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NATIONAL SECURITY AGENCY
FORT GEORGE G. MEADE, MARYLAND

CRYPTOLOG

SEPTEMBER 1976

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The Bible & the Washington MONUMENT
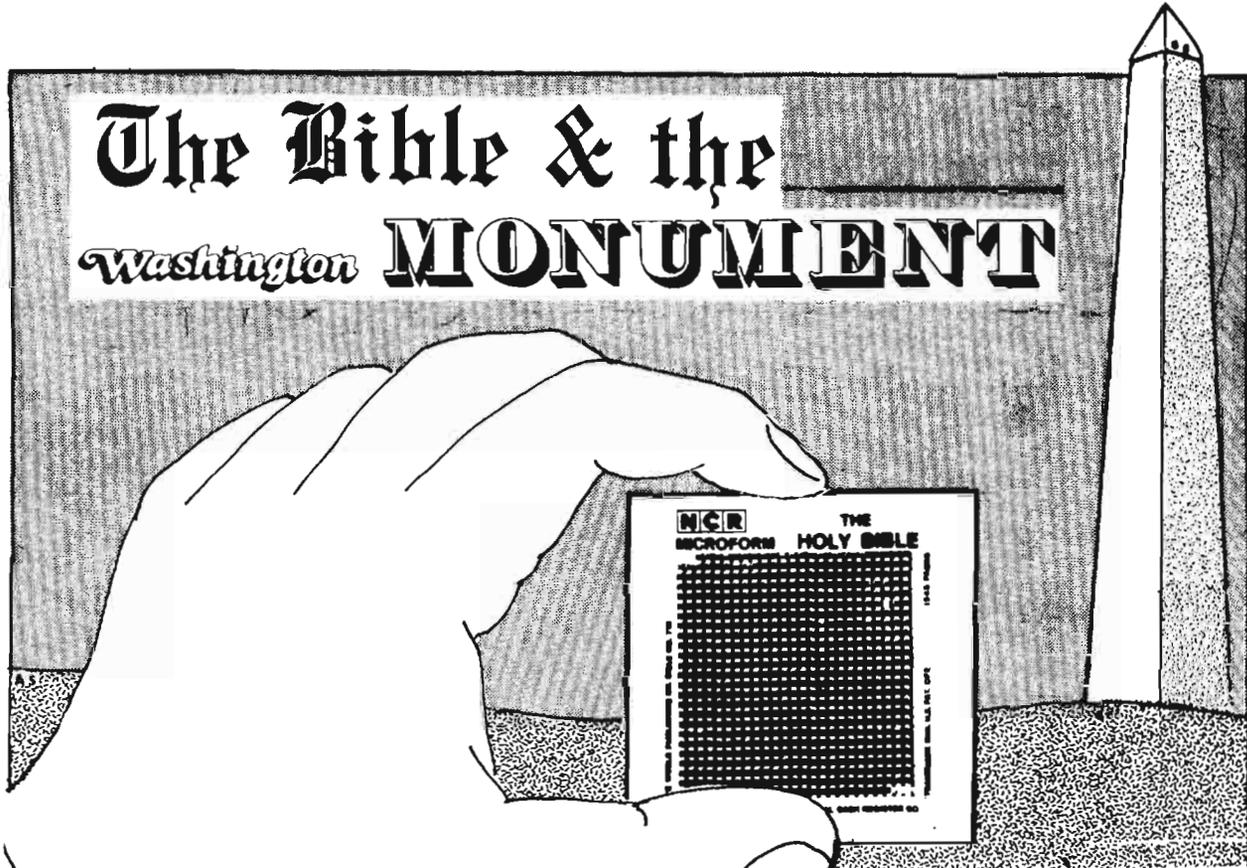
Don Snow, C5
DDO Micrographic Coordinator

For the past 5 years I have carried a microform version of the Bible in my wallet. It's all there -- Old and New Testament -- 1245 pages. And it's on a piece of film 2 inches square. I've found that it's an ideal sample to show people when I talk to them about *MICROGRAPHICS*. They're familiar with what the original book looks like, and they can *hardly believe that it can be reduced to something as small as the above chip, and still be read. That, as the current saying goes, is what Micrographics is all about.

Let's use another example, which almost everyone is familiar with: Would you like to hold the Washington Monument in the palm of your hand? Easy -- just take a picture of it. Now, instead of a shaft of granite over 555 feet high (and weighing many tons), you have a photographically reduced version of it. Now it's one or 2 inches high, and you can take it out of *your* wallet any time you wish, instead of going down to the Mall to look at the "original."

Those two examples, then, explain what Micrographics can do. By means of quality photography, we can obtain greatly reduced versions of "things" -- printed matter or whatever -- and then make as many copies of the reduced version as we need.

Here in the Agency, more and more people are getting into Micrographics. For the most part, they deal with printed matter -- frequently in large volume. Computer print-outs (which often have to be retained and used for long periods), and a welter of reports, technical aids, as well as material received from other originators -- all of the above compound the "information storage and handling" problem.

So, in search of relief, they have entered the world of Micrographics. They have found that "source documents" (which is the term we use for material that has been typed or set in letterpress and then reproduced on paper, in however many copies as needed) can be converted to a suitable microform. Source-document conversion is handled by L23, Reprographics Division.

If, on the other hand, someone has many cabinets full of computer print-outs, Micrographics can help there. The Agency has (in C74) two Computer-Output-Microfilm (COM) recorders. A COM recorder uses a 7-level or 9-level magnetic tape as its input; the information on the tape goes through a mini-computer at the front end for formatting; then it is displayed on a cathode-ray tube, and a camera takes a picture of the complete display. The process is then repeated, until every "page" of information has become a "frame" on the film. The output film can be 16mm or 35 mm film, or 105mm microfiche.

The advantage of COM lies not only in its speed (30,000 to 120,000 characters per *second*) but in the compaction of the information on the output film. For NSA's Family Day I had an exhibit which included: a computer tape of unclassified information; a print-out of the tape which comprised over 2000 11x14" pages; and seven microfiches produced from the same tape by NSA's COM recorder.

Of course, when information is reduced so drastically, there has to be some way of enlarging it to its original dimensions, so that it can be read by the user. For this purpose we have the microform reader, a device which projects a page image onto a screen (usually at the front of the reader). It will remain there until the user manually moves to the next desired image.

If the user wishes to have a paper version of a given page image, he can get one with a reader/printer. This is much the same as a reader, but it has a roll of sensitized paper inside. The user looks at an image on the screen, presses a button, and in about.6 seconds the machine gives him a print of that image. Now the user can underline passages, scribble on the margin, or show that page to someone who doesn't have access to a reader. Naturally, the emphasis should be on the tempo-

rary need for a page-print; to make one or more prints with the idea of filing them away defeats the purpose of micrographics.

There are two main factors which explain why Micrographics is growing daily in importance -- not only at NSA, but throughout the intelligence community, throughout the government, and certainly in the world of business. First, people are realizing that they can convert much of their *dynamic* working materials to microform, rather than use the technology for old or *static* materials which they no longer need within arm's reach in the office.

