NATO and was at an ASW facility in Italy (Leghorn) about 1965. I saw an advertisement for sale of what appeared to be ATLAS in the European edition of the New York *Herald Tribune* about 1966 or 1967.

The system was displayed to visiting dignitaries from time to time, including the famous mathematician, John Von Neumann and others from academe, and Los Alamos. (the 1101 was an example of "von Neumann" system architecture where sequences of instructions/commands are intermixed with data).

References: 1.) *Magnetic Recording, The First 100 Years*; Daniel, Mee, Clark; IEEE Press 1999, in particular Chapter 16. 2.) Remington Rand/Univac literature on 1100 series of computers, 1101-1108. 3.) *A few Good Men from Univac*; Lundstrom; The MIT Press; 1987. 4.) *Annals of the History of Computing*, Vol. 1, Number 2, October 1979 ("The Birth of ERA").

[Editor's note: Many thanks to Foundation member

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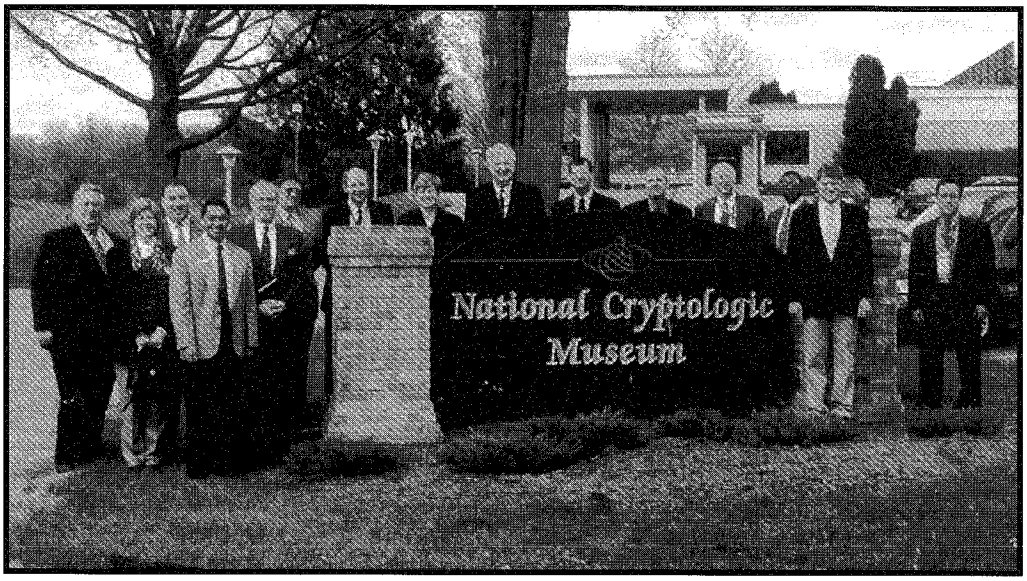
SENIOR SERVICE SCHOOL PARTICIPATION

Early this year two Foundation members, Tom Johnson and Jim Boone, participated in a class of the Industrial College of the Armed Forces (ICAF), sister institution of the National War College, and a component of the National Defense University. (Dr. Johnson recently retired as Senior Historian in NSA's Center for Cryptologic History. He was an Air Force officer in Southeast Asia. Mr. Boone is chairman of the NCMF Acquisition Committee, with experience at NSA and in industry.)

The subject was the general relationships between the intelligence community and industry. This session was a part of an intelligence option in the ICAF curriculum, from which the graduates return to their respective services and agencies to fill influential positions. They are a bright and involved group of mature students. Tom and Jim were invited to participate by Dr. Richard Schroeder, lead professor for this curriculum. The subject matter was entirely unclassified and the topic was treated as a generalized overview with some specific examples.



ICAF Seminar Visits

From left to right: Ben Crew, ICAF Faculty; Kathy Smith, OSD; Terry May, DAF; Capt. Vincente Agdamag, Navy; Richard Schroeder, ICAF Faculty; CDR Ed Rachauskas, USN; Bob Prince, DA; Pat Newman, NSA; Frank Goss, NSA; Col. John Grimes, USAF; Bill French, CIA; Col. Art Nilsen, USAF; Col. Romeo Morrisey, USA; Lt. Col. Jim McKinney, USAF; and Lt. Col. Tony Dominice, USAF.

While emphasizing that close government-industry relationships are recognized as an absolute necessity in modern high-technology intelligence activities, it was pointed out that these relationships are complex and sometimes difficult to pursue. One of the factors which drives that complexity is the need for security. Security is often thought to be synonymous with secrecy, and can create real strains between the parties. It was also pointed out that there is no shortage of patriotism in industry and that joint programs can, with proper attention, understanding, and under the proper contract form, be conducted very successfully.

