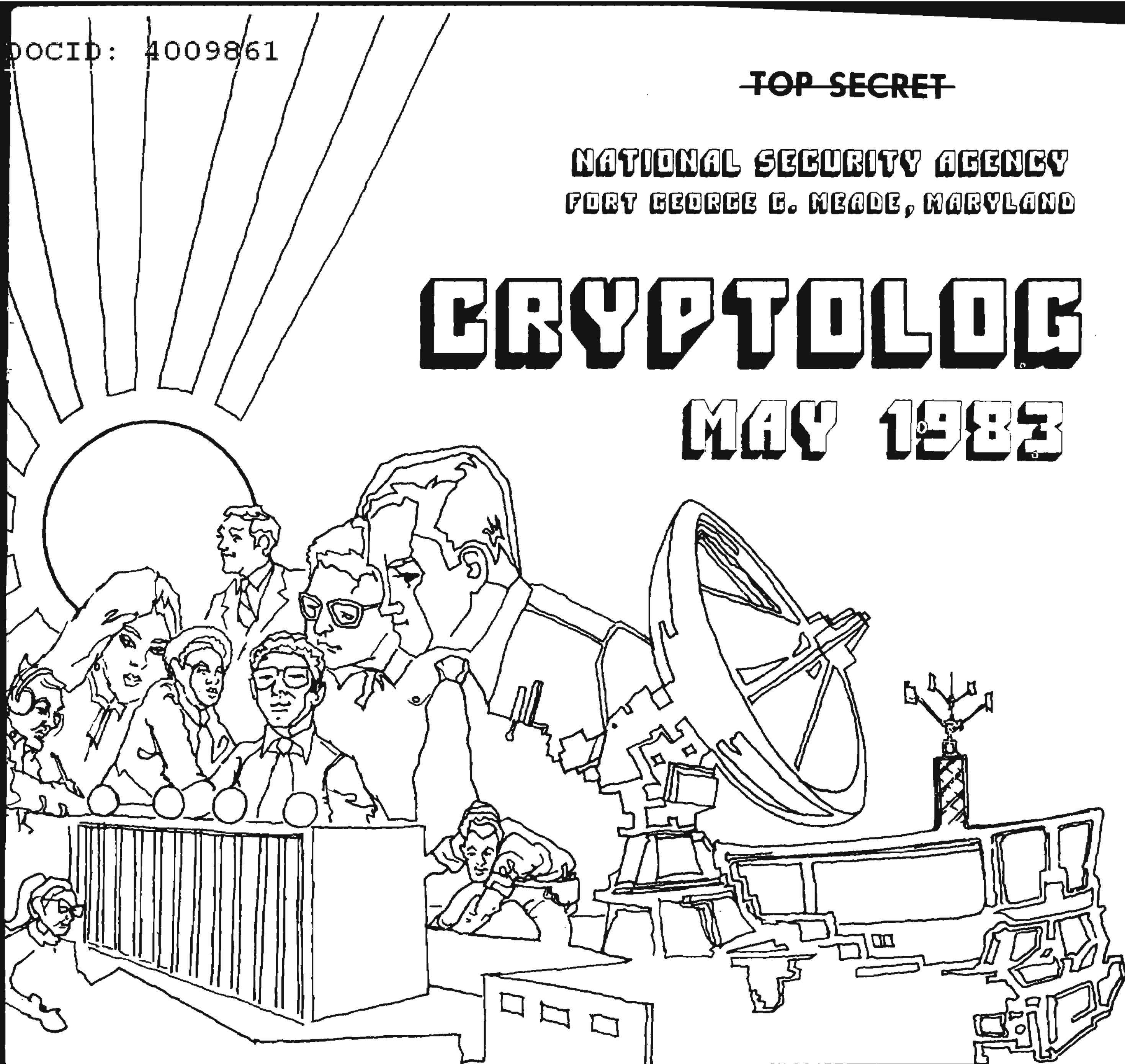
DOCID: 4009861

~~TOP SECRET~~

NATIONAL SECURITY AGENCY
FORT GEORGE G. MEADE, MARYLAND

CRYPTOLOG

MAY 1983



P.L. 86-36

~~THIS DOCUMENT CONTAINS CODEWORD MATERIAL~~

~~CLASSIFIED BY NSA/CSSM 123-2~~
~~DECLASSIFY ON: Originating Agency's Determination Required~~

~~TOP SECRET~~

CRYPTOLOG

Published by P1, Techniques and Standards

VOL. X, No. 5 MAY 1983

Editorial

At my bank, having direct mail deposit qualifies me for certain privileges, but when I applied for them, I was told I was NOT a "direct mail depositor." I disagreed; my paycheck is sent directly to them, and has been for some time. Then, I discovered the key: my account is joint with my wife, and the computer lists her name FIRST. So when they retrieve data about MY accounts....

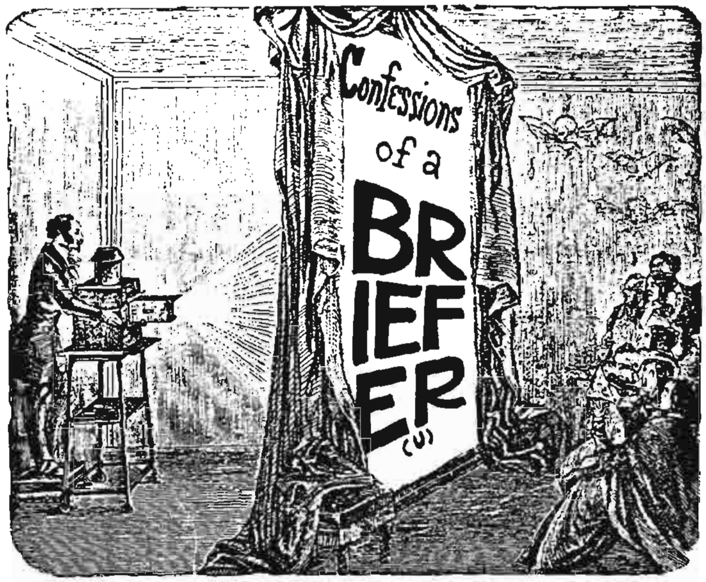
Some years ago, when I dabbled in real estate, I had several fat listing books, and kept them in order by area, price, and number of bedrooms. The listings were typed, and often contained errors. Some were easy to spot. If the tax district or the number of bedrooms was wrong, it was easy to make a pencil change on my copy and move the listing to the right place in the books.

I notice that real estate agents are computerized these days. They go to a terminal, key in a price range, number of bedrooms, geographic area, etc., and out comes a string of listings. Who makes the corrections? I doubt that anyone does. It wouldn't surprise me to hear that some real estate people "hide" new listings, when submitting them to "Multiple List" data bases, by putting typos into key data fields, to give their own agents "the first shot" at a new listing. Between accidental and intentional typos, I wonder how much of the existing data actually gets to the requestor.

Please don't write in and tell me about good programming practices. That's not my point. Both we and our targets are coming to rely more and more upon data retrieval for our information. Anybody who can read and type can call up data on most of these systems, but only the more innovative people will be able to squeeze out of the system the "hidden" data. Knowing how to do this could depend upon understanding how people behave when they use a data base, and also how the data base itself really works. It could, in fact, become a new cryptologic skill field.

P.L. 86-36

by [redacted] B109



"Wake up, Jim. The briefing's over."

"Huh, what did you say? Oh, I guess I must have drifted off. Sure is hard to stay awake in a dark briefing room after lunch. Say, Fred, did you get copies of that guy's slides for me to read back in the office so I can find out what Project RATTLECAN is all about?"

Does this exchange sound familiar? If not, then this article is not really for you. (Keep on reading though; you might learn something that will be useful later.) But if you are one of those who have been bored to sleep on numerous occasions as some well-meaning project officer or analyst read an endless succession of slides to you, perhaps this article will contain some thoughts that may help you avoid inflicting similar boredom on others. It may even make your briefings more effective.

One of the most basic causes of poor briefings here at NSA (and elsewhere as well, I am sure) is the mistaken view that briefings are a good, concise way to transfer information to people. Absolutely nothing could be further from the truth. Yet we constantly use briefings to "bring people up to speed" on a wide range of detailed and complex topics. The subtle deceit of briefings is particularly interesting when someone has received a "Good brief!" from his audience. Just ask the briefee afterwards how many tanks the Zendian Army has, or how many communications circuits are at Field Station Xapa, or some other detailed question on the topic and most likely you will get some answer like "Well, I don't recall exactly, but I'll call Tommy Talker who briefed me on it and he'll have the answer." In this case Mr. Briefee may not have the facts but he did get the message.

The fallacy of using briefings to bring people "up to speed" is that briefings are not a good medium for the presentation of a lot of objective, factual data. They are, however, an excellent medium for affecting people's attitudes and emotions. In our society we have so thoroughly suppressed our emotions (e.g., "Grown men don't cry") that we would tend to deny that we are even subject to a play on our emotions, especially in some intellectual palace like the National Security Agency. Unfortunately, this leaves us extremely vulnerable to approaches from a nonintellectual angle and the briefer who discovers this vulnerability, either by accident or as an active intellectual discovery, can use this approach to produce consistently "good briefs." This is a fact long known to Madison Avenue and it is equally true here at the Agency.

When you have had a good briefing, what are the things that you most readily recall? In all likelihood it will include items such as the command and presence of the briefer and the quality of the graphics. You will remember the organization that sponsored the briefing and those memories will be of a competent and professional outfit. You will know that the topic briefed is:

[] very grave;

[] requires immediate action by your organization;

[] is in competent hands; or

[] needs more resources in the out years.

But you will not recall specifically why you have those feelings.

All this having been said, then, how can we use this knowledge in building a "good brief"? The most basic step is to decide what emotional message, feeling, or attitude you want to inculcate in the listener. Generally, the attitude or emotion will be one favorable to the topic and organization presenting the brief. For instance, a project officer will generally want to leave listeners impressed with the importance of the project so that future requests for support will be favorably endorsed. In short, although briefings are generally thought of as being informational, most briefings are sales pitches. Once the basic message of the briefing is established, all other work should support that message.

In briefing there is no substitute for the competent briefer, a person who speaks with all the self-assurance of a Nobel Laureate but who at the same time compliments and involves the listeners; one who does not preach to them. For some people these qualities are natural, but for most they can be acquired. The secret is lots of practice and the knowledge that you know more about your topics than your listener.

Armed with this confidence, the briefer should never use a script. If you know what you are talking about, you don't need a script. If you don't know what you're talking about, you shouldn't be briefing. Bishop Fulton Sheen never used any notes on his very successful TV show during the 1950s. When asked about this once, he cited a remark he had heard as a child. An old woman walking out of church was complaining because the bishop had read his sermon from notes. Her question, which impressed Sheen, was "How the devil can he expect us to remember what he's saying when he can't remember it himself?"

Freedom from the script allows the briefer to give the appearance of being extemporaneous as he or she responds to the quips, comments, and questions of the briefee(s). It also permits the briefer to tailor the brief readily to the background and interest of the listener. Finally, the freedom from the script allows the briefer to establish a pace or rhythm for the briefing that enhances the authority and assurance of the presentation.

With the script eliminated, the only tangible form left to the briefing is the graphics. These are as critical as the presence of the briefer and, in fact, can often make the briefer seem more professional and the briefing come across better. In the choice of graphics it is especially important to keep in mind the emotional appeal of the brief. The Chinese writer who said that one picture was worth a thousand words knew what he was talking about, and the proper choice of graphics can save a lot of talk and questions.

For example, consider the graphics in Figures 1 and 2. "Zendian Army Power" (Figure 1) is just a compilation of numbers. The briefee will read it rather than listen to the briefer--and you'd better hope that the briefee doesn't have some spurious knowledge or he might make some comment like "I thought the Zendians had Type Q tanks instead of Type Ys." This sort of question could well be enough to throw an inexperienced briefer off pace or, worse yet, lead to intellectual questioning of every statement.

Figure 1 has has yet another critical flaw: In column 1 the numbers don't add up to the total shown. If the listener notices this, he/she will spend the rest of the briefing adding up any numbers that appear, looking for other errors.

FIGURE 1: ZENDIAN ARMY POWER

	TROOPS	TANKS	HEAVY ARTY	MED ARTY	APC	HELOS
I CORPS	55,000	250	200	500	600	45
*						
III CORPS	58,000	300	212	550	600	43
IV CORPS	61,000	312	220	560	500	48
V CORPS	58,000	270	220	550	550	45
ABN CORPS	25,000	**	---	200	---	350
TOTAL	247,000	1132	632	2360	2250	531

* There are no units in the Zendian Armed Forces with the designator 2 or II because the Zendians consider this number bad luck.

** There are no tanks per se in the Airborne Corps but there are approximately 200 of the so-called "Y-type tanks" that are in reality a lightweight high-speed tracked anti-tank gun.

Figure 2

Figure 3

Figures 2 and 3 (previous page) are good examples of effective graphics. Both of them evoke a strong emotional response. In fact, either of these pictures could well move the listener to a rendition of war stories about when he/she drove tanks, rode in helicopters, or had some related experience. This will imbue feelings of camaraderie between the briefer and briefee that will make the briefee much more amenable to the briefer's message.

These two pictures have some other practical advantages:

[] they will serve to cue the briefer;

[] they will not limit the remarks the briefer may wish to make

[] they don't contain the intellectual snags that are found in Figure 1; and

[] perhaps best of all, they will not have to be changed or updated unless the Zendians get rid of that tank or helicopter.

(When using slides like this, however, make certain that it is really a picture of what you say it is or it will be almost as bad as having numbers that don't add up.)

By concentrating on influencing emotions or feelings, we do not ignore the facts. We just use them in a different manner. Rather than being sort of inert things, the facts that we have to use are woven into the fabric of the brief in a way that supports the basic message. One way to do this is with "amazing facts." We all have a store of "amazing facts" but probably don't realize it. For example, the fact that the Zendian Navy has 89 operational submarines will probably mean very little to anyone but an avid naval buff, but the same fact cast in a different context becomes an "amazing fact": "The Zendian Navy has the largest submarine force in the third world!" Bar, pie, and line charts are all effective ways of presenting amazing facts such as this.

While you never want to read your slides to your listeners, there are times when you may want to let your listeners read the slides themselves. This provides a change of pace for both briefer and briefee. It's a quick way to slip over what otherwise may be a long narrative and it involves the briefee in the briefing process more actively. Such graphics should never be long textual passages. The proper form is short "bullets," ideally only one or two words each. (See Figure 4.)

UNITARY PLANNING
I&W EMPHASIS
SURVIVABLE COMMUNICATIONS
COMPUTER INTEROPERABILITY
PRODUCTION ENHANCEMENT
COMBINED WORKFORCE

Figure 4

The briefer can introduce this type of graphic with some line such as "These are the characteristics of ..." (whatever the subject is). The briefer should watch the faces of his audience and move on to the next graphic as soon as the the expressions of the listeners show that they have read the graphic.

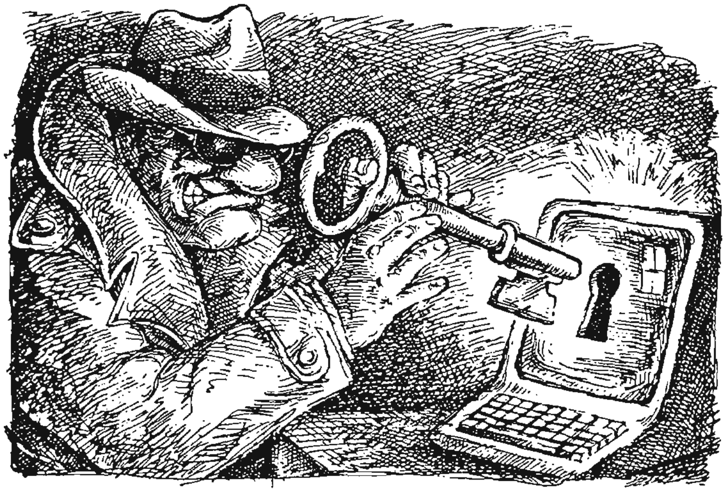
In summary, the key to effective briefing is to remember that briefings should be used to form attitudes or affect emotions, not only to transfer objective facts. The effective brief should have one central underlying attitudinal or emotional message that it is attempting to deliver and all aspects of the briefing must support this. The briefer should not use a script and the graphics should be simple and chosen with an eye to their emotional impact. Facts used in the briefing are much more effective when placed in some sort of comparative context. Slides to be read should be read by the briefee not the briefer.

Good luck! Good brief!

"Epilogue"

In closing, I believe it is necessary to comment on the ethics of briefing. It is evident that, armed with information about the weakness of our psyche, an unprincipled bureaucrat can take considerable advantage of his or her colleagues. At present the only sure counter to this is the individual integrity of the briefing organization which must use its power only for pure motives. Unfortunately, a full discussion of the ethics of briefing is beyond the scope of this article, but perhaps some reader may feel an urge to expand on that topic.

STILL MORE ABOUT PASSWORDS (U)



[redacted] P13

P.L. 86-36

A USER VIEWPOINT

The password controversy continues. On the one hand, [redacted] and others have stressed the need for greater security to avoid potential compromise. On the other hand, [redacted] and others have made a strong case for short, easy-to-type and memorable passwords to avoid needless errors and frustration on the part of the user. I am in sympathy with both causes, although I violently object to [redacted] closing paragraph (CRYPTOLOG, Mar 83, p. 38): he states that an easily remembered password is easy to type regardless of length, and that he doubts that a non-typist (i.e., one who does NOT find a long, memorable password easy to type) will use a terminal for very long. I would argue just the opposite. The probability of error rises progressively with each additional character added to the password, especially since characters are not being echoed on the screen. Also, my personal observation has been that the majority of non-secretarial users--linguists, programmers, and managers among them--are in fact either non-typists or poor-to-fair typists, myself included; yet terminal usage among these groups is increasing rather than decreasing, as more and more people become aware of the advantages which a computer terminal can provide to the professional user.