Secondly, recent years have seen a great improvement in the quality of equipment. Standards are also being developed -- for reduction ratios, formatting, titling, etc. This becomes vital the moment one activity, say, in the intelligence community, begins to exchange material with another in microform. In-house, the Micrographics Systems Coordinating Office (N33/MISCO) has standardized on two models of microfiche readers, which comply with DoD reduction-ratio standards. MISCO also maintains an overview of all Agency micrographic applications, and represents NSA on a number of inter-Agency micrographics working groups and committees.

To sum up, Micrographics is one of the newer technologies to hit the work force. It's a space-saver; it's a money-saver; it's a time-saver. No longer confined to archival or "dead-storage" material, it is finding its place in the work pattern of more people every day.

Look around you. The file cabinets, the storage cabinets, even the drawers of your desk -- they're all chock-full of paper. Chances are that a lot of that paper could be converted to microform. And it would be just as usable.

Think about it. Then do something about it. Enter the world of Micrographics!

(UNCLASSIFIED)

Want a copy?
...of the 1974–1976 Cumulative Index?

As the end of Volume III approaches, it has become apparent that the cumulative cross-indexed listing of CRYPTOLOG articles and authors' names will be too long to print as part of the December issue. Therefore we shall print the index as a separate publication.

For reasons of economy, we shall print only the number of copies actually requested.

If you would like to receive a copy of the index, please fill out and mail the following form. (If you do not want to cut up this issue of CRYPTOLOG, just write "Index" and your name and organization on a plain piece of paper.)

- -

TO: P1, CRYPTOLOG   Please send ___ copy/copies of CRYPTOLOG Index to:

_____   _____
                (Name)   (Organization)
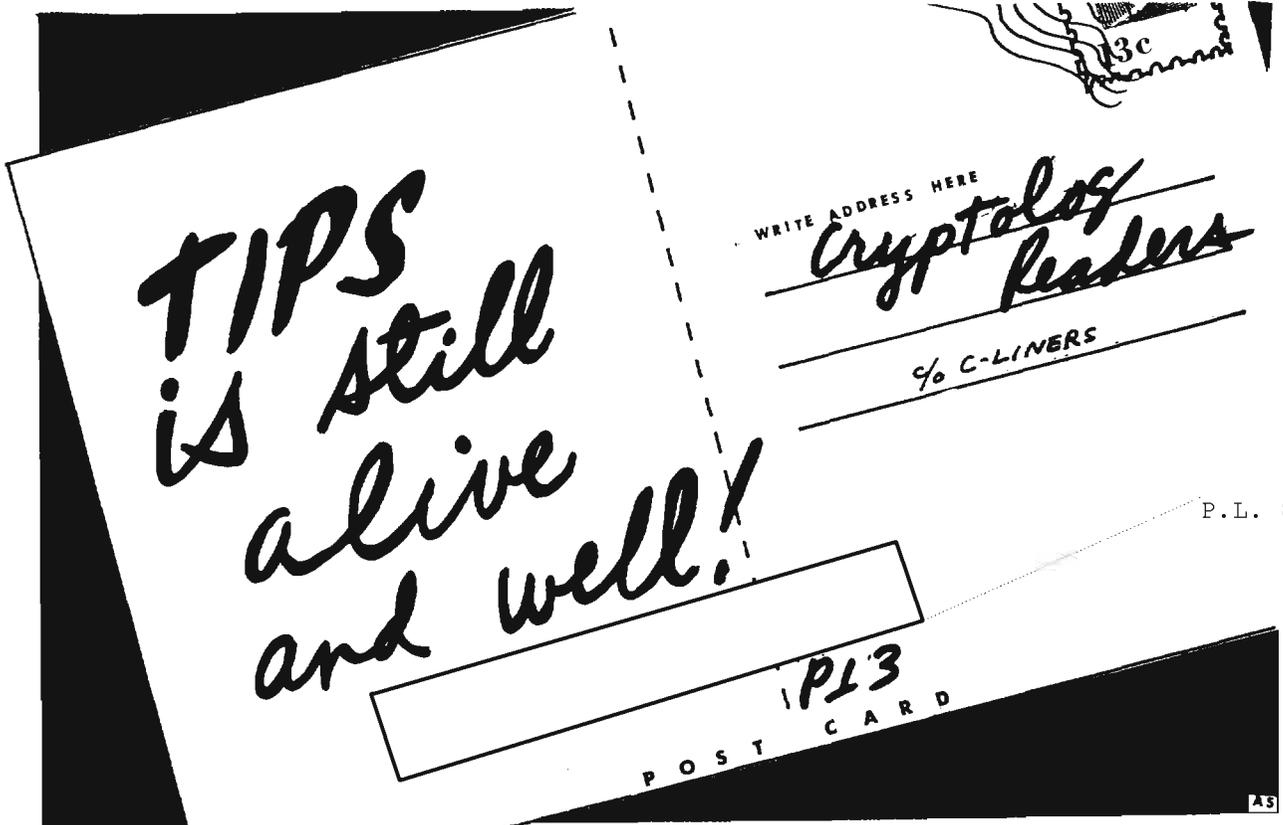
TIPS is still alive and well!

WRITE ADDRESS HERE

Cryptolog Readers

c/o C-LINERS

PL3

POST CARD

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As was the case with Mark Twain, reports you might have heard about the demise of TIPS -- NSA's Technical Information Processing System -- have undoubtedly been grossly exaggerated.

True, TIPS is showing signs of aging. After all, she has been around since the mid-Sixties. To some, such longevity should qualify her for some kind of geriatric support. To others, notably some folks in C11 (the Information Systems Division of C), the old girl is still very much alive. Admittedly, a young and more glamorous replacement is being sought. Nobody knows when this rival will be embodied (or "em-machined") but she is coming and plans are being made for her arrival.

At this stage in her career, then, one feels it would be a good time to record a few random thoughts about TIPS. A few words of background information may be in order for those not in the category of C Old-timers. First, a more or less official definition:

TIPS is a part of RYE, ☐ ☐ The TIPS system encompasses the hardware devices, software executive routines, conventions, communications package, and data bases in support of the quick-turnaround, on-line, information storage and retrieval capability within RYE. (See Section 4, of forthcoming USSID 703, Technical Information Processing System (TIPS), for general information about this system.)