The train of events from pre-WWII Riverbank, through IBM, National Cash Register, Bell Laboratories and the Teletype Corporation was outlined. The impact of cryptologic activities on the early computer industry, particularly with Electronic Research Associates, Control Data Corporation, IBM, and Cray Research, was explored as a classic example of such complex interactions. The point was made that success from the government's view really requires; 1) working with industries which have related market objectives, 2) having good exchange relationships with a variety of government laboratories, and 3) maintaining close associations with researchers at universities. The students were told that this is a big challenge, but the payoff is also great. It is well worth the effort. In fact, success often depends on it.

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MEMORIAL REGISTER

The third class of inductees into the Museum's Hall of Honor has just been announced. That number has been kept intentionally small and selection is the highest peer recognition from the cryptologic community. Several of our members, however, have suggested some alternative means of recognition for fellow workers, esteemed leaders, and mentors who figured in their own professional lives with NSA and live in their thoughts. One put action behind his words, making a contribution of $100 per name for a list he submitted. The Foundation's Recognition Committee took this on, and devised an "In Memoriam" Register, in which the name of the individual, dates of service at NSA and sponsor (if the sponsor desires) will be recorded. A leather-bound book has been purchased, and will be on constant display in the national Cryptologic Museum. Already sixteen names have been submitted. To enter names, simply submit them to the Foundation (address on back) with a check for a minimum of $100 each. If you have questions, contact the Foundation office.

ATLAS AND THE EARLY DAYS OF COMPUTERS

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Snyder for these recollections, when the foundation of today's cyber world was being laid. OTRG refers, of course, to the legendary Navy operators, the On-the-Roof-Gang, so-designated by their "shack" on the roof of the NSS building near the Pentagon.]

Looking Ahead . . . in Hindsight

"Where a calculator like the Eniac today is equipped with 18,000 vacuum tubes and weighs 30 tons, computers in the future may have only 1,000 vacuum tubes and perhaps weigh only 1 1/2 tons."

Popular Mechanics, March 1949, as quoted in the Richmond Times-Dispatch, 21 April 2001.

FOR THE BOOKSHELF

Steven Levy, *Newsweek's* chief technology writer and a regular contributor to *Wired,* as well as author of *Hackers (1984)* has a new book, *Crypto: How the Code Rebels Beat the Government – Saving Privacy in the Digital Age* (New York: Viking, ISBN-0-670-85950-8). It evidently derives from an impressive array of interviews with principal figures in the debate over public cryptography. His contention is that NSA was so preoccupied with the cryptologic challenge posed by foreign armies and governments that it neglected the growth of individual concern for privacy, spawned by the Internet and e-mail, and the resultant push for cryptography from the private sector. This was new to NSA. NSA had inherited decades of government and military efforts to limit outside knowledge of cryptography and closely regulate the export of the technology. Largely unaware of this background, or the reasons for it, the "cyberpunks" were motivated by little more than a desire for privacy in their electronic communication. From the libraries, from the Internet itself, and from exchanges among themselves they began to learn about cryptography. Warned by a well-meaning individual (who happened to be an NSA employee as well as a fellow member of "the club") that they might be venturing onto thin ice, some took this as a government-inspired threat. It was seen as an assault on their free speech ("scrambled" writing seen as free speech). As their work improved, they came to understand better the challenges and power of the government monopoly. Under Director Bobby Inman, NSA sought to reason with the proponents of public cryptography. Dr. Clint Brooks became Agency point man for "equities," seeking an acceptable balance between risk and accommodation. Many of the names recently re-introduced in the governing party are encountered first in the earlier decade. An irony is that the innocents who started the rebellion seem later to appreciate why the government's historic position was what it was: that criminal and terrorist interests also desired 100% privacy from government scrutiny to carry out their work, and that to protect

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VENONA: ANOTHER LOOK AT HISTORY

Julie Wetzel, Program Chairman

Robert L. "Lou" Benson of NSA and Herbert Romerstein, author of *The VENONA Secrets: Exploring Soviet Espionage and Americas's Traitors*, joined on 23 March 2001 at the National Security Agency to present a fascinating new chapter in the continually unfolding story of VENONA, the American exploitation of encrypted messages of Soviet agents, to an NCMF audience. Benson, NSA's Technical Director for Counterintelligence, first provided an update on VENONA releases. He briefly described the more than 20 books that have either been written or revised as a result of the VENONA releases by NSA. He also discussed some of the current issues surrounding VENONA – more releases of Russian historical materials, and better understanding of when VENONA translations were first made available to the FBI.

Romerstein, former head of USIA's Office to Counter Soviet Disinformation and a staffer for the House Permanent Select Committee on Intelligence, as well as co-author (with former KGB officer Stanislaw Levchenko) of The *KGB Against the Main Enemy* (1989) then spoke. Based upon five years of study of the VENONA documents, other US government records, and extensive research in the Moscow archives of the Communist International Party and the German Communist party archives, he demonstrated the linkage between the Communist Party of the United States and Soviet intelligence operations, through a combination of written correspondence and VENONA messages. Calling the VENONA cables "the mortar that holds together information from Soviet archives and US government investigations of the '40s," Romerstein described the relationship between key figures and activities of the Communist Party and orders from and reports to Moscow, revealed through VENONA. Names such as Elizabeth Bentley, Whittaker Chambers, the Rosenbergs, Donald Maclean and a host

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FOR THE BOOKSHELF

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the common interest such privacy could be a barrier. This is a fascinating and easily read view behind the scenes, and it affords, in part, an appreciation of why NSA's current leadership is having to re-invent the Agency.