Having said this, let me state that I think the problem is easily solvable in a manner which should satisfy both viewpoints. Instead of viewing the problem theoretically--short passwords are good, but breakable; large alphabets, pass phrases, and "passcodes" are good, but will result in higher error rates--we should take the Agency environment into account. Many Agency computer systems have a feature which automatically "kicks out" anyone who unsuccessfully tries a user ID-password combination three or four times in a row. Those which do not can be easily modified to allow this capability. If the office security manager is alerted to terminals on which three unsuccessful ID-password combinations have been tried, I doubt very much that a hostile entity would have any success in breaking even a five- or six-letter, single-case, mnemonic password before being apprehended. At the same time, a poor typist gets several chances at entering the combination correctly before setting off the alarm. This system thus provides the best of both worlds: a user-friendly password environment which is, for all intents and purposes, immune to exploitation.

[redacted]

P.S. A challenge to all UNIX users: how many of you can type "Low flying bees eat wax beans" (to use [redacted] example of a pass phrase) and get it right the first time? It's easy to find out: set terminal type to STTY -ECHO ; type in the phrase enclosed in single quotes, i.e., 'Low flying bees eat wax beans' and hit <RETURN>. A system message will appear as follows:

flying bees eat wax beans: not found
(or whatever you REALLY typed)

After you're done experimenting, STTY ECHO will make your characters visible again. (At an informal testing in the KEPLER laboratory, I got the phrase right 3 out of 7 times; however, I fall under the "non-typist" category.)

THREE GOOFS AND YOU'RE OUT

On [the system I use], a user signs on with user initials and then is required to type in a password. If the person "fails," they may try again and again and again.... To prevent exhaustive searches, why not flag to the systems operator any console that tries say three times? Or lock that terminal out?

[redacted] P.L. 86-

PASSWORDS: FRIEND OR FOE?

Speaking of passwords, what is an acceptable balance between security and convenience? I have found what I believe to be a rather comfortable and simple solution (but then I'm sure SOMEONE will disagree). I simply choose a word...such as walnut, then alter or mispell it (walllnut, wawlnut...etc.). Not enough to make it difficult to remember, but definitely making it more secure and harder to guess.

[redacted]

MORE ON PASSWORDS AND HUMAN FACTORS
(from COMPSECNEWS, June 1983)

One of the frequently heard complaints from persons who changed to more clever passwords containing special symbols or mixtures of upper and lower case, was that when bringing some of the terminals up cold, and prior to loading the terminal emulator, they could not login. True that each keycap may not send the same character before an emulator load as it will after, but when those infrequent occasions arise, you can still prpbably login if you only knew what keys to press. For example, one system I know of uses the "back tab" key to produce the "/" prior to emulator load. Obviously an inconvenience, but most users do not regularly have to perform initial terminal loads.

Other systems that I have seen have accounts called "LOAD." These accounts do not require the person who logs in to enter a password, only to choose a desired emulator. After the selected emulator is loaded, the real user login is then required. If your system does not have this feature, complain to the system Guru. Incidentally, notice that an emulator load is all that the "LOAD" account can do.

Another comment had to do with the login-id being secret. The suggestion centered around doing away with initials as the login-id, and using a secret account name in addition to a secret password. Maybe a useful idea, but one point missed by this comment was that the current login algorithm used on most of the systems does not reveal what is wrong when the login fails. For example, notice of login failure only appears after the id and the password has already been given. Another problem with this suggestion is we already have a requirement to identify individual use of sensitive computers. Work is currently underway to assign each and every user of our computer systems a unique id that will be the same regardless of which computer system is used. The adopted format will follow first two initials followed by the first five letters of the last name. A central registry is being established to resolve conflicts.

[redacted] (June 1983) P.L. 86-36

Keep your comments coming! In particular, I would like to see more comments from users about the consequences for them of various access restrictions, password procedures, etc. How have some practices on the systems YOU use hindered or helped YOU in your work? I know that it is fun for a lot of you ingenious people out there to think up new password schemes and gimmicks, but the computer security experts are pretty inventive and ingenious too. What they need, more than new techniques and ideas, is some clear feedback from users about the COSTS and BENEFITS of different kinds of procedures currently in use. If they get a clear indication from users that certain methods of implementing access restrictions impose a relatively high cost on users, they will be motivated to use their ingenuity to find other and better methods that are just as secure but less costly to the user. I was interested to note, in the COMPSECNEWS item above, the assumptions that

1) users rarely had to load terminals "cold"; and
2) coping with keys that send different characters before and after emulator loading constituted a minor inconvenience at most.

What do you think about those assumptions?

P.L. 86-36

As a hunt-and-peck typist, I find odd-ball special characters are a MAJOR stumbling block, even when the keycaps agree with the character that gets sent. Even the shift key and "CTRL" key are frequent error-makers for me. Also, my impression is that users have to down-line-load Delta Data terminals more frequently, at least for some systems, than the COMPSECNEWS editor assumes. In fact, if I had to cope with that problem, even having to load a terminal once a week would be far too often for me! The "LOAD" account mentioned in the article seems to me a much more promising and user-friendly approach than "if you only knew which key to press."

For a programmer, or someone thoroughly familiar with the terminal and software, perhaps keys that send different odd-ball sets of characters at different times may present only a minor annoyance; in fact, computer folk seem to thrive on and positively welcome such problems. Most others, however, are very unlikely to agree with them. Computer specialists, and computer security specialists in particular, need to be reminded that situations constituting brief nuisances or even amusing challenges for them can be stressful and exasperating for other kinds of users.

-M.E.D.

LOOKING AROUND with [redacted]

Cryptography at GLOBECOM 82

P.L. 86-36

Review: Digital Telephony (U)

(U) A DES-type algorithm, using 800-bit vectors in place of the 48-bit vectors of DES, was proposed at GLOBECOM 82 (the 1982 Global Communications Conference) for the encipherment of medical records. The key would be 160,900-bits long. The Belgian author of the paper, Desmedt, claimed that this would protect medical records during the life of the person concerned. In reply to a question, he admitted that he did not know how to keep the 160,900-bit key itself secure and intact for the 100-year period.

(U) The Desmedt paper on super-DES was one of five papers on cryptography presented at GLOBECOM 82 in December. In addition, there were five other sessions on coding, primarily speech coding, which proposed reducing bit rates for video and voice and facsimile. Compression techniques and the ability to recover from channel errors are critical to the use of digital encryption techniques.

(U) One of the surprising papers was about a detailed experiment with analog encryption at Bell Labs. Apparently low bit rate encryption causes so much loss of voice quality, especially over low-quality lines which cannot support 9600-bps rates, that there is a growing demand for encryption which sends analog waveforms. The Bell Labs work has been done by computer processing, but they expect to develop a real-time circuit, after which their VLSI chip designers will examine the cost of single-chip analog encryption. That could have a revolutionary effect on secure voice and on cryptanalytic priorities.

(U) Two other surprises were the sophisticated insight into the strengths and weaknesses of various public key schemes, especially the flaws of the Hellmann-Merkle algorithm, and the importance of the recent Racal-Milgo patent on finding large primes for the RSA public key algorithm. Several speakers stated that the RACAL-MILGO algorithm had made the integration of DES and the RSA algorithm feasible as the basis of a switched ad hoc public cryptographic network.

(U) This demonstrated interest in the feasibility of the RSA algorithm as a means of keying DES links is more interesting in the light of the Inman interview (Science, Dec 82), which identified RSA as a secure method.

(U) The leadoff paper by J. Michael Nye, a self-styled cryptographic "expert," described the methods and cost of intercepting telecommunications in the US and gave a list of 26 domestic cryptographic suppliers offering 104 products and 13 foreign vendors offering 81 products in the US market. The list of suppliers and products is growing, and the impact of Personal Computer encryption is yet to be felt. This is a very big change from ten years ago, when only a few companies supplied cipher equipment to the US market. Most of the products are for fixed telephone service, but as the new technology of cellular radio develops over the next decade, the market for voice encryption, to protect the 900-MHz mobile circuits from interception will increase to millions of vehicle radios.

(U) Cox, Jayant, and McDermott of Bell Labs gave a paper on a time-frequency segment permutation analog encryption which they believe is very secure against cryptanalytic attack, without loss of voice quality or syllable intelligibility. The delay for the scrambling and descrambling is no more than 256 to 512 milliseconds for 16-msec speech segments. Each 16-msec segment, sampled at 8000 Hz to give 128 samples, is converted to sub-bands by digital filtering, and the sub-band vectors are then permuted. The digital vectors are stored in a buffer with a memory capacity up to 512 msec. A cryptographic keystream decides on the segment permutation, and also decides which time segment will be sent. Any time segment can be delayed up to 256 msec. The input test data were voiced digits in random order, used to avoid the redundancies of normal conversational speech.

(U) The cryptographic scheme is to fill the buffer with 16-msec segments, then send all of them in some pseudorandom order until the buffer is transferred to the receiving end. Then the buffer is refilled and the scrambling and transmission begin on the next multi-segment block of speech. It is not clear from the published paper whether the segment transposition key is the same or changes from block to block.

(U) The scrambler was implemented on the BTL Digital Signal Processor, and tests showed that it gave better intelligibility than simple frequency inversion scrambling. The scrambled signal envelope sounds like "birds chirping." To maintain synchronization, a series of pulses is sent down the channel whenever the scrambling buffer is reinitialized, and these high pitched pulses send like "cricket chirps" interleaved with the signal.

(U) Although the system is described as an "analog" scrambler, it is clearly a 5-stage analog-digital process, in which most of the processing at each end is digital, but the transmitted signal is an analog waveform. It has been tested over the Murray Hill phone system, with addition of simulated white noise and phase roll (a channel impairment).

(U) Because sample-to-sample fidelity is important to speech reconstruction, i.e., the sampled speech at the receiver must match the samples that are supplied to the digital-to-analog (D/A) converter at the transmitter, it is necessary to equalize the channel to compensate for channel distortions and to synchronize the instants of sampling at each end. The synchronization pulses (cricket chirps) are used to establish and maintain sample timing and are also used for channel equalization (since they give the impulse response of the channel).

(U) The main thrust of the designers' work was to get good intelligibility. They now want to reduce the software algorithm to a hardware device, and VLSI design can follow from there. The audience showed substantial interest in this scheme.

(U) Despite the rapid introduction of digital channels, for many years to come, most of the world's telephone connections will be made over copper circuits that will not support high bit rate digital speech. One of the driving forces behind the development of digital transmission and local loops is the desire for high-quality secure speech. If the hybrid analog-digital scrambling gives good enough speech quality, and no particular security weaknesses become known, the market pressure to develop digital services to the 64,000-bps level IDN (= Integrated Digital Network) may reduce (since customers won't have to buy them) and this could affect an important part of the digitization of the telephone network.

[redacted]

EO 1.4.(c)
P.L. 86-36

(U) The Desmedt paper on Super-DES began with a critique of existing cryptographic methods, interleaved with some familiar commentary on NSA intervention in the DES design. A point of interest is the statement that the Geneva Management Group in 1981 concluded that DES was not adequately secure. Desmedt argues that encryption algorithms that iterate the basic operations many times provide higher security than the individual operations (e.g., substitution, transposition) but are impractical to implement on VLSI chips. He also argues that a DES-breaking special machine may be costly today, but in 20 years could be cheap enough to break messages enciphered on DES now. He also acknowledges that no "shortcut" solution to DES is known. Hellmann's insinuation that a "trapdoor" was built into DES by NSA is referred to. The problem of public key algorithms such as the Merkle-Hellmann scheme is described as either they have known weaknesses or they may have unknown weaknesses. What is notable about all of this critique is that the authors are professors of mathematics in Belgium and they are very up-to-date in the state of cryptology in the public domain. (One of them spent 1978-79 at UCLA, Berkeley, doing pertinent research.)

This is undoubtedly a reflection of the rapid transborder flow of technical information between academicians and the arrival of increasingly capable people into the arena of public cryptology. Without doubt, the technical quality of the work will increase and will threaten SIGINT.

(U) The particular cryptographic scheme that Desmedt <u>et al</u> propose is a version of DES in which blocks of data of 1,600 bits are enciphered, under the control of a 160,900-bit key. The S-boxes of DES are replaced by one-way knapsack functions. This revised "S box," instead of operating on eight bits, operates on 200 bits, and there are eight of them operating in parallel. Each of the new "S boxes" is initialized with 100 integers of 20 bits, so that it contains 20,000 bits. There are eight "S Boxes," which use up 160,000 bits of the key. Because of the trapdoor function, even if the 160,000 bits were known and all the S-box outputs were known, it would still be very difficult to compute the 800-bit input. However, the 160,000-bit key is not known. It is kept secret. That makes it even harder to compute the input from the output. The 200-bit outputs are expanded up to 208 bits and then hashed down to 100 bits to give the 800-bit output. This complicated process is iterated a number of times. A stream or block mode with this algorithm is possible.

EO 1.4.(c)
P.L. 86-36

(U) Yiu and Peterson of Hewlett-Packard gave a paper on a single-chip VLSI Public Key algorithm. The algorithm is Hellmann's discrete exponential scheme using Galois Field arithmetic. The chip has 12,000 transistors and is designed for a 4-MHz clock rate. The Public Key algorithm would be used in conjunction with DES, to distribute keys for the DES algorithm. The purpose of the chip design was to give higher speed and lower cost for encryption. The use of Galois Field arithmetic eliminates the need for carry or borrow operations, and the arithmetic operations can be executed by linear feedback shift registers. The developers expect to use the chip in a computer network, but the company, according to Yiu, has no commitment to market it.

(U) Doctor Yiu mentioned the recent Racal Milgo patent for finding large prime numbers in a few seconds as an important breakthrough in implementing Public Key networks. The patent, No. 4,351,982, claims that it reduces microprocessor computation time to find a set of 200-bit primes from 1,200 hours to two hours. Desmedt stated in his talk that the RACAL MILGO datacryptor took only 17 seconds to distribute key (but it was not clear that it would find RSA primes in that short time). Hollander of BTL (Bell Telephone Labs) has a patent application that purports to find large primes very quickly. The Japanese are developing a chip that will do RSA encryption at 50,000 bps. The work is a joint project of NTT, NEC, Hitachi, Fujitsu, and Oki. Sandia has developed an algorithm that will do multiplication modulo C in log2(C) + 7 clock pulses, which is an improvement over the conventional modular multiplication, which takes N x N clock pulses for an N-bit modulus. The Sandia method would take only N + 7 clock pulses. It is aimed at RSA encryption using 512-bit prime numbers. At 20-MHz clock speed they expect to be able to encrypt at 25 Kbp/s. Now that the RSA Public Key algorithm has been publicly identified by a former NSA Director as secure, there will undoubtedly be intensified work to make it easier to use to set up DES links. The high utility of being able to dial up any other party and set up a secure link, without prior key distribution, is irresistible from both intellectual and marketing viewpoints.

(U) A paper on the AMD DES chip was given by Brown, an AMD executive. This was followed by some discussion of the merits of DES. Both Yiu and Brown felt that DES was in fact secure, and that the criticism that Desmedt and other authors had raised were not supported by any facts. No one had been able to read or exploit DES, and it had the advantage of a standardized tested algorithm. The AMD DES chip was capable of 1.7 Mbytes/sec, so that it could be used for disc controllers. It cost $75 for a single unit.

(U) Another paper at the cryptographic meeting was an Italian scheme by CSELT for a "robust" 4800-bps speech coder. Audio tapes showed it to be resonant and of low quality. The paper did not seem to offer any important new work. However, the topic of speech coding and other compression coding was treated at five other sessions. There were 31 papers on voice and image compression, of which 16 were by foreign authors. The sessions were:

[] A8 : Low bit rate speech coding

[] B6 : Image processing

[] D4 : European videoconferencing

[] E6 : Advances in speech coding

[] F7 : Speech processing

(U) The interest in compressed speech in sessions A8, E6, and F7 was initially to allow narrowband encrypted voice signals. Now a number of other applications, including low-cost bandwidth conservation and interim storage of voice, have emerged from the capability to compress speech.

(U) The interest in compressed video is for both teleconferences and private TV broadcasts (e.g., Pay-TV, TV relay by satellite, and Direct Broadcast Satellites (DBS)). The common carriers and the broadcasters both see commercial advantages in being able to send TV signals that can be securely encrypted. Because bits/sec cost money, the customers want the pictures compressed.

(U) In Europe there is a multinational effort to develop a standardized videoconference system, with a standard video coder. Some of this is for satellite applications, to thwart interception, but most of it will probably pass overland on radio relay and optical fibers. The compression allows cheaper conferences and security, and the standardization will allow the Europeans to intercommunicate and keep US companies out of the equipment market.

(U) There are now hundreds of papers published on vocoders, fax coders, encryption, video coding, etc. Many of the papers are foreign, but the Europeans in particular have been handicapped in the speech area, for example, by the lack of specialized journals which consolidate the work. As as result, they look to the US journals, especially the IEEE publications, as the focus of the current work. This also makes it difficult for US parties to keep up with the foreign work because it is spread across a number of journals and is often published in German, French, Italian, Swedish, Japanese, etc. However, the foreign literature is growing, and will become a more important source of new work in cryptography and coding.

(U) The Europeans, arriving on the scene after the US has identified the problems and paid for the basic research, will be able to converge on coding and encryption standards to serve many of their PTT plans, without the competition, confusion, public controversy, and divided purposes that have arisen in the US in both Government and civil coding and encryption. By the end of the decade, they may have passed the US in these fields, just as they have surpassed the US in a number of other selected technologies and industries.

References:

1. GLOBECOM 82 Conference Record

2. US Patent 4,351,982 (RACAL MILGO)

3. E.F. Brickell, A Fast Modular Algorithm with Application to Two Key Cryptography, Sandia National Labs. Re DE-AC04-76DP00789

4. Simmons, G., and M. Norris, How to Cipher Faster Using Redundant Number Systems, Sandia National Laboratories, Aug 1980.

5. Miyaguchi, A., S. Mizuta, K. Furuie, T. Tsujiguchi, and H. Mizuta, Combination Type Computer Circuits for Code Handling, NEC, 1981.

6. NTIS Search Vocoders, V1,2, 1982.

7. Inman, Bobby, Science, V218, 24 Dec 1982, p. 1290.

8. NTIS PB-806860 Vocoders 1970-82, abstracts from the Engineering Index. Apr 82. Contains foreign vocoder abstracts. (In P1 library)

9. NTIS PB-82-806852, Apr 82. Vocoders. Citations from NTIS data base. US literature (In P1 library)

10. NTIS PB 82-863671, Mar 82, Facsimile Communications, Citations from INSPEC data base. (Contains many foreign literature references)

Digital Telephony
by John C. Bellamy, Wiley, 1982.