Chances are that, as a RYE user, you've already "interfaced" with the most common of these input devices, the lowly teletype. The manufacturer is the Teletype Corporation of America, and the most common terminal type (for RYE) is the ASR (Automatic Send and Receive)
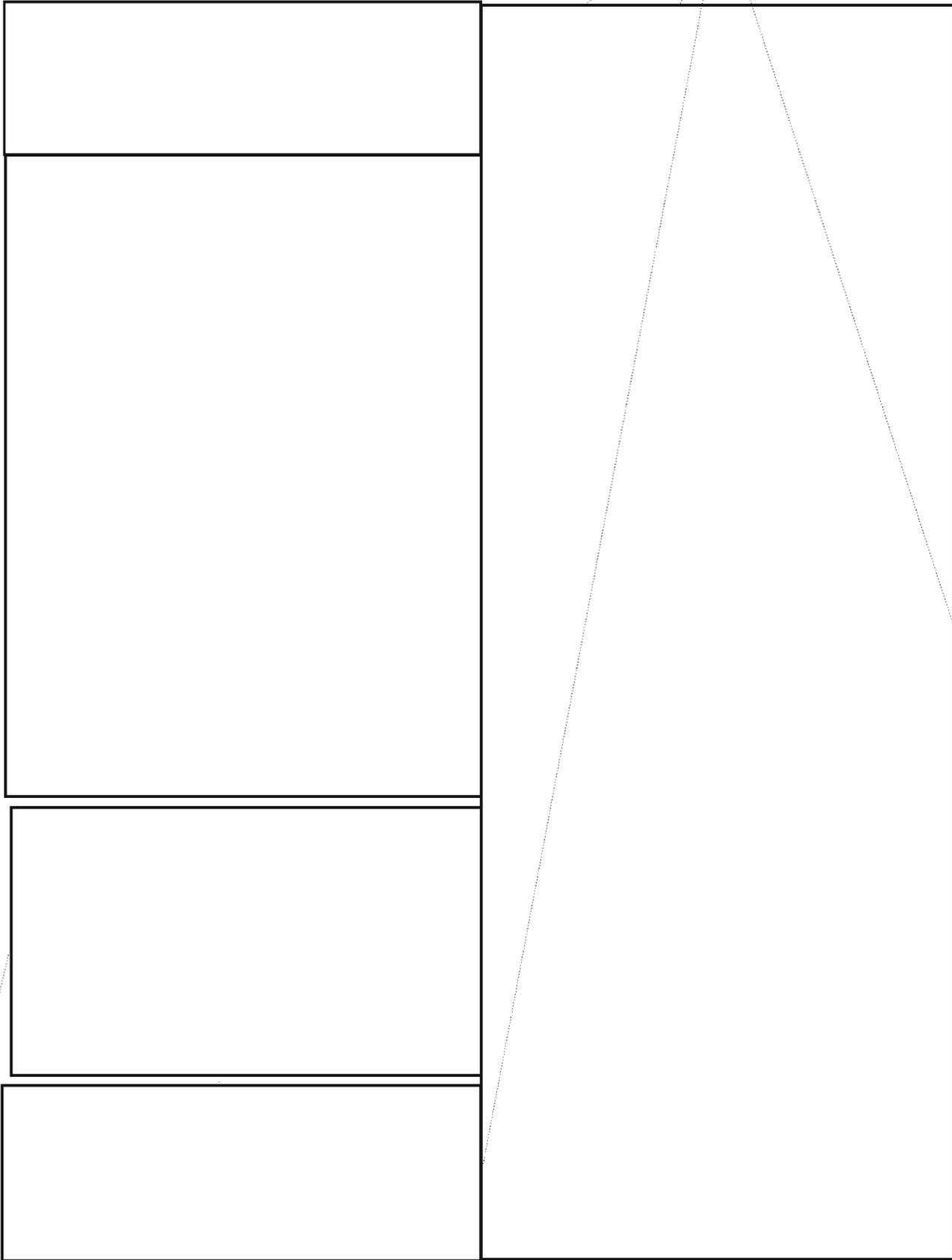