Aegean Park Press has announced the publication in CD-ROM form of Herbert Yardley's *Japanese Diplomatic Secrets*, his follow-on to the notorious *American Black Chamber* (1931), which made his name anathema in government circles and led to some of the statutes underpinning the "equities" argument of Levy's *Crypto*. For fifty years this work bore the reputation of being the only book seized (in 1933) and suppressed by the U.S. government. Edited by former Navy cryptologist Emil Levine, and representing some 1,061 pages of text, the CD (read-only PDF format, but searchable with Adobe Reader) includes articles from the journal *Cryptologia* written by David Kahn, Lou Kruh, and Robin Denniston, keyed to pages in the original. The bulk of the work deals with revelations concerning the 1921-22 Washington Disarmaments Conference, at which size limitations were placed on – among others – the Japanese navy, planting the seeds for WWII. If this is your cup of tea, or the subject interests you, the price is not unreasonable ($40, plus $5 postage, Aegean park Press, Box 2837, Laguna Hills, California 92654).

Perhaps it would not be out of place here to take note of the passing of Foundation member Wayne Barker, founder of Aegean Park Press, in May 2001. Wayne served in the Signal Intelligence Service, China-Burma-India theater (SIS CBI), along with Lambros Calimahos and others, whose work has been generally overlooked in published histories. His knowledge of cryptanalysis led to the establishment of a publishing house that concentrated on quality re-printing of declassified government documents and texts dealing with cryptology (and thus probably helped to inform and educate the young generation of computer-types in *Crypto*). ■

SENIOR SERVICE SCHOOL PARTICIPATION

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Since many of the students will be returning to project management and procurement positions, the speakers took the opportunity to mention some disturbing trends: 1) attempting to use industry as a source of "cheap" bodies, 2) lack of consistency in major program directions, and 3) a tendency to solve old problems "better," while failing to address new problems as a team. Nevertheless, the class was assured that from an industry point of view, at least as seen by these speakers, nothing beats working for an informed, smart customer on a problem that is challenging and important. To the extent that those requirements can be met, there is no shortage of inventive, available and trusted talent in industry.

The interaction was very positive. The class made a follow-up visit to the National Cryptologic Museum. Perhaps other Foundation members will be inspired to take advantage of similar speaking opportunities to broaden appreciation of cryptology and cryptologic considerations among those from whom the subject is still new and strange.

MESSAGE CENTER

Prompted by the late Ted Wildman's article, "Desert Sailors on Horseback," (*The Link*, Summer 2000) Bob Painter (Silver Spring, Maryland) writes that he reached for his copy of *A Different Kind of War*, a book based on the papers of VADM Milton "Mary" Miles, published in 1967. "All of the men mentioned in Ted's piece are remembered in Miles' account of the 'Rice Paddy Navy,'" Bob says, and he notes that Miles had a keen appreciation for their accomplishments. He describes this as "a heck of a good book . . . one that ought to be remembered and read by the younger folks." You're quite right, Bob – thanks for calling attention to a rousing good "sea story."

Inspired by the SIGSALY story (*The Link*, Fall, 2000), Mel Klein is undertaking a companion work and seeking individuals who can contribute from their knowledge and experience. SIGSALY was a narrowband speech privacy system developed by Bell Laboratories. Bell also developed, c1944, a wideband multichannel system, designated AN/TRC-16, which continued in use until the early 1950s. That is the system Mel is researching. If you have technical and/or operational experience with the "TRACK-16," he would be most grateful for your input. He is at 1407 Sarah Drive, Silver Spring, Maryland 20904, e-mail: kmelville2@home.com.

VENONA: ANOTHER LOOK AT HISTORY

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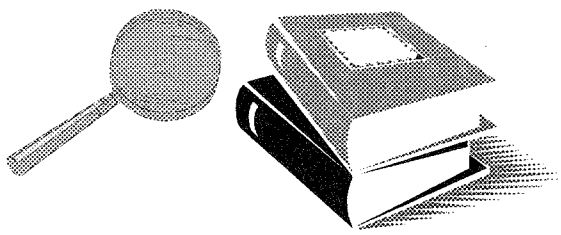
of others were all part of this lively and fascinating presentation. Romerstein cited VENONA as making "certain key facts indisputable" – namely, who in America spied for the USSR and what the overriding principles were that animated domestic Communist, and that these spies were never a "left of center faction or liberals in a hurry," but "Americans who willingly gave their primary allegiance to the USSR."

Romerstein and his co-author, Eric Breindel, contend that the VENONA texts complement Communist Party documents in showing the Party's role as "a recruiting ground and vetting agent" for these individuals. He concluded that "a comparison of those decrypted Soviet cables with other material provides a fresh understanding of the scope of Soviet espionage in America and what it meant to World War II and the Cold War."



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