~~(C)~~ Is "plesiochronous"a familiar word? It soon will be, if you are concerned with international digital networks. A plesiochronous network does not synchronize the network, but merely uses clocks at each node that are accurate enough to keep the bit slip rate low enough not to interfere with operation. The US domestic digital network is synchronized, to save the cost of the node clocks, but the CCITT has established clock standards to interface different national networks by plesiochronous gateway connections. Because the national networks run at slightly different rates, [redacted] and COMSEC will have to anticipate this plesiochronous structure.

EO 1.4.(c)
P.L. 86-36

(U) Network synchronization schemes are just one small part of John Bellamy's new book on digital telephony. The author, who received his PhD in EE in 1971, worked as a manager at the Collins Division of Rockwell International in transmission systems, then as a member of the technical staff at Arthur A. Collins, Inc., the R&D firm that hived off from Collins Radio when Rockwell took them over. He is now an R&D manager at the Communications System Division of United Technologies, so he has substantial practical experience with modern telecommunications engineering. It is notable that Collins builds digital radio equipment so well that Western Electric dropped some of its own projects and buys from them. In addition to his industry experience, Dr. Bellamy has been an Adjunct Professor of Electrical Engineering and Computer Science at Southern Methodist University since 1976, so he is used to organizing, simplifying, and teaching engineering technology.

(U) His book is a well-written tutorial on telephony and digital telecommunication. Although digital transmission was developed with computer and data traffic in mind, the main traffic volume will be voice for a long time. Analog transmission and networks will also be around for a long time, but digital telephony is of particular interest where encryption is wanted (as he says on page 75) because of the paucity of good analog encryption.

(U) The book covers digital networks from a general overview of the analog network in the US, through voice digitization algorithms (PCM, DPCM, APC, vocoders, etc), fundamentals of digital transmission, switching and multiplexing, through digital modulation, network synchronization and control, to high-level descriptions of several digital networks and a discussion of the future of digital telephony. Among other things, the book has a 16-page glossary of pertinent terms, such as burst isochronous, Centrex service, despotic network, elastic store, HDB3 code, justification ratio, mesochronous, muldem, permanent virtual circuit, plesiochronous, robbed digit signaling, state store, transhybrid loss, traveling class mark, and waiting time jitter. These terms are indispensable refinements in educated discussions of networks. (This glossary will soon be in the NSA terminology base).

(U) Some points of interest in the book:

[] One of the principal difficulties in making the large telephone network operate is the variety of signals and signaling functions, all of which have to be translated by interfaces or made compatible.

[] Common Channel signaling in the Bell System is highly centralized, making the entire network vulnerable to failures in the CCIS packet traffic.

[] If a CCIS node fails to store and forward certain network information correctly, the network will gradually lock up because disconnects do not occur automatically.

[] Digital microwave radio is cheaper than T-carrier for distances as short as eight miles, and the major impetus for digital radio has been the introduction of digital switches, not the demand for digital traffic, which can pass over the analog network.

[] Fifteen different types of digital central office switches are in service in the US, and more are expected as foreign suppliers enter the US market. The disadvantages of digital networks are increased bandwidth, A/D and D/A conversion, time synchronization, topologically restricted multiplexing, and incompatibility with the large analog plant.

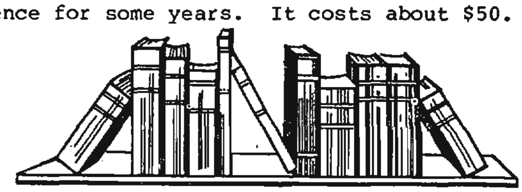
[] Voice digitization, nominally 64,000 bps, can be as great as 400,000 bps for specialized services such as broadcast transmission.

[] About ten different speech coding schemes are described.

(U) In the chapter on digital switching, the advantage of time-domain switching is shown to be the ease of getting switches that don't suffer from blocking. There is quite a lot of information in the switching chapter. The chapter on network synchronization examines many of the timing problems and the solutions such as bit slips, elastic stores, pulse stuffing, and packetization. The chapter on digital networks leads from ARPANET to the ISDN (integrated services digital networks). Circuit-switched nets are shown to be more efficient for voice transmission than packet-switched nets, but digital speech interpolation can increase the effective number of channels on a trunk if the circuit switching is fast enough. Current circuit switching can operate fast enough so that even the beginnings of syllables are not lost. The final chapter is on traffic analysis, as the traffic engineers and designers do it.

(U) The book is well written and well illustrated, with references and exercises. Because of the integration of transmission and encryption, as well as the continuous growth and switchover into digital networks in every country, a knowledge of the engineering and technology of digital networks will be an essential part of a cryptologic repertoire. Bellamy's book is a good beginning to this knowledge. The enciphered speech cryptanalytic experts in R52 ordered desk copies after reviewing the book.

(U) Summing up, Digital Telephony is timely, gives good coverage of digital networks, and should be a useful text and reference for some years. It costs about $50.



CUMULATIVE INDEX (U)

EO 1.4.(c)
P.L. 86-36

Part Three: Keywords

The following cumulative index of CRYPTOLOG (Vols. I through IX, 1974-1982) was produced using UNIX/PINSETTER tools on MYCROFT and BARDOLPH1. The index is in three parts, and is being published in three successive issues. Part one is an index by author; part two is an index by title; and part three is an index by keyword. Items in multiple issues (February-March 1975, for example) are indicated by the first month (i.e., by Feb 75).

AAAS
 Feb 82 Gayler - AAAS, 1982; [redacted]
 Feb 82 Software - AAAS, 1982; [redacted]

ABNER
 Aug 77 Early Days in NSA Computing; Chauvenet L.R.
 Nov 77 Letter: [redacted] Article; Snyder S.S.
 Jun 78 Equipment Maintenance on ABNER; [redacted]

Acronyms
 Apr 80 OH, K!; [redacted]

Africa
 Nov 77 How Many African Countries Can You Spot?; [redacted]

Afrikaans
 Sep 74 Language in the News; [redacted]

AG-22/IATS
 Mar 76 Musings About the AG-22/IATS; Phillips C.J.
 May 76 What's Wrong with AG-22/IATS?; [redacted] D.R.
 Jun 76 Comments on AG-22/IATS; [redacted]
 Jun 76 Comments on AG-22/IATS;
 Jun 76 Comments on AG-22/IATS;
 Jun 76 Comments on AG-22/IATS;
 Jun 76 Comments on AG-22/IATS;
 Jun 76 Comments on AG-22/IATS;
 Jun 76 Comments on AG-22/IATS;
 Jun 76 Comments on AG-22/IATS;
 Sep 76 More Comments on the AG-22/IATS; [redacted] B.
 Oct 76 Another Word on AG-22/IATS; [redacted] M.A.
 Apr 77 The Last Word on IATS?; Phillips C.J.
 Jun 77 AG-22/IATS: A View From the Bridge; [redacted]
 Sep 77 Another Last Word on IATS; [redacted] P.A.
 Oct 77 Letter: AG-22 Page Print; 'Reader'

American Magic
 Apr 82 Review: The American Magic; [redacted]

Amerind
 Sep 74 Language in the News; [redacted]

AOC News
 May 82 Is There An Old Crow In Your Future?; [redacted]

Appraisal System
 Nov 78 Letter: Appraisal System: 'Anon.'
 Nov 78 Letter: Appraisal System; [redacted]

Arabic
 Sep 74 Language in the News; [redacted]
 Dec 74 Language in the News;
 Apr 75 Language in the News; Tetrault E.W.

[redacted]
 Sep 74 COMINT Analysis of [redacted]
 Dec 74 Letter: [redacted] Article; 'Anon.'

Archives
 Jun 78 Never Again!; Gurin J.
 Nov 78 Never on My Watch; [redacted]

Arms Control
 Feb 82 Gayler - AAAS, 1982; [redacted]

Artificial Intelligence
 May 77 Another Controversial Book on Artificial Intelligence; [redacted]
 Sep 77 The Doctor Is In(capable of Diagnosing); Chauvenet L.R.

Asia
 Aug 76 Integrated Analysts for Asia; [redacted] W.D.

Ask Art
 Apr 79 Letter: Ask Art; 'Sue'

Assignments
 Jan 80 Coming Home; [redacted]

Automation
 Oct 75 Automation of a TA Process; Murphy T.
 Sep 77 [redacted] D.L.

P.L. 86-36

EO 1.4.(c)
P.L. 86-36

P.L. 86-36

Awards
Aug 74 Learned Organizations--1974 CLA Essay Contest, 1974 CMI Essay Contest; CISI Prizes and Honors, Spring 74;
Jan 76 Lenin and State Prizes: Now You See Them, Now You Don't!; [redacted]
Jan 78 Thanks for the Attaboy!; [redacted]
Apr 78 Prizewinners in Three Holes;
Jan 80 CLA News: Sydney Jaffe Award;
Sep 82 Letter: Kudos; [redacted]

Blue Russian
Nov 75 Golden Oldie: Blue Russian; [redacted] J.F.

Bookbreakers
Sep 74 Cryptanalysis and Code Recovery; Mountjoy M.
Apr 75 Letter: Professionalization of Bookbreakers; [redacted]
May 75 Letter: [redacted] Letter; [redacted]
May 75 Letter: [redacted] Letter; [redacted]
Jun 75 Letter: Bookbreakers; Professionalization of Country Specialists; [redacted]
Jun 75 Letter: Myers Letter; 'Anon.'
May 76 Conversation With a Bookbreaker; 'Anon.'
Mar 77 [redacted]
Jul 77 Bookbreakers Forum; [redacted]
Jul 77 [redacted] Buck S.H.
Jan 78 New and Improved Aid for Bookbreaking; [redacted]
Jun 78 Bookbreakers Forum; [redacted]
Nov 78 Linguistics and the Code Reconstructor; Buck S.H.
Apr 79 Bookbreakers Forum;
Apr 80 ... And In A More Modern Vein; [redacted] V.
Apr 82 Bookbreakers Forum On Machine Aids; [redacted]

Book Review
Feb 75 Review of 'Guide to Russian Technical Translation' by Salemme; [redacted]
Jun 75 The Navajo Code Talkers;
Dec 75 A Personal Comment on Winterbotham's 'The ULTRA Secret'; Tiltman J.H.
May 77 Another Controversial Book on Artificial Intelligence; [redacted]
Jan 78 'Bodyguard of Lies' (Book Review); McConnell H.
Jan 78 'The Man Who Broke Purple' (Book Review); Filby P.W.
Oct 78 Feeding the Germans Misinformation (Book Review); Filby P.W.
Nov 81 Review: What Do You Think?; [redacted] M.E.
Dec 81 Review: In The Name of Efficiency; [redacted]
Mar 82 A Historian Looks at SIGINT; Filby V.R.
Apr 82 Review: The American Magic; [redacted]
Sep 82 Normandy: 1944; [redacted]

P.L. 86-36

Broad Spectrum
May 82 Full or Broad Spectrum Lighting; [redacted]

Budgeting
Jul 77 ZBB? What In the World Is That?; [redacted] W.E.

By-Lines
Feb 78 By-Lines Don't Cost--They Pay!; [redacted]

C-LINERS
Mar 77 Letter: C-LINERS Article; 'Appalled'

CAA News
Dec 75 Learned Organizations--CLA Essay Contest; CAA News;
Jul 77 CAA News: What Ever Happened to the CAA?; [redacted]
Aug 77 CAA News: What Are They Up to Anyway?; [redacted]
Sep 77 CAA News: Whom?; [redacted]
Oct 77 CAA News; [redacted]
Nov 77 CAA News; [redacted]
Dec 77 CAA Message and News; [redacted]
Jan 78 CAA News; W.E.S.
Feb 78 CAA News; W.E.S.
Mar 78 CAA News; W.E.S.
Apr 78 CAA News; W.E.S.
May 78 CAA News; W.E.S.
Jun 78 CAA News; W.E.S.
Jul 78 CAA News; W.E.S.
Sep 78 CAA News; W.E.S.
Oct 78 CAA News; W.E.S.
Nov 78 CAA News; W.E.S.
May 79 CAA News;
Jun 79 CAA News;
Aug 79 CAA News; [redacted]
Oct 79 CAA News: Conference on Communications Analysis;

P.L. 86-36

EO 1.4.(c)
P.L. 86-36

P.L. 86-36

[redacted]
Mar 77 [redacted] D.A.

Calendar
Dec 74 A Proposal for Calendar Reform; Leahy F.T.

EO 1.4.(c)
P.L. 86-36

Callsigns
Dec 74 An Approach to Callsign Analysis; Jackson W.J.
May 78 Callsigns and WARC-79; [redacted]
May 78 TA Implications of FCC Proposal; [redacted]
Sep 78 [redacted]

EO 1.4.(c)
P.L. 86-36

CAMINO
Feb 75 CAMINO News; [redacted]

Career Fields
Jun 76 How Things Have Changed!; [redacted]
Jan 78 The Changing Face of NSA; 'Anon.'

P.L. 86-36

P.L. 86-36

EO 1.4.(c)
P.L. 86-36

P.L. 86-36

P.L. 86-

P.L. 86-36

EO 1.4.(c)
P.L. 86-36

Sep 76 Learned Organizations--1976 CLA Essay Contest; 1976 CMI Essay Contest;
Mar 78 CLA News;
Sep 78 CLA News;
Feb 79 CLA News: Russian Institute;
Oct 79 CLA News;
Jan 80 CLA News: Sydney Jaffe Award:
Jan 81 NCS-CLA Symposium;

Clustering
Apr 78 A Little PEP Talk; [redacted]

CMI News
Aug 74 Learned Organizations--1974 CLA Essay Contest, 1974 CMI Essay Contest; CISI Prizes and Honors, Spring 74;
Jan 75 Learned Organizations--IAI News, CISI News; CLA is Ten Years Old!; CMI News;
Jul 75 Learned Organizations--CLA News; CMI News;
Sep 76 Learned Organizations--1976 CLA Essay Contest; 1976 CMI Essay Contest;
Jan 79 CMI News;
Aug 79 CMI News; [redacted]

EO 1.4.(c)
P.L. 86-36

Codes
Sep 74 Cryptanalysis and Code Recovery; Mountjoy M.
Feb 75 Basic Patterns of [redacted] Codes and Ciphers; [redacted]
Jun 75 The Navajo Code Talkers;
Jun 76 The Marquis and the Medium; [redacted]
Nov 78 Linguistics and the Code Reconstructor; Buck S.H.
Mar 82 [redacted]

EO 1.4.(c)
P.L. 86-36

Collection
Aug 74 What Is a Collector?; [redacted]
Dec 74 The New Collection Criteria; [redacted]
Aug 75 Abdul and His 40 Tanks; Mason F.O.
Feb 76 The [redacted] System; [redacted]
May 76 Some Principles of Cover and Deception; [redacted]
Jun 76 The [redacted] Collection System: Murphy T.
Aug 76 NSA Cryptologic Collection;
Oct 76 Another Word on AG-22/IATS; [redacted] M.A.
Jan 77 Where Were We?; Mason F.O.
Nov 77 Director's Memorandum: [redacted] Guidance'; Inman B.R.
Nov 77 Objective Satisfaction Score: Collection Performance; [redacted]
Jan 78 An Early NSA Proposal for Satellite Remoting; [redacted] Nolte W.M.
Jan 78 What Ever Happened to COPES?; [redacted] W.E.
Feb 78 Collection-Support TA is Not for Everyone; [redacted]
Jun 78 [redacted]
Jan 81 KITTIWAKE; [redacted]

Color Code
Sep 74 Gary's Colors; Garofalo C.A.
Feb 82 Golden Oldie: Simplicity in Color; Garofalo C.A.

EO 1.4.(c)
P.L. 86-36

Comic Strip
Sep 77 Al Balloni, Editor; A.J.S.
Jan 79 Al Balloni, Editor; A.J.S.

EO 1.4.(c)
P.L. 86-36

COMINT
Sep 74 COMINT Analysis of [redacted]
Jan 75 The Case for COMINT Readers; [redacted] H.G.
Apr 76 Golden Oldie: Hidden Losses in COMINT Production; Gould R.E.
May 76 COMINT in the Russian Navy, WWII; [redacted]
Jan 78 COMINT, COMSEC, and Hilbert's Tenth; [redacted]
Feb 79 The COMINT Chain 'Gang'; [redacted]

Communications
Oct 75 Computers, Comms, and Low-Grade Ciphers: [redacted]
Apr 80 [redacted]

EO 1.4.(c)
P.L. 86-36

P.L. 86-36

Communications Changes
Apr 75 A Comm Change at Ramasun Station; [redacted]
Oct 82 Golden Oldie: The Reality of Communications Changes; [redacted]

Computers
Aug 74 Right-to-Left Text Sorts Are Not Impossible; [redacted]
Dec 74 Flag-Waving Programmer; John G.
Jan 75 The Yawn of the Computer Age or When Your Terminal is Terminal; [redacted]
Jun 75 Professionalizing in Computer Systems; [redacted]
Aug 75 Computer Network Resources In C5;
Oct 75 Computers, Comms, and Low-Grade Ciphers: The Southeast Asian Exploitable Message Processing System; [redacted]
Apr 76 What's the Best Location for the Computer Applications Function?; [redacted] C.E.
Jun 76 Computers In The ELINT and Telemetry Business; [redacted]
Mar 77 A View of the Central Computer Complex in the Late 1970s and Early 1980s; Phillips C.J.
Mar 77 An Overview of Project [redacted] Coyle J., [redacted]
Apr 77 Contemplating Computing; [redacted]
May 77 Universes, Galaxies, Stars, Bars, and Other Concepts; Phillips C.J.
Aug 77 Early Days in NSA Computing; Chauvenet L.R.
Apr 78 Remedial Software Engineering; [redacted] J.F.
May 78 The Joys of UNIX; [redacted]
Oct 78 Data Security and Human Error; [redacted] J.M.
Jun 79 Teaching Computer Science To Linguists; [redacted]

P.L. 86-36

EO 1.4.(c)
P.L. 86-36

P.L. 86-36

EO 1.4.(c)
P.L. 86-36

P.L. 86-36
P.L. 86-36
P.L. 86-36
P.L. 86-36
EO 1.4.(c)
P.L. 86-36
P.L. 86-36
EO 1.4.(c)
P.L. 86-36

Crypto-TA
- Jun 75 More on Squaring the Page (A Crypto-TA Function); Mason F.O.
- Apr 79 A Somewhat Larger Problem: [redacted] W.E.
- Aug 82 An Old Problem; [redacted]
- Oct 82 Answer: An Old Problem; [redacted]

Cryptograms
- Sep 74 Secrets of the Altars--The Moustier Cryptograms; [redacted]

Cryptographic
- Apr 75 Psyching the Code Clerk: [redacted] Callimahos L.D.