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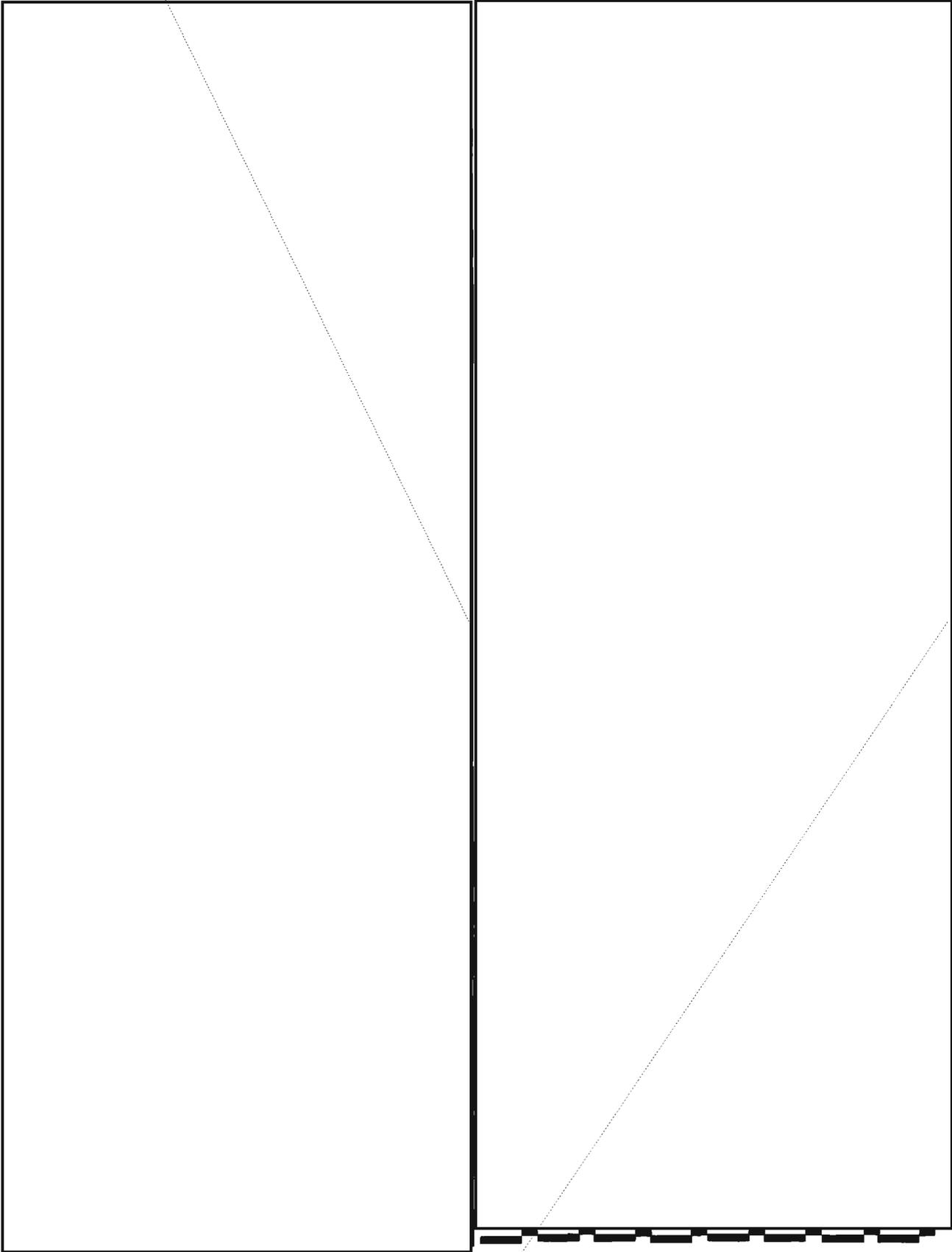
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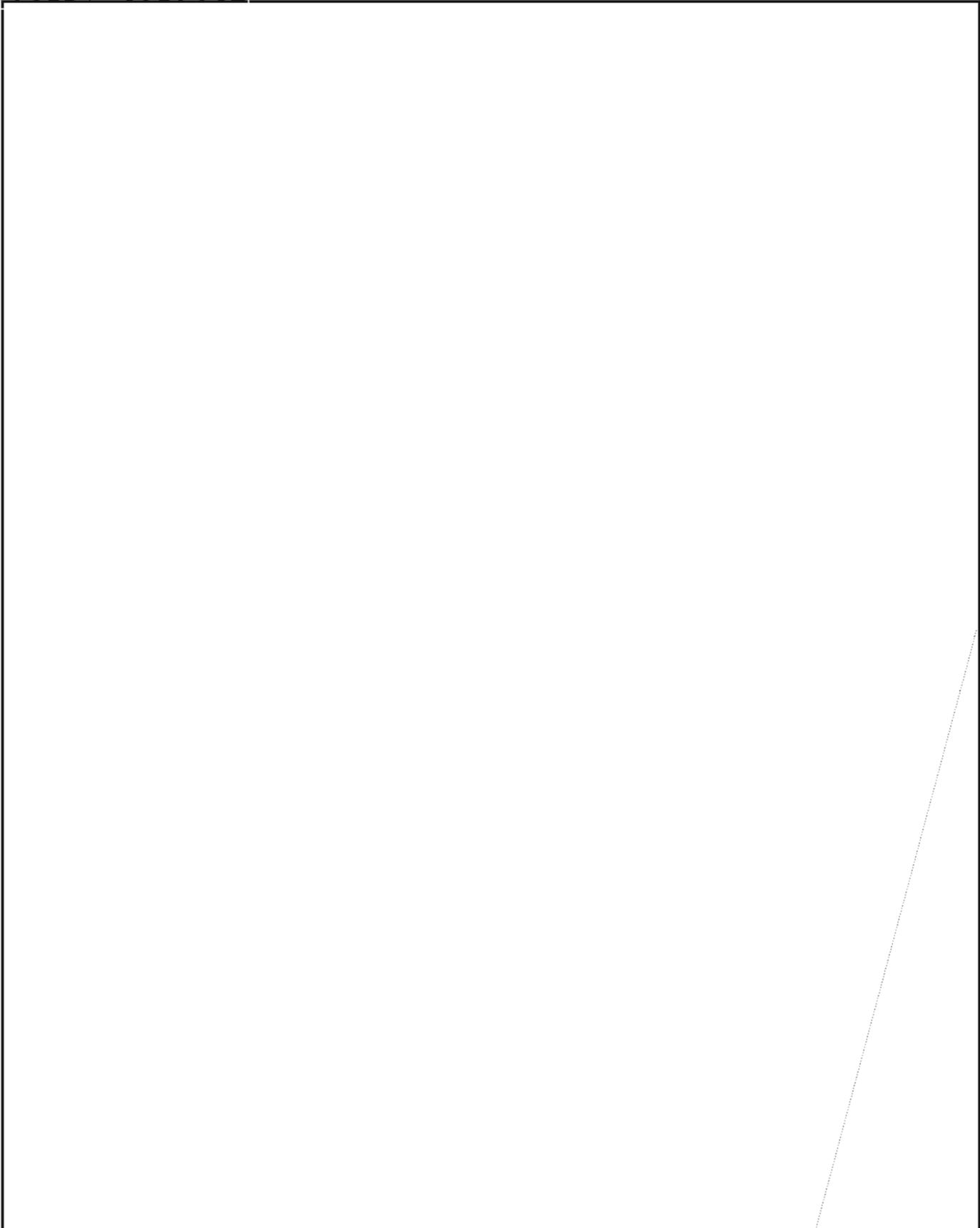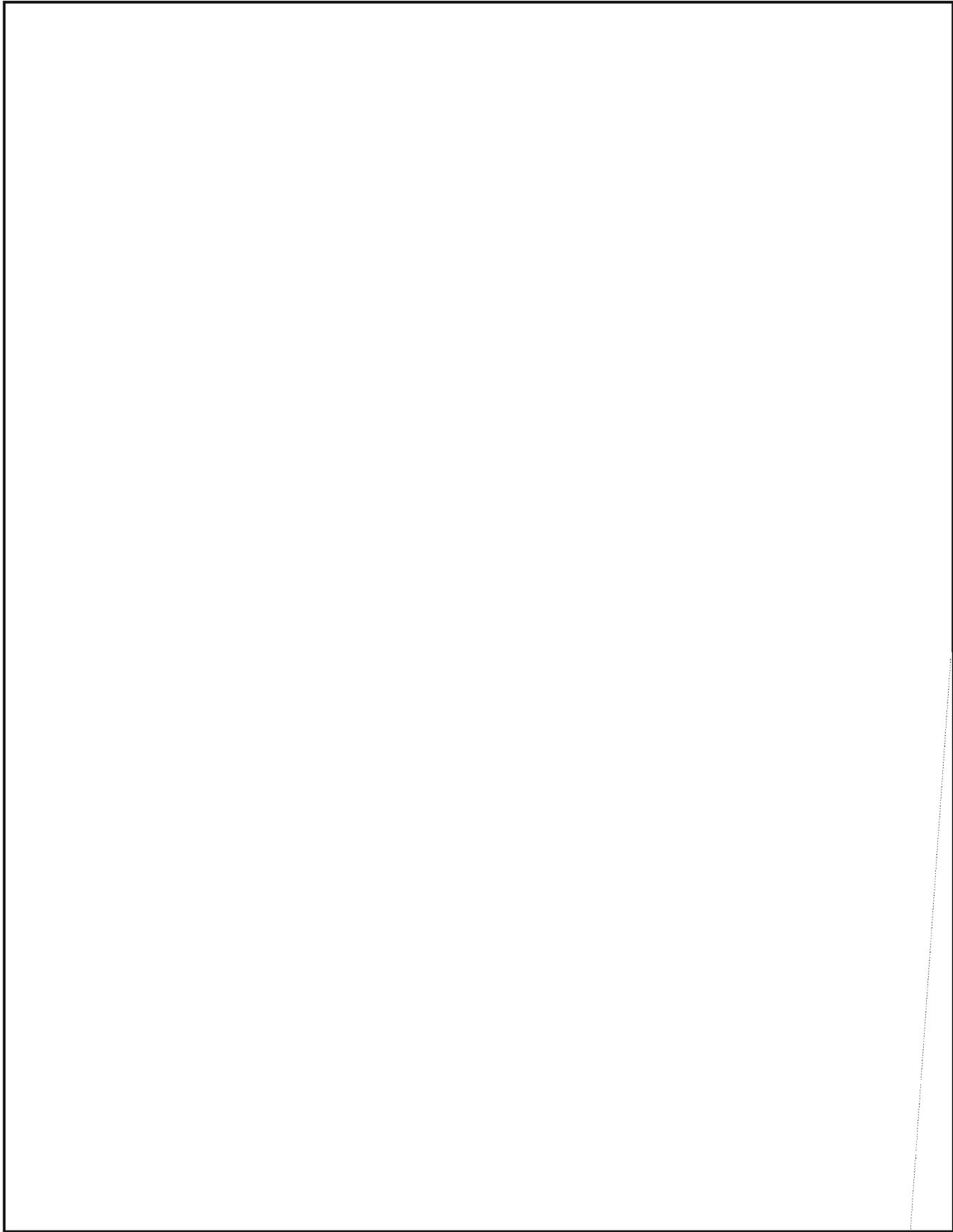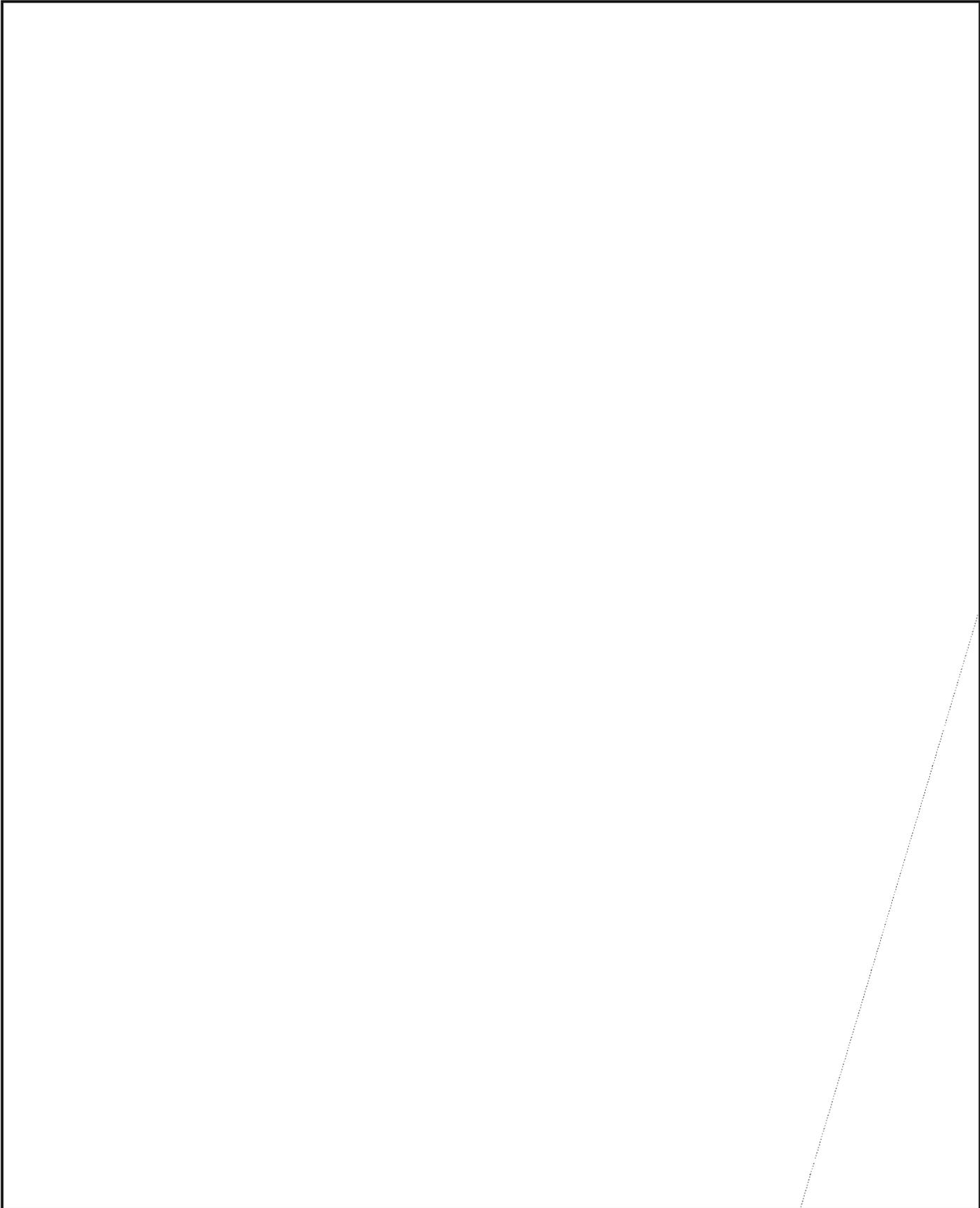
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IS THERE LIFE AFTER CERTIFICATION?
John J. Mollick, B24   (UNCLASSIFIED)

What happens to the linguist after he or
she (from now on, for convenience, let's just
say "he") has become certified as a level-III
professional linguist? Does he stay at that
level forever? Or does he continue to develop
his language skills? Does he strive for some-
thing *better than* level-III proficiency? If
he does, what is it that he's striving for?
An as yet undefined level-*IV* proficiency? Or
for the unofficial title of "superlinguist,"
"language consultant," "language whiz," or
some other informal name that indicates that
he is recognized, among certified linguists, as
someone who *really* knows the foreign language
thoroughly? When and how does a person get
that recognition from his peers? Can criteria
be established for making that recognition
formal, with some kind of *official* title to
accompany it? These are only some of the ques-
tions that are being discussed by an ad-hoc
committee that was recently empowered to advise
the Language Career Panel on problems of devel-
oping the skills of the Agency's certified
linguists.

It seemed reasonable to us committee members
to ask certified linguists themselves for their
opinions about matters involving them, on which
we would be making recommendations. Therefore,
as one member of the committee, I decided to
take an informal poll

The poll was very informal. I improvised
casually and typed sloppily (personally, I find
it easier to be a level-III linguist than a

level-II typist) a questionnaire that I sent to
50 people I know
As of this writing (June 1976) I have received
18 replies. No one would dare to state that the
opinions
necessarily represent the feelings of most of
the Agency's linguists. I do think, however,
that their opinions are enlightening. Therefore
I am summarizing their replies here, in order to
demonstrate how at least a representative hand-
ful of the Agency's linguists feel about their
chosen field of professionalization and in order
to invite other linguists to share their ideas
with me. I will welcome any additional views
and will channel them into the committee's dis-
cussions. In that way we can be assured that
the suggestions we submit to the Language Car-
eer Panel will take into consideration the
input provided by linguists themselves.

Of the linguists who replied to the original
questionnaire, 14 had been certified; 3 hoped
to be in the future. Of those certified, 6
felt that they could easily pass
language PQE (Professional Qualification Exami-
nation); 8 had doubts.

In response to the question of how they main-
tain their language proficiency, 14 stated that
they rely on the work environment; 8 also do some
studying at home; only 3 rely on in-house
training. Seven feel that additional language
training would aid them substantially in doing
better work in their present jobs; 11 did not
feel that way. Furthermore, 9 feel that their
language abilities are equal to the demands of

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the job; 2 feel undertrained; 7 feel over-trained.