EO 1.4.(c)
P.L. 86-36

CRYPTOLOG
- Aug 74 CRYPTOLOG A Letter of Introduction; Wolff H.E.
- Dec 74 CRYPTOLOG Index for 1974;
- Jan 75 CRYPTOLOG Index for 1974;
- Dec 75 CRYPTOLOG Index for 1974-1975;
- Nov 76 Letter: Cumulative Index; Bostick C.W.
- Dec 77 CRYPTOLOG Index for 1977;
- Mar 78 An Idea for an Article; Miller D.E.
- Dec 78 CRYPTOLOG Index for 1978;
- Jan 79 Letter From the Publisher; Lutwiniak W.
- Mar 79 Readers' Survey; D.H.W.
- May 82 CRYPTOLOG Numbering;

Cryptologic Mission
- Feb 79 Let's Not Forget Our Cryptologic Mission: Gurin J.
- Apr 79 Letter: Gurin Article (Feb 79); [redacted]

Cryptology
- Jan 76 Football and Cryptology; [redacted]
- Feb 78 First Lady of Navy Cryptology [redacted] R.P.

Cryptosystems
- Oct 75 The Do Xa Pads; Wiley E.
- Sep 78 [redacted]

EO 1.4.(c)
P.L. 86-36

Crypto Devices
- Aug 82 AFCEA 82 and ICC-82: New Crypto Devices; [redacted]

CSI News
- Dec 75 Establishment of CSI Newsletter;

Cyrillic
- Jun 76 Transliteration or Cyrillic?; [redacted] G.

Data Bases
- Jan 75 How Clean Does a Data Base Need to Be?: [redacted]
- Feb 79 Literature Search On-Line; Miller M.E.
- Jan 80 CIRC: An Intelligence Data Base; [redacted]
- Nov 82 Central Research and The Paper Blob;

P.L. 86-36

[redacted]

P.L. 86-36

Data Flow
- Apr 80 Data Flow--Challenge of the 1980s; Phillips C.J.

Data Security
- Oct 78 Data Security and Human Error; [redacted] J.M.

Data Sorting
- Aug 74 Right-to-Left Text Sorts Are Not Impossible; [redacted]

Data Standards
- Nov 74 Data and Definitions: Calling Things by Their Rightful Names; [redacted]
- Nov 78 Data Standards Center; Pattie M.T.
- Dec 78 a/k/a Sam; [redacted]
- Feb 79 Data Standards Without Tears; [redacted] P.Q.
- Feb 79 Well, Maybe a Sniffle or Two...; Pattie M.T.
- Mar 79 Data Standards Without Tears: A Comment; [redacted]
- Mar 79 Letter: Data Standards; [redacted]
- Jun 79 ... Mr. Pattie Replies; Pattie M.T.
- Jun 79 Data Standards Without Teeth; [redacted] P.Q.
- Aug 79 An August Baudy; [redacted]
- Jan 82 Data Field Naming/Coding Conventions at NSA; [redacted]
- Aug 82 All I Ever Wanted To Know About DES; [redacted]

P.L. 86-3

Dates
- Jul 77 Dating Game; Williams D.H.
- Aug 77 Postscript to 'Dating Game'; [redacted]

P.L. 86-3

Deception
- Feb 76 How Do We Know It's True?; Filby V.R.
- May 76 Some Principles of Cover and Deception; [redacted]
- Jun 76 'Right On, Vera!'; [redacted]
- Jun 79 [redacted] M.R.

Degarbling
- Sep 77 [redacted] D.L.
- Dec 77 Letter: [redacted] Article; [redacted]

DESKPAD
- Nov 75 DESKPAD: A Programmers's Tool; [redacted] H.

DIALOG
- Aug 77 DIALOG Available at NSA;
- Feb 79 Literature Search On-Line; Miller M.E.

Dictionaries
- Feb 75 Glossaries versus Dictionaries: Which Should It Be?; Gurin J.
- Feb 75 The Devil's Dictionary;

Aug 76 Note on FRANCOPHONEGLOS;
May 78 Project UTENSIL: The DDO Data Dictionary/Directory; [redacted]

Documentation
Sep 77 Is There a Doctor in the House?; [redacted]
Jan 80 System Acquisition Document Review; [redacted]
Jun 82 Human Factors: Responsible Documentation; [redacted]

Economic Intelligence
Oct 81 Economic Intelligence: Problems and Prospects; [redacted]

Editor's Note
May 76 Scraps from the Editor's Desk; Salemme A.J.
Feb 79 [redacted] and a Little Bit of Luck; Williams D.H.

Editorial Comment
Feb 78 No, Winnie, You've Got It Upside Down Too!; A.J.S.
Jun 82 Letter: Editorial Comment; [redacted] P.A.

Efficiency
Dec 81 Review: In The Name of Efficiency; [redacted]

ELINT
Nov 74 [redacted] What? Where? Why?; [redacted] G.A.
Apr 75 The Uses of ELINT; [redacted]
May 75 Letter: Bloom Article; [redacted]
Apr 76 Will the Real ELINT Please Stand Up; [redacted]
Jun 76 Computers In The ELINT and Telemetry Business; [redacted]
Aug 76 Yes, Don, There is an ELINT!; [redacted] W.L.
Nov 76 Letter From Canada; [redacted]

Emitter Identification
May 79 Emitter Identification Techniques; [redacted]

English
Dec 74 Language in the News; [redacted]
Jun 75 Where Does 'Does' Come From?; Tetrault E.W.
Aug 75 Language in the News;
Nov 76 The Uses of Elegant English; [redacted] J.R.
May 77 Choose Ye!; [redacted]
May 77 Plain English; [redacted]
Jun 77 Vich Iss R-r-right?; A.J.S.
Nov 77 What Ever Does 'However' Mean?; [redacted]
Jan 78 The Joys and Frustrations of Plural-Dropping; A.J.S.
Mar 79 Fairbanks on English; Fairbanks S.
Apr 79 More Fairbanks on English; Fairbanks S.
May 79 More Fairbanks On English; Fairbanks S.
Jun 79 How Are Your Stamina?; Fairbanks S.
Jul 79 Wilt Thou, Angelina ...?; Fairbanks S.

Equipment
Jun 78 Equipment Maintenance on ABNER; Bernard R.
Oct 78 Will It Really Do the Job?; [redacted]
Apr 79 But, Mr. Boak, Did You Ever Try To Get Rid of One in a Hurry?; D.H.W.
Oct 79 Another Source; [redacted]
Oct 79 Snowballs On The Roof; Filby V.R.
Aug 82 AFCEA 82 and ICC-82: New Crypto Devices; [redacted]

Equivalency Tests
Nov 75 NCS Offers Course-Equivalency Tests;
Apr 76 NCS Offers Course-Equivalency Tests, Clarification;

Evaluation
Oct 77 K1: SCA Field Management and Evaluation; [redacted]
Jul 79 EXPERT; [redacted]

EW
Jun 75 The Role of the Electronic Warfare Advisory Element (EWAE) of NSA; [redacted]
Oct 76 Russian SIGINT and Electronic Warfare; [redacted]

EXPERT
Jul 79 EXPERT; [redacted]

Exploitation
Feb 78 [redacted] Schlauch R.H.
Jul 79 EXPERT; [redacted]

Field Stations
Apr 75 A Comm Change at Ramasun Station; Reese J.C.
Oct 75 The Danang Processing Center; [redacted] A.
Jan 76 Leo in October; Murphy A.I.
Apr 76 One Day in Danang; [redacted]
Jun 76 Letter: [redacted] Article; Murphy A.I.
Jan 77 Where Were We?; Mason F.O.

Forms
Sep 77 Speaking of Logging ...; [redacted]

FRANCOPHONEGLOS
Aug 76 Note on FRANCOPHONEGLOS;

French
Aug 74 Nice Busman's Holiday for One NSA Employee; [redacted]
Sep 74 Language in the News; [redacted]
Aug 76 Language in the News;

P.L. 86-36
EO 1.4.(c)
P.L. 86-36

P.L. 86-36

French Connection
Dec 76 The French(fried) Connection: Gino the Genie; [redacted]

Frequencies
Jan 79 The Return to HF; [redacted]
Jan 82 HF - The Rebirth: [redacted]
Jun 82 Amateur Spread Spectrum; [redacted]

[redacted]
Feb 76 The [redacted] System; [redacted]
Oct 77 Update on [redacted]

Games
Oct 76 A Vexing Agency-Wide Problem; Mason F.O.
Nov 76 Answer to 'Vexing ... Problem'; Mason F.O.

EO 1.4.(c)
P.L. 86-36

Geography
Dec 74 Maps in Mind--A Photoessay; [redacted]
Dec 74 Puzzle: Citizens of the World;
Nov 77 How Many African Countries Can You Spot?; [redacted]
Apr 78 +Conoces Bien la Geografia?; [redacted]
Oct 78 Know Your Geography; [redacted]
Dec 78 How Do You Spell Peking?; [redacted]
Feb 79 Know Your Geography; [redacted]
Apr 80 Geographic Trivia;

German
Sep 76 Language in the News;
Nov 77 Backing into Language Acquisition; [redacted]

P.L. 86-36

Glossaries
Aug 74 The New Traffic Analysis Glossary;
Oct 74 Golden Oldie: An Unofficial Glossary of Weasel Words;
Feb 75 Glossaries versus Dictionaries: Which Should It Be?; Gurin J.
Feb 76 Expletives Deleted: Glossing Over a Glossary; [redacted]
Aug 77 Expletives Deleted?; Salemme A.J.

[redacted]

EO 1.4.(c)
P.L. 86-36

Jun 76 The [redacted] Collection System; Murphy T.
Oct 76 Letter: [redacted] Article [redacted]

Graphics
Dec 75 Graphic Analysis of Linear Recursive Sequences; [redacted]
Dec 76 Graphic Names; [redacted]

GUPPY
Feb 75 Replacement of the GUPPY Library; [redacted]

Hebrew
Sep 74 Language in the News; [redacted]

HELIPAD
May 79 Project HELIPAD: An Epitaph; [redacted] M.L.

HF
Jan 79 The Return to HF; [redacted]
Jan 82 HF - The Rebirth; [redacted]

HFDF
Sep 74 Project CARRIAGE: Worldwide HFDF Modernization Plan; Webster J.B.
Nov 74 [redacted] What? Where? Why?; [redacted] G.A.

EO 1.4.(c)
P.L. 86-36

Hiring
Oct 74 News from NCS--Agency Resumes Hiring of LICs; NCS Offers Course in 'SIGINT Appreciation';
Dec 75 Linguists From The Melting Pot; Gould R.E.

P.L. 86-36

History
Feb 75 The Gulf of Tonkin Incident; [redacted] W.D.
May 76 COMINT in the Russian Navy, WWII; [redacted]
Sep 78 Soviet COMINT and the Civil War; [redacted]
Nov 78 Cast a Double Shadow: The Trojan Horse of SIGINT; [redacted]
Jan 79 W.W.II Japanese Translation at Arlington Hall Station;
Mar 79 Pursuit of the [redacted] E.L.
Sep 82 Normandy: 1944; [redacted]
Dec 82 Does Anybody Here Remember PURPLE?; [redacted]

EO 1.4.(c)
P.L. 86-36

Human Factors
Jun 77 Human Factors and Systems Design: An Estranged Relationship?; [redacted]
Oct 77 Human Factors and the Use of Microfiche Readers at NSA; Snow D.
Jan 79 Human Factors Newsletter;
Jan 82 Human Factors Corner: Information System; [redacted]
Feb 82 Human Factors Corner: But What Do I Do With My Papers?; [redacted]
Feb 82 Human Factors Corner: Some Advice to Users of Unfriendly System; [redacted]
Mar 82 Human Factors Corner: Consumer vs. Computer: A Review; [redacted]
May 82 Human Factors Corner: Data Gathering, How Do We Spend Our Day?; [redacted]
Aug 82 Human Factors Corner: Video Display Terminals and Vision of Workers; [redacted] M.E.
Oct 82 Human Factors Corner: Text Editors; [redacted]
Nov 82 Human Factors Corner: How Do People Organize Cooperative Work?; [redacted]
Dec 82 Passwords; [redacted]

IAI News
Jan 75 Learned Organizations--IAI News, CISI News; CLA is Ten Years Old!; CMI News;
May 75 Learned Organizations--CLA News; IAI News;

P.L. 86-36

P.L. 86-36

Indicators
Dec 82 Development and Correlation of Indicators; [redacted]

Information
Jan 82 Human Factors Corner: Information System [redacted]
May 82 The NSA Information Desk: 'No Comment'; [redacted]

INKSTAND
Jun 77 SIGINT Welcomes INKSTAND; [redacted]

Intelligence
Dec 75 What Are We About? (Fragments, Figments, or What?); [redacted]
Apr 76 Letter: Comments on [redacted] Letter on What Are We About?; [redacted]
Apr 76 Letter: What Are We About? Article; [redacted]

P.L. 86-36

Intelligence Community
Aug 77 New Directions for the U.S. Intelligence Community; Gaddy D.W.

Intern Program
Sep 74 A Long Hard Look at the Intern Program--Program Philosophy; Recruitment (Part One); 'Exinterne'
Oct 74 A Long Hard Look at the Intern Program--Selection and Orientation (Part Two); 'Exinterne'
Nov 74 A Long Hard Look at the Intern Program--Motivation and Morale (Part Three); 'Exinterne'
Dec 74 A Long Hard Look at the Intern Program--What Happens to the Graduate? (Part Four); 'Exinterne'
Feb 75 Letter: Exinterne Articles; Tetrault E.W.
Apr 75 Letter: Exinterne Articles; [redacted]

EO 1.4.(c)
P.L. 86-36

Interpreters
Feb 75 The Faithful Echo--The Role of the State Department Interpreter; [redacted]
Oct 77 The Perils of Being a State Department Interpreter;
Feb 78 The Unseen Go-Between; Gurin J.

IRA
Aug 77 What Is an Information Research Analyst?; [redacted]

EO 1.4.(c)

[redacted]
Oct 79 [redacted]

IRONHORSE
Oct 75 IRONHORSE: A Tactical SIGINT System; [redacted]
Oct 76 Letter: IRONHORSE Article; [redacted]

ISHTAR
Jan 75 The SIGINT Users' Handbook or: What's an ISHTAR?; [redacted]

Japanese
Nov 76 Toujours La Politesse (Japanese); Buck S.H.
Jul 77 The Transcription Skill: Concepts and Teaching Methodologies; [redacted]
Jan 79 W.W.II Japanese Translation at Arlington Hall Station;

JPRS
Sep 77 JPRS Language Reference Aids; [redacted]

Keyword Spotting
Mar 77 Letter: Keyword Spotting; Gurin J.

EO 1.4.(c)
P.L. 86-36

KITTIWAKE
Jan 81 KITTIWAKE; [redacted]

[redacted]
Dec 78 [redacted]
Dec 78 [redacted]

KRYPTOS News
Feb 82 KRYPTOS: A New Society; [redacted]
Dec 82 KRYPTOS News; [redacted]

Language
Aug 74 Nice Busman's Holiday for One NSA Employee; Dudley B.
Aug 74 The Language of Beisbol in Everyday Talk; [redacted], Santiago-Ortiz R.A.
Sep 74 Language in the News; [redacted]
Oct 74 Character Building in the People's Republic of China; [redacted]
Oct 74 Even a 5-year-old Child ...; Tetrault E.W.

P.L. 86-36

Nov 74 Purity of the Russian Language--Slavophiles vs. Westernizers; [redacted]
Dec 74 Language in the News; [redacted]
Dec 74 The Old [redacted] Section; [redacted]
Jan 75 The Case for COMINT Readers; [redacted] H.G.
Feb 75 The Faithful Echo--The Role of the State Department Interpreter; [redacted]
Apr 75 Language in the News; Tetrault E.W.
Jun 75 The Navajo Code Talkers;
Jun 75 Where Does 'Does' Come From?; Tetrault E.W.

P.L. 86-36

Aug 75 A Fix for the Language Problem?; [redacted]
Aug 75 Language in the News;
Oct 75 Language Lessons Learned: A Personal Memoir; [redacted]
Oct 75 Tactical Language Exploitation: A Lesson Learned?; [redacted]
Nov 75 Golden Oldie: Blue Russian; [redacted] J.F.
Feb 76 Expletives Deleted: Glossing Over a Glossary; [redacted]
Mar 76 1976 Language Meetings and Conferences;
Mar 76 A Comparison of NSA and ATA Certification Standards; [redacted]

P.L. 86-36

EO 1.4.(c)
P.L. 86-36

P.L. 86-36

Mar 76 To Pull a 'Ponyal'; [redacted]
Apr 76 Computer-Aided Transcription of [redacted]
Apr 76 How Do Adults Learn Language?; [redacted]
Apr 76 Language in the News: Language Rule;
May 76 Hypnosis and Self-Hypnosis in Language Learning; Buckley D.
May 76 What Language Problem?; Pattie M.T.
Jun 76 An Evaluation of a Scientific Chinese Machine Translation; [redacted]
Jun 76 Notes on Translation from the Chinese; [redacted]
Aug 76 Language in the News;
Aug 76 Research in Speech Perception (Dr. Ruth Day); Tetrault E.W.
Sep 76 Language in the News;
Oct 76 Language Skill File; [redacted] Mooney K.
Oct 76 Some Ideas about Mechanized Language Working Aids; [redacted]
Nov 76 Golden Oldie: The Things They Say; Miller D.E.
Nov 76 The Uses of Elegant English; [redacted] J.R.
Nov 76 Toujours La Politesse (Japanese); Buck S.H.
Dec 76 What's In a Name?; [redacted]
Jan 77 Letter: [redacted] Article; Kenny M.M.
Apr 77 'It's Got to Get Out Today!'; Blank F.
Jul 77 [redacted] Buck S.H.