Regarding their future in the language field, 17 linguists said that they greatly enjoy language work. Sixteen gave qualified affirmative answers when asked if they *desired* to remain in language-oriented jobs. Most of the qualifications concerned the need for career progression, recognition, and variety in work. Several individuals flatly stated that they believe one can remain a linguist only if he is willing to sacrifice the financial rewards, since "management is the route to take for higher grade." Not surprisingly, then, only about half the linguists felt that they would stay in the language field.

Thirteen linguists were against the formal establishment of a level IV for language checkers and consultants; only 4 favored it. Objections generally concerned the following:

- The experts have long been identified and already are checkers and language consultants. Therefore the establishment of additional criteria and testing will just waste more time both on the part of those administering the tests and those linguists who would be forced into "nonproductive study at the expense of the job, merely to reach another meaningless milestone";

- After establishment of level IV, linguists would feel pressured to reach that level. Eventually the standards would be dropped to accommodate linguists who just cannot meet high standards. *Then we would find ourselves in a situation similar to that which currently exists -- except that there would be a number of level-IV linguists and people would be discussing the desirability of establishing level V for "the real experts."*

The above objections apparently would be mollified if the attainment of level IV were limited to the few truly superior linguists, and if their excellence were adequately recognized and rewarded. Those favoring the level IV seemed to confirm this. They suggested that level IV would give career linguists "something to shoot for," but that it would be worthwhile only if it promised an opportunity for upper-level grade advancement and if the criteria were kept sufficiently stringent, in order to limit the level-IV ranks to a very small handful of genuine experts.

Only one person favored the "grandpersoning in" of "recognized experts." All others were adamantly against any such "free rides." However, several asked the rhetorical question, "Who, then, creates and checks the tests?" Some doubt was expressed that an effective level-IV

test could indeed be created. It was indicated that perhaps there would be a need for criteria other than formal testing if a level IV were to be established. One linguist suggested an "open-ended PQE test" in which the highest scores would be selected for the few level-IV billets.

Fourteen linguists stated that they feel periodic rotations into other language jobs are advisable. Most emphasized that rotations should be optional, rather than mandatory. Only six would consider crosstraining from [____] into another language.

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The questions that elicited the strongest comments were those asking for proposals on how to increase the linguists' satisfaction with their jobs and improve their working lives. For the most part, the diverse answers can be divided into the following categories:

- *Recognition*

  Most linguists specified that they want recognition above all else. A number felt that lack of recognition of the worth of linguists is evident in the inability of Agency linguists to compete successfully with managers or others for promotion. Despite almost unanimous complaints about lack of recognition, few specific suggestions were made regarding how that recognition should be shown, except for boosting pride of authorship by putting the linguists' or analysts' names or numbers on products to which they have contributed. Most linguists stated in one way or another that they feel management does not recognize the significant role that the linguist plays. This desire for recognition leads logically to the next desire.

- *Pay*

  Again, there was almost complete unanimity that people cannot advance far enough in the language field. The theme "eliminate the need for linguists to leave the language field in order to progress beyond the GG-12/GG-13 level" was a common denominator in the linguists' replies. One individual suggested, "Senior technicians should be equal to middle and upper level managers. The work is equally demanding; the output is as important to the mission of NSA." Another suggested that there is no valid reason why a "GG-12 linguist cannot work for a GG-9 manager."

- *Training*

  Many linguists recognized the need for language maintenance and for continual training. Some suggested occasional sabbaticals to local universities both for training and as a sign of recognition. Several suggested the need for additional overseas training in the "native environment." Few felt

ANOTHER CIPHER BY WILLIAM MEYER
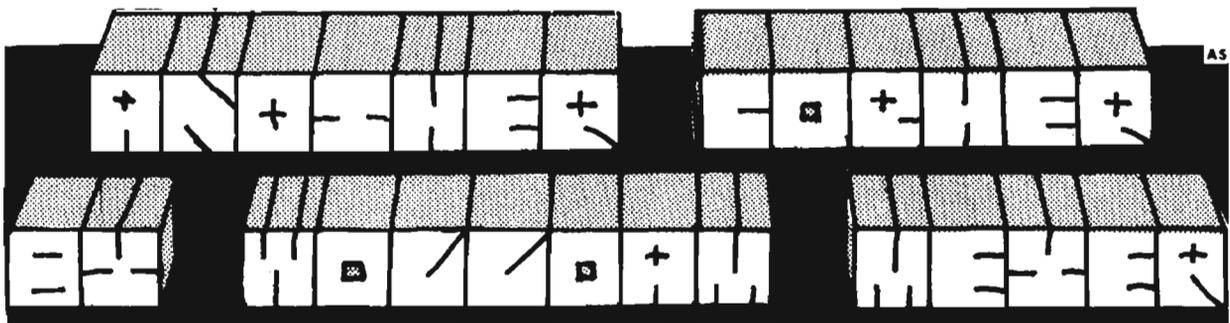
While taking Mechanical Drawing in high school, I became interested in the various styles of lettering and printing. At that time the heavy block letters were popular. You can still notice the influence today in the letters on school sweaters and jackets.

See how easy it is to develop this alphabet within the blocks. "Form follows function," as the art teachers say. (Or used to say.)

A B C D E F G

H I J K L M N

O P Q R S T U

V W X Y Z
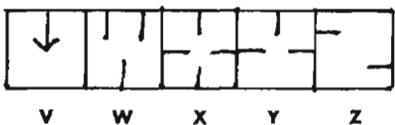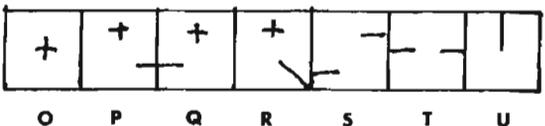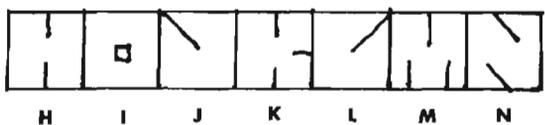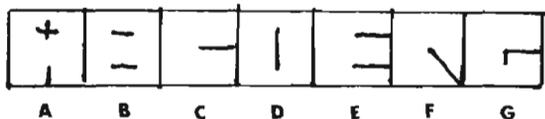
The letters were fairly easy to read, but it was very time-consuming to draw the blocks before writing your message. So I took the next step and abolished the squares. I just drew the marks and let my mind supply the blocks around them:


A B C D E   etc.

It didn't take long for my friends and me to become adept at our "secret cipher," but several refinements soon crept into the system (some to remove ambiguities, and others to increase ease in writing):

B E K X Y

(NO CHANGE)

X
(PLAIN
TEXT)
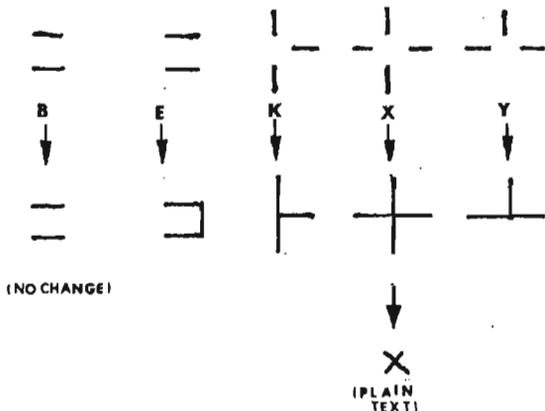
The cipher is simple and fast to write, and extremely easy to learn. Practice it with the following message. Trace the first few words until you get the hang of it. Just keep in mind that you are mentally supplying the square around each letter, and you will be able to visualize each letter easily.

After you learn the cipher, amaze your coworkers! Or teach your children, so that they can send "secret messages" to their friends when they should be listening to the teacher.
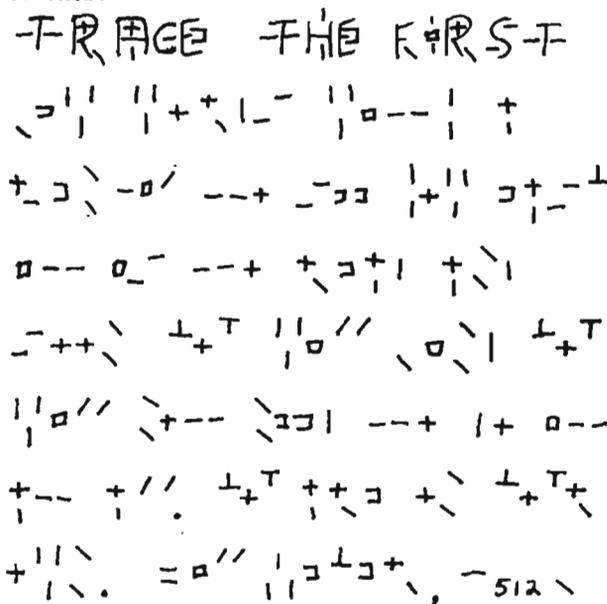
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...And _Still_ More Comments!
(On the AG-22/IATS Question)