EO 1.4.(c)
P.L. 86-36

Jul 77 Tool Languages; [redacted]
Aug 77 Expletives Deleted?; Salemme A.J.
Sep 77 [redacted] D.L.
Sep 77 JPRS Language Reference Aids; [redacted]
Sep 77 The [redacted] Seminar Program; [redacted] W.L.
Nov 77 Backing into Language Acquisition; [redacted]
Nov 77 Language Processing Forum; [redacted]
Nov 77 Letter: Salemme Article; [redacted]
Nov 77 Letter: Salemme Article; [redacted]
Dec 77 What Made Them Do It? (Language Self-Study); [redacted]
Jan 78 Thanks for the Attaboy!; [redacted]
Feb 78 [redacted]
Feb 78 The Unseen Go-Between; Gurin J.
May 78 Uncle-a Sam Wantsa You!; [redacted]
Jun 78 Celtic Languages Today; [redacted]
Jul 78 Is A Translator a Professional?; [redacted]
Sep 78 Letter: Pattie Article; Buckley D.
Sep 78 Soviet COMINT and the Civil War; [redacted]
Sep 78 What's In a Non-Name?; [redacted]
Oct 78 And-a You Betta Have Moti-vaysh!; [redacted]
Dec 78 Agency Summer Language Study; Buckley D.

Jan 79 Golden Oldie: On First Opening Kenney's 'Statistics'; Mountjoy M.
Jan 79 Henry Cement and other Phantoms of the Opera(tions); [redacted]
Feb 79 Language Career Panel: Clarification of Nov 78 Item;
Mar 79 VORD is a Better Idea; [redacted]
May 79 Run This Through Your Transcription Machine; [redacted]
May 79 Where Do Good Transcribers Come From?; [redacted]
Jun 79 Letter: 'Sixth Language'; [redacted] P.A.
Jun 79 Sign Language;
Jun 79 The Baltic Encoders; [redacted]
Jul 79 Gears of the Mouth; [redacted]
Jul 79 Letter: [redacted] Article (Apr 79); [redacted]
Jul 79 Wilt Thou, Angelina ...?; Fairbanks S.
Aug 79 Language Proficiency Certificates for Military Personnel; [redacted]
Oct 79 NCS Summer Language Program;
Apr 80 LIME-A, OHIO; LEEM-A, Peru; Salemme A.J.
Apr 80 P16 Language and Cryptologic Library; [redacted]
Jan 81 Why Do They Leave?; [redacted]
Apr 81 Grading The Russian PQE; [redacted]
Jan 82 Letter: [redacted] Article; Chauvenet L.R.
Feb 82 Native Scripting of Languages; [redacted]
Apr 82 Partial Machine Translation: Final Report; Pratt D.L.; [redacted]

P.L. 86-36

Nov 82 The Costs of Muddling Through; Gould R.E.

EO 1.4.(c)
P.L. 86-36

Language Identification
Jan 80 LIP; [redacted]

Leadership
Oct 82 Leadership: A Personal Philosophy; [redacted]

P.L. 86-36

Lexicography
Sep 74 Some Thoughts on Lexicography; Buck S.H.
Feb 75 Glossaries versus Dictionaries: Which Should It Be?; Gurin J.
Jul 77 [redacted] Buck S.H.

EO 1.4.(c)
P.L. 86-36

Library
Feb 75 Replacement of the GUPPY Library; [redacted]
Aug 76 NSA Cryptologic Collection;
Jun 79 Letter: Library Changes; [redacted]
Jun 79 Letter: Library Changes; [redacted]
Apr 80 P16 Language and Cryptologic Library; [redacted]

Linguistics
Nov 78 Linguistics and the Code Reconstructor; Buck S.H.

P.L. 86-36

P.L. 86-36

Linguists
Apr 75 Machine Course for Linguists; Tetrault E.W.
May 75 Are We Wasting Linguistic Time?; [redacted] M.R.
Aug 75 Linguists -- We Need An 'Experts Yellow Pages'!; [redacted]
Oct 75 Linguists -- You Have an Expert to Call!: [redacted]
Dec 75 Linguists From The Melting Pot; Gould R.E.
Sep 76 Machine-Produced Aids for the Linguist, Part I; Salemme A.J.
Oct 76 Machine-Produced Aids for the Linguist, Part II; Salemme A.J.
Dec 76 Let's Give the Linguists a Bigger Piece of the Pie!; [redacted]
Jan 77 What If the Linguists Disappeared?; Myers L.S.
Mar 77 A Few Thoughts on the NSA Linguist; 'Anon.'
Mar 77 Letter: Butcher Article; Buckley D.
Apr 77 Letter: Buckley Letter; Tetrault E.W.
Jun 77 Letter: Buckley Letter [redacted]
Sep 77 Letter: Lebanik Letter; Buckley D.
Mar 78 A Linguist Looks at the Tube [redacted] R.S.
Jun 78 As I Was Saying Two Years Ago ...; Pattie M.T.
Jun 79 Teaching Computer Science To Linguists; [redacted]
Aug 79 On Coming of Age at NSA: Confessions of an Ex-Linguist; [redacted]
Oct 79 Letter: [redacted] Article (Aug 79); Taylor D.L.
Jan 80 LIP; [redacted]
Jan 80 NSA/CSS Military Linguist Program;
Apr 80 Help Wanted; [redacted]
Aug 82 Linguist Machine; [redacted]

P.L. 86-36

LIP
Jan 80 LIP; [redacted]

Lithuanian
Jun 79 The Baltic Encoders; Reiskis A.

Lycian
Sep 74 Language in the News; [redacted]

Machine
Apr 82 Partial Machine Translation: Final Report; [redacted]

Machine Aids
Apr 75 Machine Course for Linguists; Tetrault E.W.
Sep 76 Machine-Produced Aids for the Linguist, Part I; Salemme A.J.
Oct 76 Machine-Produced Aids for the Linguist, Part II; Salemme A.J.
Oct 76 Some Ideas about Mechanized Language Working Aids; [redacted]
Apr 82 Bookbreakers Forum On Machine Aids; [redacted]

Machine Intelligence
Jul 75 Machine Intelligence--Promise or Delusion?; [redacted]

Machine Translation
Jun 76 An Evaluation of a Scientific Chinese Machine Translation; [redacted]

Management
Aug 74 Golden Oldie: The Management Survey of the Philharmonic;
Sep 77 Knowledge Resource Management at NSA; [redacted]
Mar 78 A Donkey in Your WHAT?; [redacted]
Jul 78 The Bucky Balance; [redacted]

Management Directives
May 75 Hooray for PMDs!; [redacted]

Managers
Feb 78 Senior Military Cryptologic Supervisors Course; [redacted]
Apr 78 Accentuate the Negative; [redacted]

Maps
Dec 74 Maps in Mind--A Photoessay; [redacted]

MAROON SHIELD
Nov 77 Director's Memorandum: [redacted] Guidance': Inman B.R.

EO 1.4.(c)
P.L. 86-36

Mathematics
Jul 78 Tell Me I'm Just a Sinobibliophobe; [redacted]

Mechanized Translation
Jul 75 RAPIDTRAN: [redacted]

Meetings
Mar 82 Rules For The Camel Corps; [redacted] C.

Memorable Memo
Aug 79 Memorable Memos;

Messages
Feb 82 A Time for Change; [redacted]
Jun 82 Golden Oldie: Reporting Message Volumes; [redacted]

Meteorburst
Mar 82 Meteorburst Communications; [redacted]

Microcomputers
May 82 The Micro Revolution: Arthur Young Study Comment [redacted]

Micrographics
Sep 76 The Bible and the Washington Monument; Snow D.
Oct 77 Human Factors and the Use of Microfiche Readers at NSA; Snow D.
Dec 77 Conversation With a Micrographics Pioneer; [redacted]

P.L. 86-36

P.L. 86-36

Oct 78 Back to Square One!; [redacted]
Oct 78 Reduction Ratios in Micrographics; Snow D.

Military
Jul 78 The Soviet General Staff; [redacted]

Minicomputers
Jun 78 A Computer Scratch Pad at Home or at Work?; [redacted]
Jun 78 Minnie's Mini; Kenny M.M.

EO 1.4.(c)
P.L. 86-36

Missiles
Nov 77 [redacted]; [redacted]

Molecule Superseries
Feb 75 Golden Oldie: Establishment of Molecule Superseries;

EO 1.4.(c)
P.L. 86-36

MORETOWN
Mar 78 [redacted]
Jul 78 Letter: [redacted] Article; [redacted]

MOSES
Jun 79 The Story of MOSES; Gardner D.G.

MSI
Dec 75 The Great Soviet Shipbuilding Mystery; Williams D.H.

Multichannel
Oct 78 [redacted]

Multivariate Techniques
Mar 77 [redacted] D.A.

EO 1.4.(c)
P.L. 86-36

Navy
Feb 78 Soviet Navy Command Post System; [redacted]

NCS
Oct 74 News from NCS--Agency Resumes Hiring of LICs; NCS Offers Course in 'SIGINT Appreciation';
Apr 75 Language in the News; Tetrault E.W.
Nov 75 NCS Offers Course-Equivalency Tests;
Apr 76 NCS Offers Course-Equivalency Tests, Clarification;
Oct 79 NCS Summer Language Program;
Jan 81 NCS-CLA Symposium;

Negative Intelligence
Oct 78 A Method for Measuring Negative Intelligence; [redacted]

Network
Aug 75 Computer Network Resources In C5;

NSA
May 76 A Soviet View of NSA; [redacted]
Dec 78 A VIP Tour through the Attic of NSOC; [redacted]

Oct 79 Snowballs On The Roof; Filby V.R.
Apr 80 What To Do About 'FANX'; [redacted]
May 82 The NSA Information Desk: 'No Comment'; [redacted]
Oct 82 Not Secret Anymore; [redacted]

On-Line Aids
Dec 82 Going On-Line With Information Aids; Gurin J.

On-Line Data
Aug 77 DIALOG Available at NSA;
Feb 79 Literature Search On-Line; [redacted]

OPELINT
Nov 81 OPELINT Is Alive and Well In B Group; [redacted]

P.L. 86-36

Order of Battle
Dec 77 [redacted]
Mar 78 Letter: Rosenbluh Article; [redacted] K.E.

Organizations
Dec 78 To Whom It May Concern; Grant L.G.
Feb 79 Letter: Grant Article (Dec 78); Pattie M.T.
Apr 81 Middle-Age Spread; [redacted]

P.L. 86-3

Organize Work
Nov 82 Human Factors Corner: How Do People Organize Cooperative Work?; [redacted]

Overheard
Oct 78 Overheard in the Burnbag Line;
Apr 82 Overheard While Standing in the Burnbag Line;

Pattern Recognition
Dec 77 What Is Pattern Recognition?; [redacted] D.A.

PEP
Apr 78 A Little PEP Talk; [redacted]

PERCIVAL
Nov 76 Check Your Morse Front-End Alignment; 'Anon.'

Performance
Feb 82 The Internal Performance Evaluation: Friend or Foe?; [redacted]

Performance Appraisals
Jan 80 Between The Lines of Your Performance Appraisal; [redacted]

Personalities
Jul 77 Match Them Up!; [redacted]
Jan 79 Golden Oldie: On First Opening Kenney's 'Statistics'; Mountjoy M.
Jan 79 Henry Cement and other Phantoms of the Opera(tions); [redacted]
Oct 79 The Roads Around Us; Chauvenet L.R.

P.L. 86-36

Personality
Sep 77 Tribute to the Guru; 'Class 32'

Personal Computers
Mar 82 A Personal Computer: A Current Cryptanalysis Support Tool; [redacted]
Apr 82 Personal Computer Application: [redacted]
Jun 82 Letter: Personal Computer Article; [redacted]

Personnel
Feb 78 First Lady of Navy Cryptology; [redacted] R.P.
Jan 79 How do You Tell These Two Clowns Apart?;

Plaintext
May 82 Letter: Plaintext; [redacted]

PLATFORM
Mar 77 An Overview of Project [redacted]
Dec 81 PLATFORM: How Did You Say That Works?; [redacted]

PL1
Nov 78 Formatting PL/1 Source Code; [redacted] K.J.

PMD
May 75 Hooray for PMDs!; [redacted]

PMT
Apr 82 Partial Machine Translation: Final Report; [redacted]

Poems
Jan 77 Executive Order 11652; 'Leiner'
Jan 81 Some Things Never Change;
Feb 82 A Wail, A Complaint, and a Melange; Snyder S.S.

Polyhedrons
May 77 The Polyhedral War; [redacted]
Aug 77 Letter: [redacted] Article; 'Weeson'

Portuguese
Sep 74 Language in the News; [redacted]
Jan 78 Thanks for the Attaboy!; [redacted]

PQE
Jan 75 The Case for COMINT Readers; [redacted] H.G.
Dec 76 Why Can't They Design a Good SR Test?; Bjorklund K.
Apr 77 Some Thoughts on the Russian PQE; [redacted]
Jun 77 Letter: Clark Article; [redacted]
Feb 79 In Defense of The Indefensible: Notes on the Russian PQE; Tetrault E.W.
Apr 81 Grading The Russian PQE; [redacted]
Jan 82 Letter: [redacted] Article; Chauvenet L.R.
Dec 82 Questions In Search of a PQE; 'Schmedlapp'

Predictions
Feb 76 The Prebendary and the Prophet; [redacted] R.
Dec 76 But It Looks Like the Real Thing; [redacted]
Mar 77 Letter: [redacted] Interview; [redacted] H.L.

Production
Apr 76 Golden Oldie: Hidden Losses in COMINT Production; Gould R.E.

Professionalization
Dec 74 The New Collection Criteria; [redacted]
Apr 75 Letter: Professionalization of Bookbreakers; [redacted]
Jun 75 Letter: Bookbreakers; Professionalization of Country Specialists; [redacted]
Jun 75 Professionalizing in Computer Systems; [redacted]
Apr 77 Some Thoughts on the Russian PQE; [redacted]
Oct 78 Continuing Professionalization; [redacted]
Apr 79 Fear of Testing, and What To Do About It; [redacted]

Proficiency
Aug 79 Language Proficiency Certificates for Military Personnel; [redacted]

Promotions
Nov 77 A Proposed Cure for the Time-in-Grade Syndrome; [redacted]
Mar 78 A Proposed Cure for the 'Performance Syndrome'; [redacted]
Dec 78 Some Tips on Getting Promoted; [redacted] V.C.
Feb 79 Letter: [redacted] Article (Dec 78); Bostick C.W.
Aug 79 ... But On The Other Hand;
Aug 79 NSA Promotion Boards: How They Work; [redacted]
Jan 81 How to Improve Your Promotion Potential; [redacted]
Jun 82 Who Wants A Promotion, Anyway?; [redacted]
Aug 82 What Promotion Boards Want; [redacted]

Publications
Jan 75 The SIGINT Users' Handbook or: What's an ISHTAR?; [redacted]
May 76 About the NSA SIGINT Summary; Hunt W.
Sep 76 Foreign Publications Procurement Program; [redacted]
Mar 77 Revised Technical SIGINT Manual in Preparation; Filby V.R.
May 78 Project UTENSIL: The DDO Data Dictionary/Directory; [redacted]
Dec 78 'No, No, Nanette!' Means Yes?; A.J.S.
Jan 79 Human Factors Newsletter;

P.L. 86-36

P.L. 86-36

Jul 79 Russian Handbook of Spoken Usage, Vol 3;
Jan 80 System Acquisition Document Review; [redacted]
Mar 82 Old Phone Books Never Die; Nolte W.M.

Punctuation
Nov 74 The Apostrophe: Some Thought's;
Oct 76 The Winnah: Kid Apostrophe!;
Aug 79 Punctuation: More Than Meets The Eye; [redacted]

PURPLE
Dec 82 Does Anybody Here Remember PURPLE?; [redacted]

Puzzle
Aug 74 Puzzle: Stinky Pinky;
Aug 74 Puzzle: Telephone Directory;
Oct 74 An October Overlap; [redacted]
Oct 74 Puzzle: Telephone Recall;
Nov 74 Answer to An October Overla ; [redacted] J.E.
Dec 74 Puzzle: Citizens of the World;
Dec 74 Puzzle: Secret Messages, 'Military Cryptanalytics';
Jan 75 Puzzle: Crossed Codewords; [redacted]
Feb 75 Letter: Citizens of World Puzzle; [redacted] G.P.
Feb 75 Puzzle: Can You Make Out the Name?; [redacted]
Apr 75 Answer to Can You Make Out the Name!; [redacted]
May 75 Puzzle: How Many Words in 'CRYPTOLOG';
Jun 75 Puzzle: [redacted]
Aug 75 Puzzle: CRY-PTO-LOGrolling;
Oct 75 NSA-Crostic No. 1; A.J.S.
Jan 76 NSA-Crostic No. 2; A.J.S.
Apr 76 NSA-Crostic No. 3; A.J.S.
Jun 76 NSA-Crostic No. 4; A.J.S.
Oct 76 NSA-Crostic No. 5; A.J.S.
Nov 76 TEXTA 'Word Seek'; [redacted]
Jan 77 NSA-Crostic No. 6; A.J.S.
Apr 77 NSA-Crostic No. 7; Chauvenet L.R.
Jul 77 NSA-Crostic No. 8; A.J.S.
Jul 77 Puzzle: Match Them Up!; [redacted]
Sep 77 NSA-Crostic No. 9; Williams D.H.
Nov 77 How Many African Countries Can You Spot?; [redacted]
Nov 77 NSA-Crostic No. 10; A.J.S.
Jan 78 NSA-Crostic No. 11; Williams D.H.
Feb 78 Puzzle: Three Holes;
Mar 78 Answer to Three Holes;
Mar 78 NSA-Crostic No. 12; A.J.S.
Mar 78 Word Seek; [redacted]
Apr 78 +Conoces Bien la Geografia?; [redacted]
Apr 78 NSA-Crostic No. 13; Williams D.H.
Apr 78 Prizewinners in Three Holes;
May 78 NSA-Crostic No. 14; 'Sardonyx'
Jun 78 NSA-Crostic No. 15; A.J.S.
Jul 78 NSA-Crostic No. 16; Williams D.H.
Sep 78 NSA-Crostic No. 17; A.J.S.
Oct 78 Know Your Geography; [redacted]
Oct 78 Letter: NSA-Crostic; [redacted]
Oct 78 Letter: NSA-Crostic; Filby V.R.
Oct 78 NSA-Crostic No. 18; Williams D.H.
Oct 78 Puzzle: Who and Whom?; [redacted]
Nov 78 NSA-Crostic No. 19; Williams D.H.
Dec 78 NSA-Crostic No. 20; Williams D.H.
Jan 79 NSA-Crostic No. 21; Williams D.H.
Feb 79 Know Your Geography; [redacted]
Feb 79 NSA-Crostic No. 22; D.H.W.
Mar 79 NSA-Crostic No. 23; Salemme A.J.
Apr 79 NSA-Crostic No. 24; D.H.W.
May 79 NSA-Crostic No. 25; D.H.W.
Jun 79 NSA-Crostic No. 26; D.H.W.
Jul 79 NSA-Crostic No. 27; D.H.W.
Aug 79 NSA-Crostic No. 28; D.H.W.
Oct 79 NSA-Crostic No. 29; D.H.W.
Jan 80 NSA-Crostic No. 30; D.H.W.
Apr 80 NSA-Crostic No. 31; D.H.W.
Jan 81 NSA-Crostic No. 32; D.H.W.
Apr 81 NSA-Crostic No. 33; D.H.W.
Oct 81 NSA-Crostic No. 35; D.H.W.
Nov 81 Cryptic Crossword; [redacted]
Dec 81 NSA-Crostic No. 36; D.H.W.
Jan 82 NSA-Crostic No. 37; D.H.W.
Feb 82 NSA-Crostic No. 38; D.H.W.
Mar 82 Cryptic Crossword; [redacted]
Mar 82 Letter: Strangest Bust of the Month; Dibben A.

P.L. 86-36

Apr 82 NSA-Crostic No. 39; D.H.W.
May 82 Bust Answer; [redacted]
May 82 NSA-Crostic No. 40; D.H.W.
Jun 82 NSA-Crostic No. 41; D.H.W.
Aug 82 NSA-Crostic No. 42; D.H.W.
Oct 82 NSA-Crostic No. 43; D.H.W.
Nov 82 NSA-Crostic No. 44; D.H.W.
Dec 82 NSA-Crostic No. 45; [redacted]

EO 1.4.(c)
P.L. 86-36

P.L. 86-36

Qualifiers
Nov 76 Clarity, Thy Name is Qualifier; Mollick J.J.

EO 1.4.(c)
P.L. 86-36

Radio Electronic
Jun 79 [redacted] M.R.

Radio Fingerprinting
Apr 80 AIT; [redacted]

P.L. 86-36

RAGPIE
Jan 78 But Why Do We Do It?; [redacted]

RAPIDTRAN
Jul 75 RAPIDTRAN: [redacted]

Readiness
Jul 79 Naval Readiness: A Basis for Comparison; [redacted]

Reference Aids
Sep 77 JPRS Language Reference Aids; Spiegelthal E.S.

Reflections
Nov 74 Reflections on a Translator's Conference; [redacted]

P.L. 86-36

EO 1.~~SECRET~~
P.L. 86-36

P.L. 86-36

Jan 79 Reflections and Recommendations; Filby V.R.

Reminiscences
Mar 77 A View of the Central Computer Complex in the Late 1970s and Early 1980s; Phillips C.J.
Apr 81 The Poet's Corner;
Aug 82 I Remember; [redacted]
Nov 82 An Old Timer Is One Who; [redacted]

Reporters
Aug 74 Calling All SRAs! -- SRA Symposium; [redacted]

Reporting
Aug 74 A Spot by Any Other Name; Filby V.R.
Oct 74 Letter: [redacted] Article; [redacted]
Apr 75 Oral Reporting: A New Challenge for NSA; [redacted]

EO 1.4.(c)
P.L. 86-36

Jun 75 Letter: Volenick Article; [redacted]
Dec 77 [redacted]
Jan 78 Letter: [redacted] Article; [redacted]
Sep 78 A Matter of Style; [redacted]
Jan 79 Reflections and Recommendations; Filby V.R.
Nov 81 Futuristic Reporting; [redacted]

Resources
Sep 77 Knowledge Resource Management at NSA; [redacted]
Apr 78 Accentuate the Negative; [redacted]

Reutilization
Oct 79 Another Source; [redacted]

Russian
Sep 74 Language in the News; [redacted]

EO 1.4.(c)
P.L. 86-36

Oct 74 The [redacted] Exercise: A Case Study in Special Research Analysis; Filby V.R.
Nov 74 Purity of the Russian Language--Slavophiles vs. Westernizers; [redacted]
Feb 75 Review of 'Guide to Russian Technical Translation' by Salemme; [redacted]
Mar 76 To Pull a 'Ponyal'; [redacted]
May 76 COMINT in the Russian Navy, WWII; [redacted]
Apr 77 Some Thoughts on the Russian PQE; [redacted]
May 77 Why Are These People Smiling?; [redacted]
Jun 77 Letter: Clark Article; [redacted]
Jun 77 Old Russian Manuscript Ciphers; [redacted]

EO 1.4.(c)
P.L. 86-36

Sep 77 [redacted] D.L.
Nov 77 Backing into Language Acquisition; [redacted]
Dec 77 Letter: [redacted] Article [redacted]
Jul 78 I Remember SPELLMAN; Salemme A.J.
Feb 79 In Defense of The Indefensible: Notes on the Russian PQE; Tetrault E.W.
Jul 79 Gears of the Mouth; [redacted]
Jul 79 Russian Handbook of Spoken Usage, Vol 3;

Apr 80 Help Wanted; Engle T.L.
Apr 81 Grading The Russian PQE; [redacted]
Jan 82 Letter: Delaney Article; Chauvenet L.R.

Satellites
Nov 75 [redacted] W.L.
Jan 78 An Early NSA Proposal for Satellite Remoting; [redacted], Nolte W.M.

P.L. 86-36

Screening Radiation
Aug 79 Letter: Screening Radiation; [redacted] W.E.
Aug 79 Letter: [redacted] Letter (Aug 79); [redacted]

SCREENWRITER
Mar 78 A Linguist Looks at the Tube; [redacted] R.S.
Apr 78 Letter: [redacted] Article; 'Fennwatcher'

SDO
Dec 81 Sleep Well: Your SDO Is On Duty; Sawyer E.L.

P.L. 86-36

Secure Communications
Jun 75 The Navajo Code Talkers;
Jun 79 The Baltic Encoders; Reiskis A.

Security
Apr 77 The 'Ice Age' and International Security; [redacted]
Jul 77 Letter: Westwood Article; [redacted]
Jul 79 Source Protection: Our Agency's Insurance Policy; [redacted]
Dec 81 Sleep Well: Your SDO Is On Duty; Sawyer E.L.

Self-Paced Instruction
Aug 74 Self-Paced Instruction: The Future is Now!; [redacted]

P.L. 86-36

SIGINT
Feb 76 How Do We Know It's True?; Filby V.R.
Apr 76 On Being Truthful; Gaddy D.W.
Oct 76 More Thoughts on 'Questionable' SIGINT; [redacted]
Oct 76 Russian SIGINT and Electronic Warfare; [redacted]
Jun 77 SIGINT Welcomes INKSTAND; [redacted]
Oct 77 Partners in the Exciting Future of SIGINT; Rosenblum H.E.
Nov 78 Cast a Double Shadow: The Trojan Horse of SIGINT; [redacted]
Apr 79 COMSEC/SIGINT Relations; Boak D.G.
Dec 81 Exercise Support; [redacted]
Mar 82 A Historian Looks at SIGINT; Filby V.R.

SIGINT 1990
Sep 82 SIGINT: 1990, Part One; [redacted]
Oct 82 SIGINT: 1990, Part Two;
Nov 82 SIGINT: 1990, Part Three; [redacted]

P.L. 86-36

EO 1.4.(c)
P.L. 86-36

SIGINT 80s
Jan 81 SIGINT In The 80s: Two Views; [redacted] Lutwiniak W.

SIGINT Alert
Dec 78 [redacted]

P.L. 86-36

SIGINT Exploitation
Apr 78 SIGINT Exploitation, 1990; [redacted]
Jul 78 Letter: [redacted] Article; Gurin J.

SIGINT Handbook
Jan 75 The SIGINT Users' Handbook or: What's an ISHTAR?; [redacted]

SIGINT Reporting
Aug 76 Initiatives in SIGINT Reporting; [redacted]

P.L. 86-36

SIGINT Summary
Mar 77 More about the NSA SIGINT Summary; [redacted]
Jun 77 More about More about the NSA SIGINT Summary; Boucher M.J.

Signals Processing
Oct 74 The Mission of the Signals Processing Requirements Panel; [redacted]

Signs
Jun 79 Sign Language;

SIMP
Jun 75 Golden Oldie: SIMP Tables;

Software
Nov 75 DESKPAD: A Programmers's Tool; [redacted] H.
May 78 The Joys of UNIX; D'Imperio M.E.
Nov 78 Formatting PL/1 Source Code: [redacted] K.J.
Feb 82 Software - AAAS, 1982; [redacted]

SOLIS
Dec 78 How Do You Spell Peking?; [redacted]
Dec 78 [redacted]
Jan 79 SOLIS: A Vehicle in Search of an Engine; [redacted]
May 79 Chapenko, Shapenko: What Difference Does It Make?; [redacted]

SOLITS
Nov 75 In Praise of SOLITS; Grant L.G.

EO 1.4.(c)
P.L. 86-36

Soviet
Aug 75 Processing [redacted] Communications; [redacted]
Nov 75 [redacted] W.L.
Dec 75 The Great Soviet Shipbuilding Mystery; Williams D.H.
Jan 76 63 Days--The Soviets in Space; [redacted]

EO 1.4.(c)
P.L. 86-36

P.L. 86-36

J.
May 76 A Soviet View of NSA; [redacted]
Oct 76 Russian SIGINT and Electronic Warfare; [redacted]
Oct 76 Work Quotas for Soviet Translators; [redacted]
Nov 77 [redacted]
Feb 78 Soviet Navy Command Post System; [redacted]
Jul 78 The Soviet General Staff; [redacted], [redacted]
Sep 78 [redacted]
Sep 78 Soviet COMINT and the Civil War; [redacted]
Apr 80 [redacted]

EO 1.4.(c)
P.L. 86-36

Space Program
Jan 76 63 Days--The Soviets in Space; [redacted] J.
Dec 76 Apollo-Soyuz Test Project; [redacted] J.E.
Sep 78 [redacted]

EO 1.4.(c)
P.L. 86-36

Spanish
Aug 74 The Language of Beisbol in Everyday Talk; [redacted] Santiago-Ortiz R.A.
Sep 74 Language in the News; [redacted]
Jan 75 The Case for COMINT Readers; [redacted] H.G.
Aug 77 Telling It Like It Is; Santiago-Ortiz R.A.

P.L. 86-36

Special Research
Dec 76 Why Can't They Design a Good SR Test?; Bjorklund K.

EO 1.4.(c)
P.L. 86-36

Spelling
Jun 77 Vich Iss R-r-right?; A.J.S.
Dec 78 How Do You Spell Peking?; [redacted]
Dec 78 [redacted]
May 82 Letter: Plaintext; [redacted]

P.L. 86-36

SPELLMAN
Jun 78 Never Again!; Gurin J.
Jul 78 I Remember SPELLMAN; Salemme A.J.
Sep 78 Letter: Salemme Article; Williams D.H.
Oct 78 More B.S. (Before Spellman); [redacted] C.H.
Feb 79 P.S.; [redacted]
Jul 79 Shootout at the SIGINT Corral; [redacted] P.S.

EO 1.4.(c)
P.L. 86-36

Spread Spectrum
Jun 82 Amateur Spread Spectrum; [redacted]

P.L. 86-36

SRA
Aug 74 Calling All SRAs! -- SRA Symposium; [redacted]
Oct 74 Letter: Sapp Article; [redacted]
Oct 74 The [redacted] Exercise: A Case Study in Special Research Analysis; Filby V.R.

EO 1.4.(c)
P.L. 86-36

Sep 77 Whither the SRA?; [redacted]

SRI
Apr 77 Flash! 115th SRI Located!; Salemme A.J.

[redacted]
Feb 78 [redacted]

EO 1.4.(c)
P.L. 86-36

Swahili
Sep 74 Language in the News; [redacted]

SYMBIOSIS
Jun 75 Project SYMBIOSIS; 'Anon.'

System Design
Jun 77 Human Factors and Systems Design: An Estranged Relationship?; [redacted]

System Development
Mar 82 Towards Better System Development; [redacted]

T-Vision
Jan 79 T-Vision: The Reference Analyst's Medium of the Future; [redacted]

Tale
Sep 74 Golden Oldie: King Eusyb and Queen Deodi; [redacted]
Oct 81 The Stairwell Society; [redacted]
Jan 82 Letter: Stairwell Society Article; [redacted]

Target Location
Jun 78 Golden Oldie: Unidentified Unit at Unknown Location;

TDY
Jan 82 All The Alligators Aren't On Sport Shirts;

Teaching Methodolgies
Jul 77 The Transcription Skill: Concepts and Teaching Methodologies; [redacted]

Technical Exercises
Sep 77 'Simonoff Says!'; A.J.S.

Technical Information
Jun 79 The Story of MOSES; [redacted]

Technical Manual
Nov 74 Guidesmanship--or How to Write Technical Manuals Without Actually Giving Anything Away; [redacted]
Mar 77 Revised Technical SIGINT Manual in Preparation; Filby V.R.

Technical Support
Oct 81 Technical Support Catalogs; [redacted] K.J.

P.L. 86-36

Telemetry
Jun 76 Computers In The ELINT and Telemetry Business; [redacted]
Nov 77 [redacted]

P.L. 86-36

Telephone
Apr 78 Telephone Problem Here; [redacted]
Mar 82 A Brief Treatise on Five Laws of Telephonic Communications; Nolte W.M.

Telex
Jan 75 UNNA, [redacted]

EO 1.4.(c)
P.L. 86-36

Terminology
Aug 74 A Spot by Any Other Name; Filby V.R.
Nov 74 Data and Definitions: Calling Things by Their Rightful Names; [redacted]
Aug 79 An August Baudy; [redacted]
Nov 81 Say What You Mean; Gaddy D.W.
Jan 82 Data Field Naming/Coding Conventions at NSA; [redacted]

P.L. 86-36

TEXTA
Aug 74 TDB: The TEXTA Data Base; Jackson W.J.
Nov 76 TEXTA 'Word Seek'; [redacted]
Jul 78 Ye Gads! Another Country Trigraph System; [redacted]
Oct 78 Letter: [redacted] Article; Pattie M.T.
Dec 81 TEXTA: What Is It? Where Is It Going?; [redacted]

[redacted]
Sep 77 The [redacted] Seminar Program; [redacted] W.L.

Third Party
Apr 81 Third Party Relationships; [redacted]

[redacted]
Jul 77 [redacted] Buck S.H.

EO 1.4.(c)
P.L. 86-36

TIDE
Dec 81 TIDE: A Brief History; [redacted]

Time Usage
May 82 Human Factors Corner: Data Gathering, How Do We Spend Our Day?; [redacted]

TIPS
Sep 76 TIPS is Still Alive and Well; [redacted]

Traffic Analysis
Aug 74 The New Traffic Analysis Glossary;
Sep 74 Gary's Colors; Garofalo C.A.
Dec 74 An Approach to Callsign Analysis; [redacted]
Apr 75 A Comm Change at Ramasun Station; [redacted]
May 75 TA, Handmaiden of CA; Mason F.O.
Jun 75 More on Squaring the Page (A Crypto-TA Function); Mason F.O.
Aug 75 Abdul and His 40 Tanks; Mason F.O.

P.L. 86-36

P.L. 86-36

P.L. 86-36

EO 1.4.(c)
P.L. 86-36

P.L. 86-36

EO 1.4.(c)
P.L. 86-36

P.L. 86-36

EO 1.4.(c)
P.L. 86-36

P.L. 86-36

Jul 78 Has It Ever Been Translated Before?: [redacted]
Nov 78 Letter: [redacted] Article; [redacted]
Jul 79 Gears of the Mouth; Lasley D.
Jul 79 Seminar on Translation Problems;
Jan 81 Translator In Your Pocket; [redacted]
Aug 82 Linguist Machine; [redacted]

Translation Grading
Mar 76 An Objective Approach to Scoring Translations; [redacted]
Aug 76 NSA's System for Grading Translations; [redacted]

Translator
Aug 74 Nice Busman's Holiday for One NSA Employee; Dudley B.
Nov 74 Reflections on a Translator's Conference; [redacted]
Oct 76 Work Quotas for Soviet Translators; [redacted]
Nov 76 Golden Oldie: The Things They Say; Miller D.E.
Jul 78 Is A Translator a Professional?; [redacted]
Jan 79 W.W.II Japanese Translation at Arlington Hall Station;

Transliteration
Jun 76 Transliteration or Cyrillic?; [redacted] G.
May 79 Chapenko, Shapenko: What Difference Does It Make?; [redacted]

Trigraph
Jul 78 Ye Gads! Another Country Trigraph System; [redacted]

Trivia
Jun 79 Letter: 'Sixth Language'; [redacted] P.A.
Jul 79 Letter: Linguatrivia; [redacted]
Apr 80 Geographic Trivia;

True Base
May 82 True Base: Two Tales; [redacted]

TSS
Apr 82 Word Processing In A4; [redacted]
Sep 82 TSS Revolution; [redacted]

EO 1.4.(c)
P.L. 86-36

Typewriter
Aug 75 Typewriter Random -- A New Look: [redacted]
Oct 75 Letter: Typewriter Keyboard;

T Organization
Mar 78 Some Background on the C/T Merger; Smith F.
Sep 78 T Establishes Human Resource Development Panel;

ULTRA
Dec 75 A Personal Comment on Winterbotham's 'The ULTRA Secret'; Tiltman J.H.
Dec 75 Mum's Still the Word! ('The ULTRA Secret'); [redacted]
Dec 75 Weapon That Helped Defeat Nazis (Winterbotham's 'The ULTRA Secret'); Filby P.W.
Feb 78 More Beans; Filby V.R.
Oct 78 Feeding the Germans Misinformation (Book Review); Filby P.W.

UNIX
May 78 The Joys of UNIX; [redacted]
Nov 81 How to Create A User-Unfriendly System; [redacted]
Dec 81 In Pursuit of: Faster Horses, Younger Women, Older Whiskey and More Money; [redacted] D.L.
Feb 82 Human Factors Corner: Some Advice to Users of Unfriendly System; [redacted]
Feb 82 Letter: UNIX Article; [redacted]
Oct 82 Human Factors Corner: Text Editors; [redacted]
Oct 82 What's The Good (Pass)Word?; [redacted]

UNIX How To
Mar 82 But Life Is Supposed To Be Hard; [redacted] J.
May 82 Letter: [redacted] Article; [redacted]
Sep 82 More Free Goodies: [redacted]

UNIX Shell
Apr 82 Shell Game; [redacted]
May 82 Letter: Shell Game Article; [redacted]
Jun 82 Letter: Shell Game Article; [redacted] J.W.
Jun 82 Letter: Shell Game Article; [redacted] P.A.
Jun 82 Loooong Shell; [redacted]
Aug 82 Shell Game; [redacted]
Nov 82 Letter: Shell Game Article; [redacted]
Dec 82 Shell Game: AJSQUE; [redacted]
Dec 82 Shell Game: Counter; W.E.S.
Dec 82 Shell Game: PWB WHEN; [redacted]

UNNA
Jan 75 UNNA, [redacted]

URSI
Dec 81 The 1981 URSI XX General Assembly; [redacted]

UTENSIL
May 78 Project UTENSIL: The DDO Data Dictionary/Directory; [redacted]

Validity
Dec 75 What Are We About? (Fragments, Figments, or What?); [redacted]
Feb 76 How Do We Know It's True?; Filby V.R.
Apr 76 Letter: Comments on [redacted] Letter on What Are We About?; [redacted]
Apr 76 Letter: What Are We About? Article; [redacted]
Apr 76 On Being Truthful; Gaddy D.W.
May 76 Some Principles of Cover and

EO 1.4.(c)
P.L. 86-36

P.L. 86-36

EO 1.4.(c)
P.L. 86-36

EO 1.4.(c)

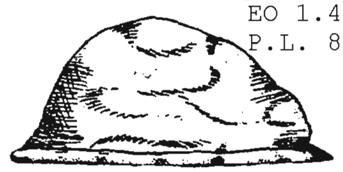
EO 1.4.(c)
P.L. 86-36

P.L. 86-36

P.L. 86-36

P.L. 86-36

EO 1.4.(c)
P.L. 86-36



From: fma at stept03 [redacted]
Subject: SHELL
Reference: CRYPTOLOG, March 83, page 32

[redacted]

[redacted] T441, 963-5553

P.L. 86-36

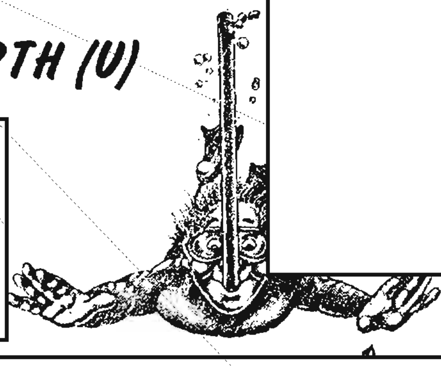
EO 1.4.(c)
P.L. 86-36

EO 1.4.(c)
P.L. 86-36

EO 1.4.(c)
P.L. 86-36

OUT OF MY DEPTH (U)

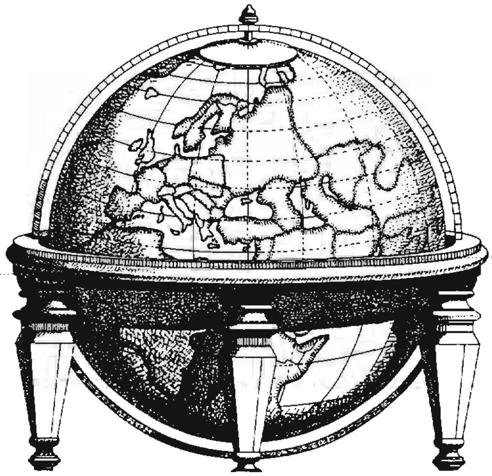
[redacted]



[redacted]

[redacted]

The Intelligence Watch Officer (U)



by [redacted] T52

P.L. 86-36

EO 1.4.(c)
P.L. 86-36

(U) Want an interesting job? Do you want to be busy--sometimes too busy to eat even when you've brown-bagged? If you are interested in current events and want to know what is going on in the world or what is going to happen next, you may be interested in the Intelligence Watch Officer (IWO) position in the National SIGINT Operations Center.

[redacted]

(U) The author served as Intelligence Watch Officer on Team 3 (P33) in NSOC from September 1981 to January 1983.

[redacted]

[redacted]

(U) During non-regular duty hours, the IWO acts for T5 in receiving and responding to requests for information from NSOC, field sites and 24-hour NSA work areas. The IWO attempts to answer all requests instead of referring them to a day shop for action. This frequently necessitates trips to the NSA Geography and Map Library, the Main Library, or to Central Research to research and retrieve a map or citation to answer the query. The IWO has a one-way pager to carry when away from NSOC for any length of time--he maintains constant contact with NSOC when necessary to receive new requests or operational requirements.

[redacted]

EO 1.4.(c)
P.L. 86-36

[redacted]

(U) If you are interested in more information on the Intelligence Watch Officer position in NSOC, contact T5, x3265s.

EO 1.4.(c)
P.L. 86-36

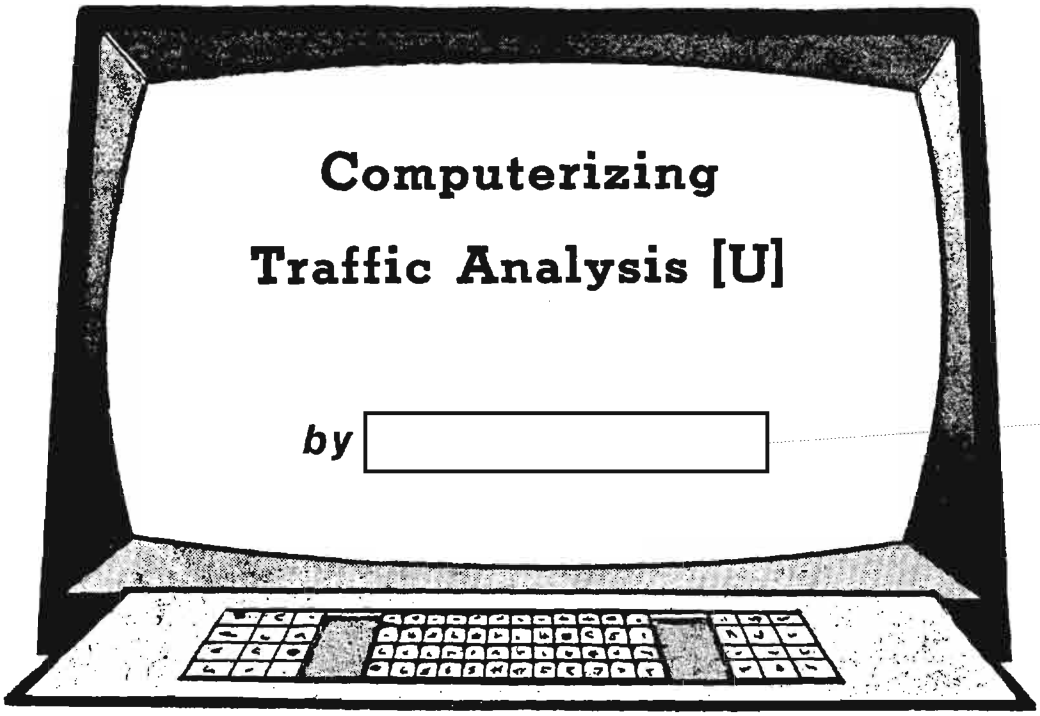
86-36

Sir,

~~(C)~~ I would like to raise a "full glass" in a toast to [redacted] on his article concern- [redacted]

[redacted]

P.L. 86-36



Computerizing Traffic Analysis [U]

by [redacted]

P.L. 86-36

The traffic analyst finds himself turning to data systems because he often has mountains of data to examine, because the people who receive (U) TA results usually want their information very rapidly, and because almost all the data the traffic analyst wants to see is already inside a computer somewhere.

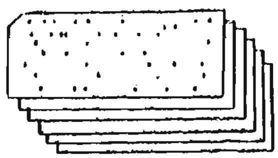
(U) Most traffic analysts who try to look at data systems develop a kind of schizophrenia. On the one hand, the TA data that comes in today has to be processed and analyzed today because there will be another batch of data coming in tomorrow. This means that the traffic analyst has to use today's data system to handle today's data. On the other hand, it does seem to us traffic analysts that data systems people would much rather talk about tomorrow's system--the one that isn't here yet, the one that won't have all these glitches and problems that today's system has.

(U) The traffic analyst who is in the trenches on a current operational problem would easily trade all the glowing promises of some brighter tomorrow for a quick fix on some of the glitches in today's system that will keep him from bleeding to death right now. That isn't my subject today--I really want to talk about the future. But as I thought about standing up here in front of all you data systems people, I couldn't resist putting in a plug for the working traffic analyst; he needs your help, both today and tomorrow.

This paper was presented at the November 1982 Meeting of CISI.

THE PROLOGUE IS PAST

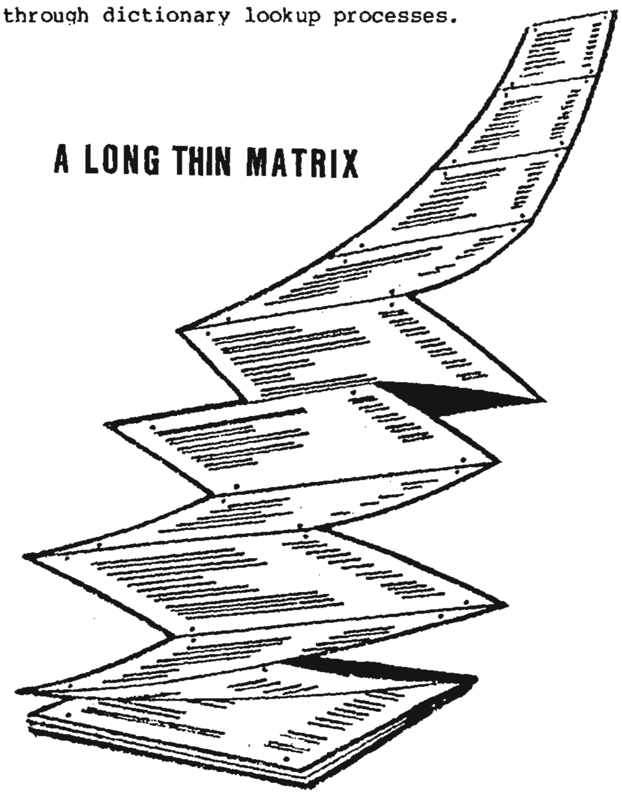
(U) I might be well to begin with a little history, or at least history as I remember it. My first recollection of what we now call data systems was a lot of 80-column cards and a card sorter. That was about 35 years ago. Watching those cards go through that sorter was rather hypnotic. The possibilities seemed limitless then--if we could only find a cheap and easy way to get the data onto the cards. I think the equipment was called Electronic Accounting Machines (EAM), and the people who supported the traffic analysts were called Methods Analysts (in the 1940s and early 50s).



(U) Since our data consisted of a matrix with 80 columns and many rows (one row for each card), our output consisted of that same matrix with its columns and rows transposed in some way. Later, we added the ability to look up words or strings in a dictionary and insert the result back into the matrix.

(U) Many years and computer systems later, in the mid-1960s, this was still the primary data systems support to traffic analysts: a transposed matrix (now often wider than 80 columns) with a dictionary lookup. There were attempts to go beyond this. Most of the things we tried were made to fit one specific problem, and never developed into general TA tools. We developed ponderous, monolithic record formats whose structure provided a special place for each variety of data we thought we would find in the traffic. What I remember most vividly are long, soporific meetings where all we ever seemed to talk about was what format the data was going to be in. We spent untold amounts of energy and resources getting all of our data into these unyielding, user-murky systems, and there was often little energy and resources left over to develop any user-friendly output.

(U) The result of this, in many areas, was that the output received by the traffic analyst was not much more than his original raw traffic, transposed both horizontally and vertically, and with some information added through dictionary lookup processes.



The form in which the output was delivered to the analyst was often decreed by someone remote from the analyst--someone who never had to actually live with the output--and it was rarely if ever changed to fit the current needs of the local problem or individual analyst.

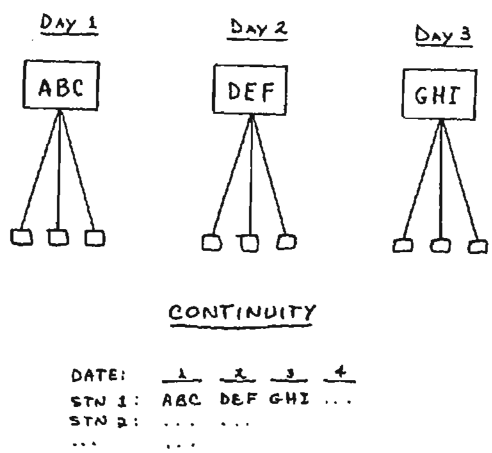
(U) It is still possible, even today, to see analysts sitting down with computer output and handlogging data from that computer output onto a form for their own personal use. In at least two areas, one might then see that same handwritten log being used a little later to punch cards for further computer processing!

WHAT IS THE TRAFFIC ANALYST TRYING TO DO?

(U) The traffic analyst is trying to draw a picture of his communications target. He usually wants this picture to show how his target looks when it is operating normally. Once he knows what his target's normal behavior is, then he is in a position to detect variations, and report them to intelligence consumers.

CONTINUITY

(U) Traffic analysts are usually looking for something they call continuity. When faced with a target that has daily-changing callsigns, the traffic analyst seeks to learn which of today's callsigns matches what callsign used yesterday.



If I can say that the station that used callsign ABC on the first day is the same station that used callsign DEF on the second, then I can say that DEF (on the 2nd day) is continuity of ABC (on the 1st). On the third day, if I can say that GHI was used by that same station, then I can add GHI (on day 3) as another link in a growing chain of continuity. Many of our TA targets do change their callsigns, frequencies, addresses, and other features on a regular basis. They do it to make collection and identification more difficult, and it is the job of the traffic analyst to defeat these changes by the development of continuity.

TWO KINDS OF TRAFFIC ANALYSIS

(U) There are two forms of traffic analysis on most problems: development and maintenance. To borrow an example from cryptanalysis, the attack against a cipher system often goes through two phases:

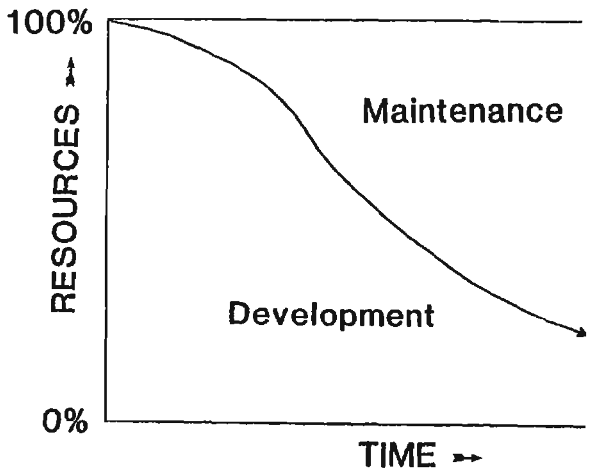
[] first, diagnosing and recovering of the general cipher system, and

[] second, exploiting and processing the recovered system, which often involves solving daily keys or settings.

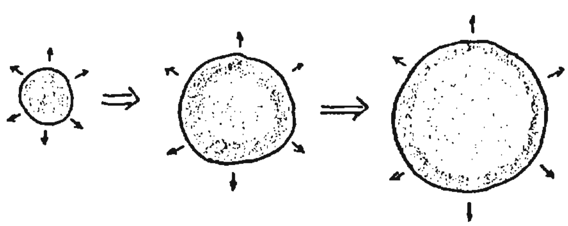
So too, in traffic analysis, one can consider that there is a development (or recovery) phase and a maintenance (or exploitation) phase, which may or may not include product reporting. However, in traffic analysis, the two phases often occur at the same time.

(U) In some ways, the traffic analysis process resembles a spreading oil blot. Out on the edges, new target territory is being conquered; new target communications structures are being discovered and cataloged; new methods of identifying and distinguishing various communications are being developed. But back in the central part of the oil blot, the territories previously conquered must be kept track of; the continuity of target communications structures previously recovered must be maintained.

(U) The more territory one conquers, the thinner the center of the oil blot becomes. The more communications structures one recovers, the more continuities there are that now must be kept track of. As the maintenance effort grows, it will use more of the available resources, draining them away from the recovery part of the effort, and at some point it will have absorbed enough of the resources so that a point of "no growth" is reached and, for all practical purposes, recovery of new structures stops. If expansion doesn't stop, the center of the oil blot will break; if development doesn't stop, the maintenance effort will fall behind and begin to lose track of continuities, which will then have to be discovered and developed all over again. This tension over resources between maintenance and development is similar to the one between software maintenance and software development.



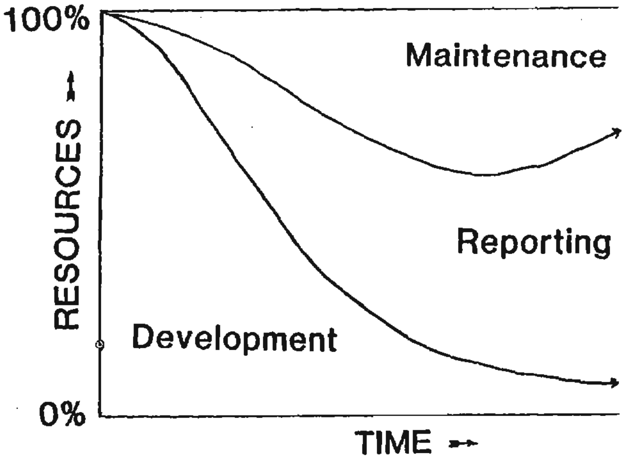
OIL BLOT



Recovery - outer edges

Maintenance - center

(U) Sometimes the personality of the manager plays a part in just where this point of "no growth" takes place. Some managers are more at home in the settled, stable atmosphere of the center, where things don't change much from day to day. These managers tend to concentrate their attention on building a smooth-running system at the center, and may put a larger proportion of their resources into that area, so that the "no growth" point is reached more quickly. Other managers thrive in the rough and tumble frontier atmosphere out on the edges of the problem, where each day is likely to bring some new and different challenge. These managers tend to concentrate their attention on the recovery effort, sometimes at the expense of the more humdrum maintenance.



REPORTING

(U) Some traffic analysis problems have a lot of potential for reporting--for providing the intelligence consumer with a blow by blow account of what the target is doing. Targets that involve ships and aircraft often have this potential because they move around from place to place, and the analysts often find much of their time taken up with reporting which ships and aircraft were active today, in what areas and performing what missions. Where this reporting potential is high, it tends to draw off resources from both development and maintenance. Managers whose problems have a strong reporting emphasis (especially time-sensitive reporting) will generally try to pull resources from development rather than from maintenance, because losing the continuities means losing the raw material for the reporting effort. Losing the development effort is generally seen as the lesser of two evils.

(U) As an aside, I should say here that the reporting side of traffic analysis is generally well ahead of the technical side in the use of computers. Since my primary interest in this paper is the working-level traffic analyst, I will be concentrating on the technical side, and I do not propose to discuss the reporting aspects of TA except as they touch on the technical side.

TRAFFIC ANALYSIS GOALS

(U) From the standpoint of the two kinds of traffic analysis--development and maintenance --we can express the general goals in the following ways:

TA DEVELOPMENT GOALS

(U) We rarely collect or analyze all of the communications of any given target. We are almost always working on a sample of the target. At any given time, there is some residue of the target that we do not maintain continuity on, and bits and pieces of that residue find their way into our unidentified or search pile--the file of incoming traffic which looks as if it belongs to our target but doesn't exactly fit any of our known continuities. Development TA concentrates on that pile, trying to dig out new target nets and continuities. This unidentified pile is almost like "background noise"; it is always there, whether we talk about it or not. If we are still growing (if the oil blot is still expanding), then our development goal is to dig more of the target out of the unidentified pile. If we have reached the "no growth" point, then our development goal is to be able to recognize and develop any new communications that the target might put on the air--communications that ought to stand out against the "normal noise" in the unidentified pile.

TA MAINTENANCE GOALS

(U) During the maintenance phase, we want to be able to hang on to the continuity that we have already recovered. We want to do this:

- [] to support whatever analysis efforts are currently engaged on the target (such as cryptanalysis, language, reporting, etc.), and
- [] to support whatever collection effort is working against the target.

(U) To do the first support requirement properly, we need to be able to correctly distinguish and identify each of our continuities as the traffic arrives at the point of analysis, i.e., after it has been collected.

P.L. 86-36

[redacted]

will always be some mixture of these two forms of traffic analysis. We also need to consider that a TA problem can quickly change from one form to the other.

[redacted]

HOW CAN COMPUTER POWER BE APPLIED TO THE TA PROBLEM?

~~(S-CCO)~~ In order to consider how the power of the modern computer might be applied to traffic analysis, we need to look at the model of TA that emerges from these two phases: development TA and maintenance TA. Although I have described them as if they were distinct and separate, they really ought to be thought of as a conjugate pair, because they tend to occur together on most problems. It is also possible for certain problems to be best described as a hybrid of these two forms: during the war in Vietnam, one out of every three pieces of intercepted traffic was unidentified, largely because of the rapidly-changing nature of the target. The point I want to leave with you today is that any attempt to provide the traffic analyst, either here in this building or anywhere in the world, with a Traffic Analysis Workbench System must reckon with the fact that the problem he is working

~~(C)~~ We decided to see if we couldn't find a way for computers to help us with the more stable maintenance problem. I remember spending several weeks laying out the logic and processes on the problem. And I remember being told, at the end of the project, that there wasn't nearly enough memory available to do what I needed.

	MAINTENANCE	DEVELOPMENT
Problem type:	continuity-keeping bookkeeping "Anything changed?"	continuity-seeking pattern searching "What's new?"
How dynamic?	slowly changing	rapidly changing
Foreknowledge:	high	low
State of solution:	~solved	~unsolved
Control:	semi-automatic	hands-on
Interaction:	human-efficient	human-intensive
Techniques:	target specific knowledge-based?	human specific "mix-n-match"
Worst case:	"below the salt"	start from scratch

A COMPARISON OF TWO FORMS OF TA

A COMPARISON OF TWO FORMS OF TA

(U) Let's look at these two forms of TA a little more closely. How do they compare when we look at them from the viewpoint of providing today's (and tomorrow's) traffic analyst with a computer support toolkit, while using a terminal workstation in an NSA worldwide networking environment?

(U) In development TA (the garrison communications in our example), we have a bookkeeping problem,

[] where the emphasis is clearly on keeping track of a lot of known continuities;

[] where we expect the changes in the target characteristics to be relatively modest;

[] where the technical means of keeping up with the target (i.e., callsign and frequency systems, address tables, etc.) are largely solved or understood; and

[] where we have good prospects of being able to project the appearance and behavior of the target from day to day.

(U) In development TA (the training communications in our example), we have a pattern-searching problem,

[] where the emphasis is on sifting through masses of low-yield ore, looking for something that forms a continuity;

[] where the next success may look nothing like the last one; and

[] where the chances of finding that needle in the haystack may depend as much on the personality of the searcher as on the content of the haystack.

If we can't <u>keep</u> continuities, (i.e., are not <u>able</u> to), then the target stays in the development phase, no matter how much we know about it. Someone once said that TA continuities take either 95% of our resources, or 5%. That number may not be right, but the idea is. Being able to keep track of the continuities is the key to whether the problem is development or maintenance in nature. A daily-changing callsign system <u>looks</u> to us as if it is rapidly changing if we haven't solved the system, but once the system is solved, we then perceive it to be slowly changing. It is a matter of viewpoint.

(U) In maintenance TA, we work largely with what the target gives us. A package of techniques to grapple with a callsign system may work well enough on a problem where the callsigns are the key to our keeping track of continuity, but may be almost useless on another problem where the callsign system isn't solved and we must rely on other things, such as serial numbers or addresses.

(U) In development TA, on the other hand, a particular technique may pull one new structure out of the search pile and then never again find anything. The development analyst may need to continually devise new attacks and new methods; to him, the search pile is a featureless mass and it is his job to sort out the various pieces and find ways to distinguish one piece from another with some reliability.

(U) The maintenance TA problem probably needs a package that will

[] look over the incoming material for the day;

[] make reasonable guesses about continuities (including garbles);

[] flash a warning light at the traffic analyst when things look <u>very</u> wrong or when it is confused by something; and

[] provide a clean and readable summary of its results to the analyst for review.

It ought to keep up with both short-term and long-term trends, and should be especially attentive about "missing persons," portions of the target which haven't been seen for a while.

(U) The development TA problem, on the other hand, needs a toolkit that will provide the analyst with a range of diagnostic, computational, and pattern-searching techniques that can be brought to bear on the problem, in whatever mix the analyst needs at the moment.

WORST CASE

(U) I have shown what might be called the "worst case" for each of these forms of traffic analysis.

(U) In maintenance TA, one sometimes finds that a problem must somehow be worked, but that it has no real resources and not enough clout to get any. Now, in the best of all worlds, where everything is done right and for the right reasons, such problems should not exist. If a problem is worth working on at all, it is worth the resources needed to get the job done. However, in the real world, those problems that are "below the salt" will always be working with whatever support they can beg, borrow, or scrounge. Providing a general package for such problems would pay for itself a hundredfold in the first few years. At the minimum, package needs to be able to "ring an alarm bell" when the target starts to disappear, or becomes more active, or changes in some other way.

~~(S-CCO)~~ In development TA, the worst case might be the situation where nothing is known. That is not as uncommon as some people might think. [redacted] When we pull together an analysis effort for a sudden war or brushfire, the analysts are usually drawn from other problems around the building; it would be nice if they didn't have to add "learning a new system" to all the other problems they will face on the new target. Therefore, the toolkit for such situations must be quite general and all-purpose.

TWO SYSTEMS OR ONE?

(U) What I have been describing so far may sound like two different systems, but what I am proposing is one system, with two parts. I have already said that these two phases or aspects of TA occur together, and I should add that on more than one problem, they are frequently done by the same people. New continuities are recovered by the development TA process, and then handed over to the maintenance TA effort to be kept track of. Information is often derived by the maintenance effort that will help the development effort. What the traffic analyst needs is one system that has enough flexibility for him to move whichever way his TA problem takes him. It would also be useful if the language we use is one that isn't going to change every few years because some equipment in the basement is being upgraded.

PINSETTER

(U) Several years ago, we began to work on the concept of a Traffic Analysis Workbench System, with the covername PINSETTER. Some of what I have described here comes out of that experience. PINSETTER has been described elsewhere, so I will not spend time on it here. However, I will share with you some of my personal conclusions about PINSETTER, especially those which seem to be pertinent to the future.

(U) There are aspects of traffic analysis which resemble word processing, and a good screen editor seems to go a long way toward putting the analyst in contact with his traffic, letting him rearrange it and touch up the rough edges and garbles the way he (the owner) wants them. It lets him look at the data before he decides what processing to apply to it. It also puts him in a good position to generate reports about his problem, especially the technical reports with technical data embedded in narrative text.

(U) A good toolkit, similar to UNIX and the PINSETTER extensions, is invaluable in providing the traffic analyst with the ability to tailor-make his own flexible processes for large scale manipulation of his traffic.

EO 1.4.(c)
P.L. 86-36

(U) Many of the practical results of PINSETTER, results that found their way into daily applications on specific targets, were not limited to traffic analysis. It became a regular occurrence to hear people from other cryptologic disciplines tell us that much of the UNIX/PINSETTER package for traffic analysts was what they needed, too.

PROBLEMS THAT NEED SOLVING

(U) Among the many problems that need to be solved, I would like to mention two. Both of these are areas that are critical to the future TA Workbench System.

ARCHIVES

(U) Some of our continuities form chains that stretch back to the end of World War II. One of the things that Data Systems people don't like to hear is that we need storage for data whose lifetime must be measured in years, and perhaps decades. Some years ago, there came a time when all of our incoming data went solely into the computers in the basement. It was the culmination of the dreams of a number of people: to take the raw traffic away from the analyst! I don't challenge that decision. It is history. But I must say that on many TA problems around the agency, there are no good records on our known continuities from that date forward, unless there were analysts still keeping some sort of hand records. The philosophy on most computer hosts is that any records not accessed within some period (usually a year or less) are taken off the system.

(U) Even if the data is put onto tape, the medium will deteriorate. Once on tape, the data is "out of sight and out of mind." The software that understands that data will sooner or later disappear or be "improved." Nevertheless, the analysts on that problem are still responsible for that period of time, and may still have to field questions about their targets for that time period. So far, we have dodged this bullet, but sooner or later we will have to face the need for long term archives.

INFREQUENT USE OF PROCESSES

(U) The second problem involves the question of software that is only infrequently used. For example, suppose that one of our larger targets has a major communications change every five or six years. The effect of this change is so great that it interrupts intelligence reporting on that target until the new communications structures are understood and recovered. Each time the change occurs, an intensive effort is therefore mounted to recover our continuities in the shortest possible time.

(U) In the old days, when the special effort was over, everything was bundled up and packed away for retrieval when the next change came along. But how do we handle this now that we have modern data systems support? After five or six years, how much of the software is still useful? Chances are that the data base has been changed, as well as the host on which it resides.

(U) Another example might be the diagnostic techniques to attack a particular kind of callsign system. Once the system in question is solved, how should we preserve the software so that it doesn't need to be reinvented the next time such a system is encountered? Suppose we don't find a similar system for five, or six, or even ten years?

CONCLUSION

(U) I don't offer either my observations or my experiences as criticisms, but rather as areas of traffic analysis support which need to be solved. I have tried to avoid mentioning specific hardware or software, except as examples. A man named Bob Biles taught me long ago that users should never tell computer people what equipment to use.

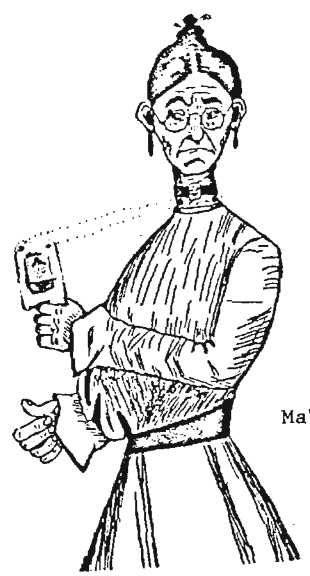
(U) Perhaps traffic analysis has lagged behind other cryptologic disciplines in making full use of modern data systems. But that is changing, thanks to the patience, ingenuity, and hard work of many of you here today. I still keep a supply of pencils around, and I still have a pencil sharpener on my desk--but I have noticed that I don't really use them very much any more.

Dear Editor:

(U) In sympathy with countless NSAers who, through the years have been antagonized, baffled, challenged, demoralized, etc., by countless forms of human and machine language (not to mention the devil's own creation, governmentese), I propose that our new OPS Bulding 2A be christened--at least informally--"The Tower of Babel"!

JOHN J. MOLLICK, B41

[Editor's Note: In keeping with the tradition of naming the streets, auditoriums, etc., in the NSA complex after outstanding individuals, we could always claim that the building had been named after the late, lamented Mabel Babel (19??-1979), one of the Agency's foremost linguists, who spoke fluent governmentese as her native tongue. Her classic work, A Governmentese-English, English-Governmentese Dictionary (now out of print), is still the classic work in the field.]



Mabel Babel

P.L. 86-36

SOLUTION TO NSA-CROSTIC No. 46

[redacted] Memo from the Editor [of CRYPTOLOG to CRYPTOLOG's Puzzle Editor]

"Our Jan-Feb issue will be devoted to the CISI Essay Contest. It would be useful to have a puzzle that has data systems as a base, if you can find a suitable text. Also, I have been contemplating running an April Fool issue. You might be thinking about that..."

NSA-Crostic 47

by DHW

N.S. Norway (1889—1960) was an aeronautical engineer, active during the pioneer days of British aviation. He was also a prolific novelist. Many of his best works are set in the country which became his post-WWII home. Mr. Norway is Word V in this puzzle.

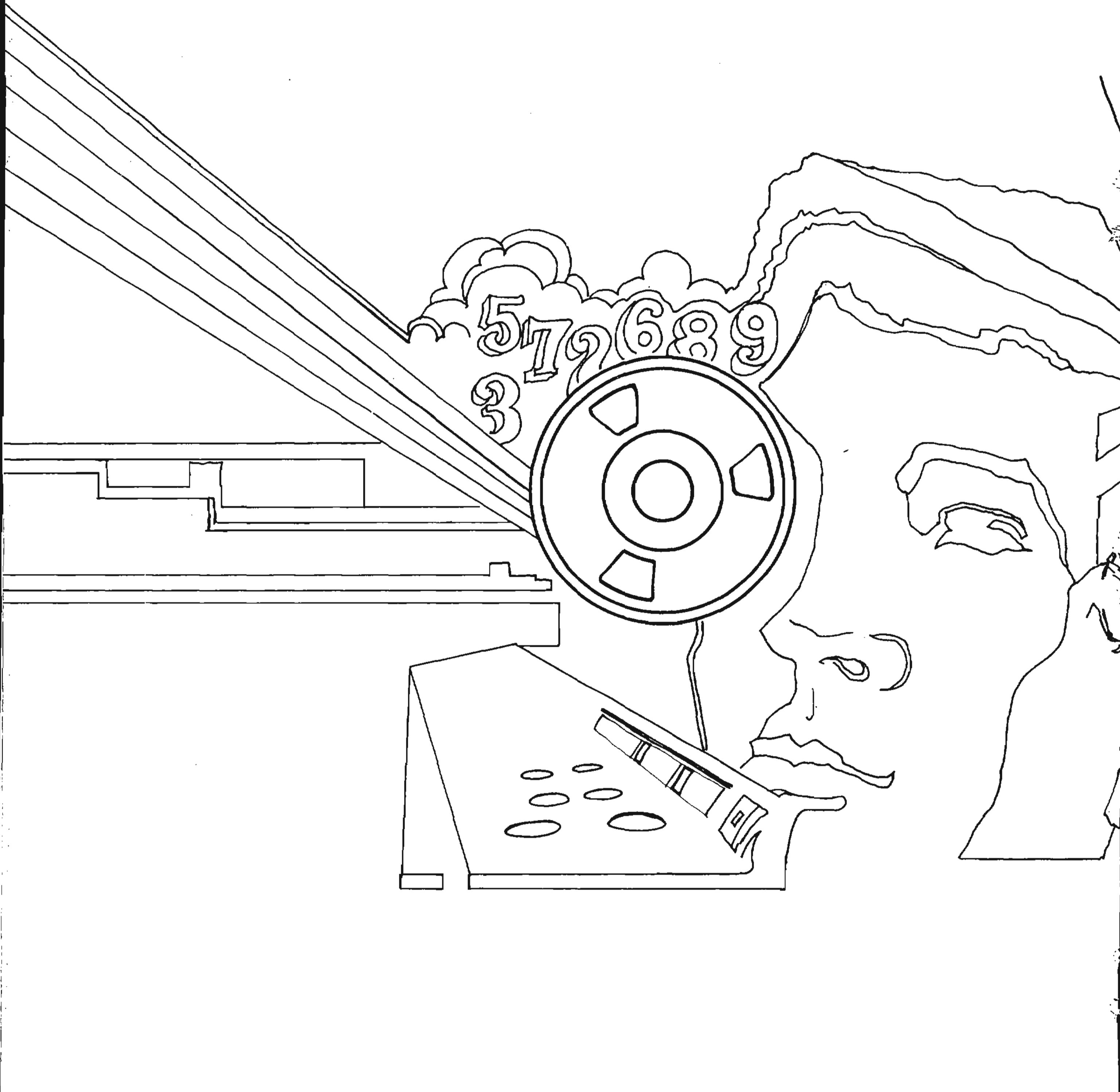
P.L. 86-36

~~FOR OFFICIAL USE ONLY~~

P.L. 86-36

~~FOR OFFICIAL USE ONLY~~

P1-AUG 83-S3-35267


5
7
2
6
8
9
3