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Issue No. 30

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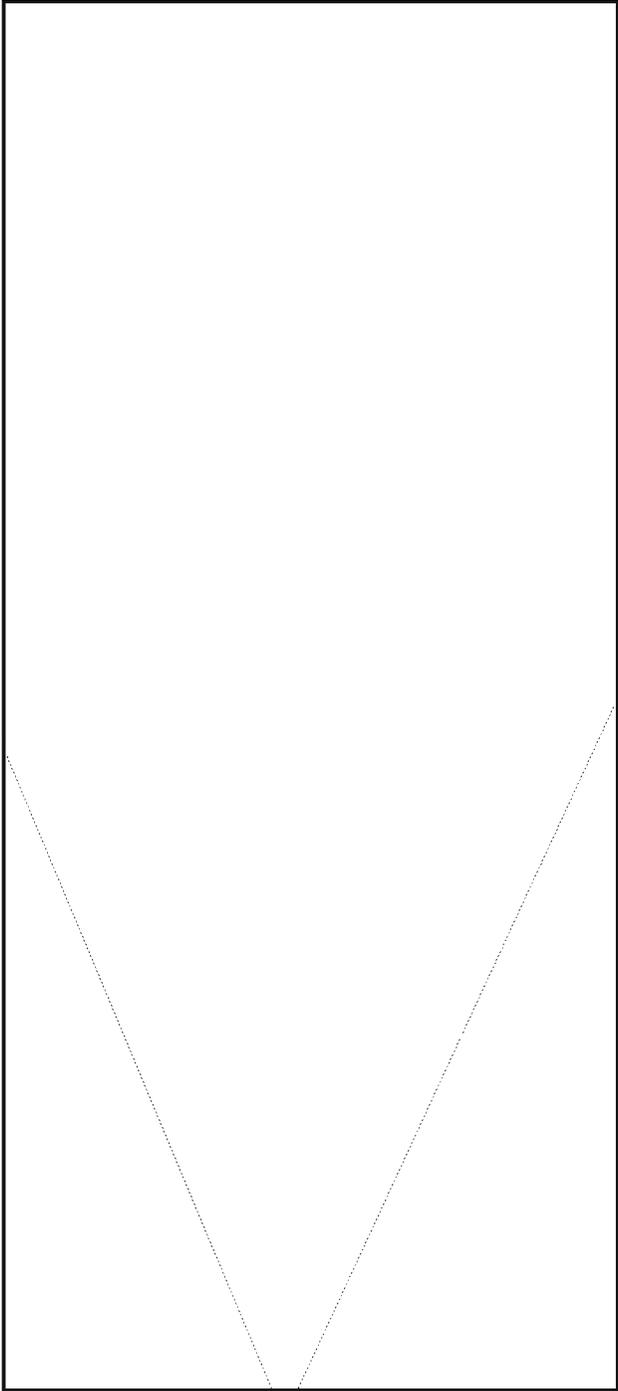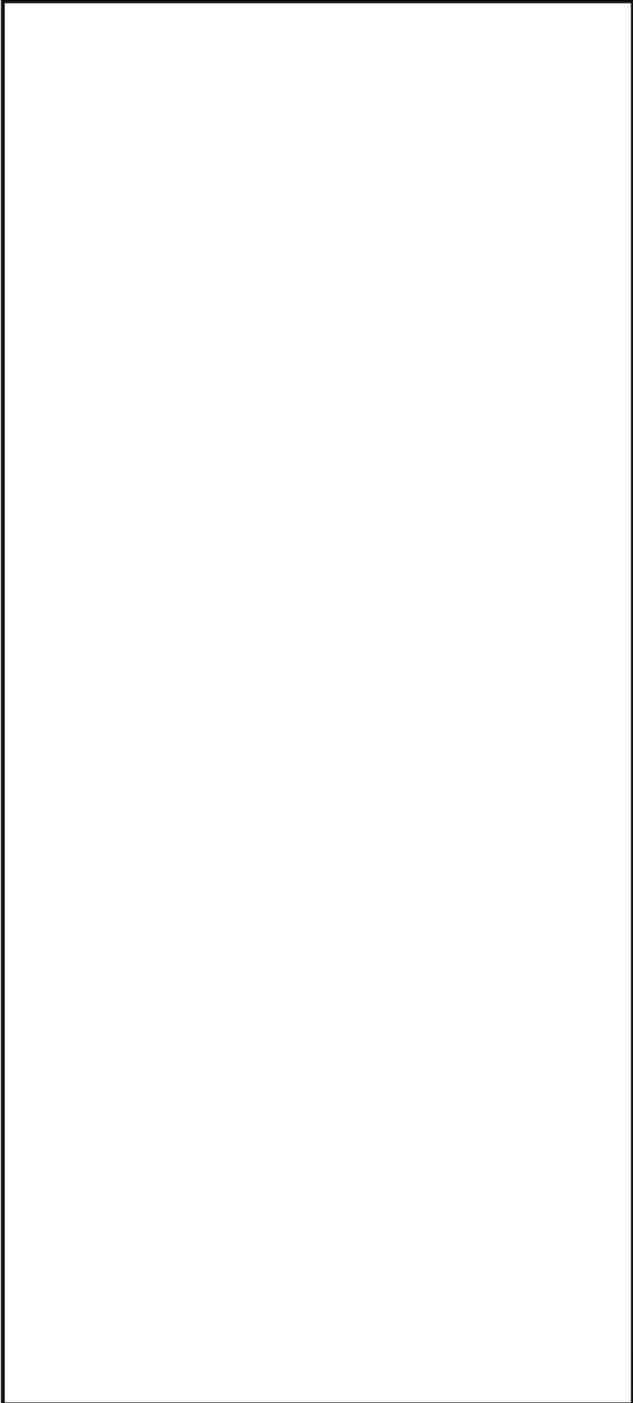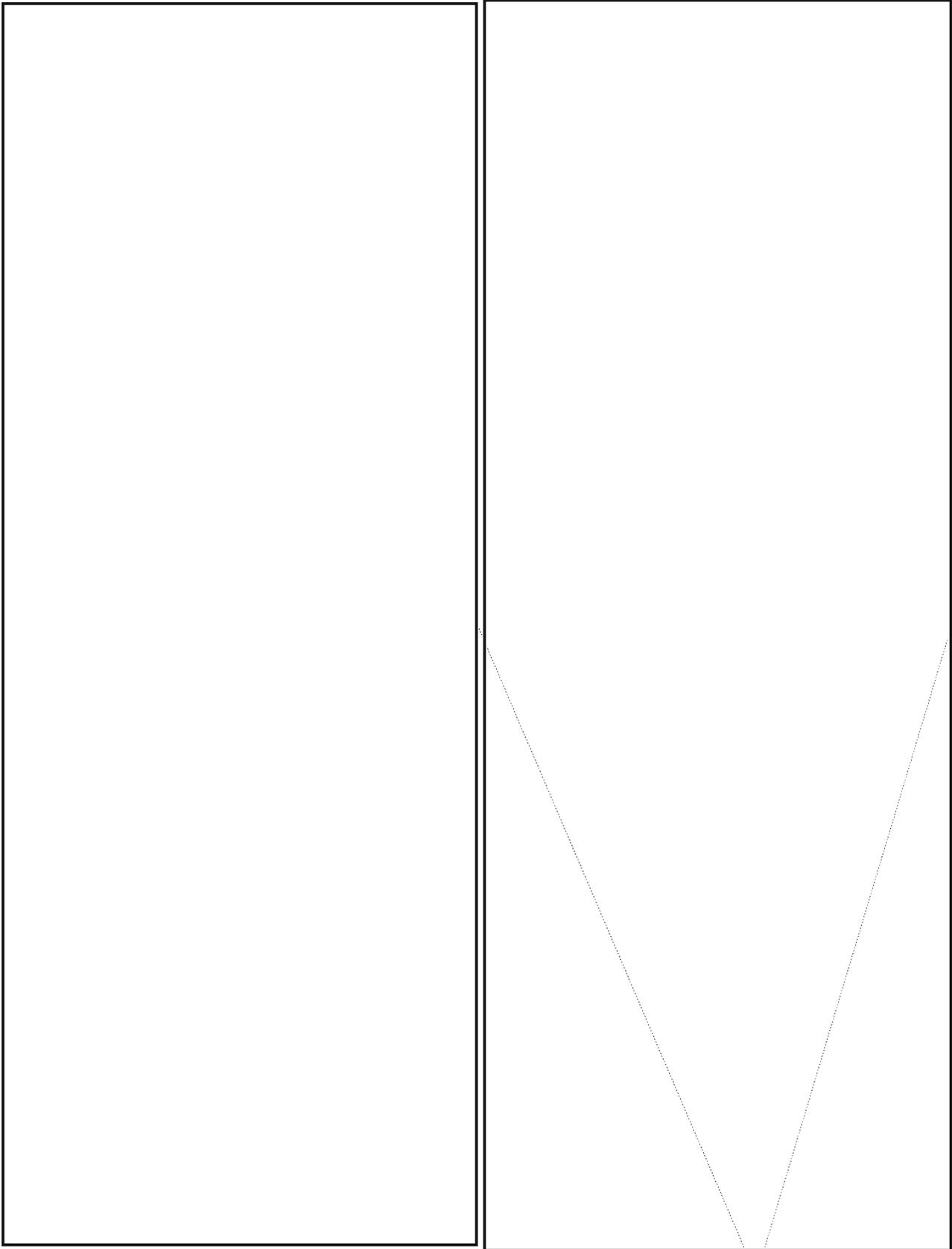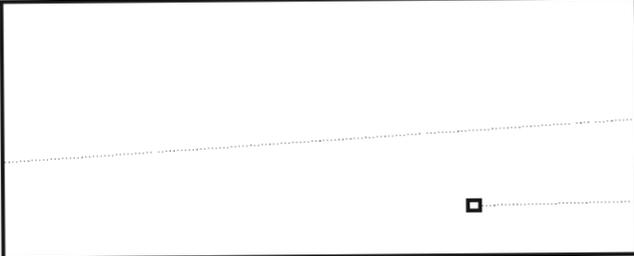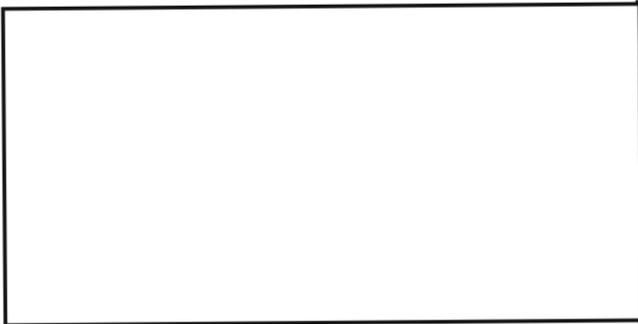
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(SECRET - CCO)

...after certification?

[Continued from page 10]

that present programs in the training school could be of any use to them. It was suggested that making it easier for linguists to transfer to other language jobs and the creating of special language teams that could be used in various language crises would be both educational and good for morale.

One troublesome item has been brought up since the basic questionnaire was issued. Is the periodic retesting of professional linguists an effective, albeit negative, incentive for linguists to maintain a high level of capability? I have some very strong feelings about this question, but I think the committee definitely needs input from the Agency's linguists.

What does all this mean? I reiterate that a poll of such a small number of persons may not be an accurate barometer of the feelings of the majority. I do feel, however, that this poll reveals there is strong desire by at least a segment of the Agency's linguists for change, and that the linguists' feelings should be taken into consideration when discussing changes that will affect their future. If this article has provoked you, the reader, to want to comment, please send your ideas, gripes, threats, etc. to me as soon as possible (our committee will be submitting its recommendations in September or October). I'll make sure that the rest of the committee members know your feelings. Send your comments to:

John J. Mollick
B24, Room 5A107

(UNCLASSIFIED)

CRYPTO-MATHEMATICS INSTITUTE

Awards to the winners of the 1976 CMI Annual Essay Contest were made by President-elect Glenn Stahly, R5, at the annual banquet held at Goddard Space Flight Center on 18 June 1976.

Instead of the usual first prize ($100) and second prize ($50), an award of $75 was made to each of two authors tying for first place:

[ ] R5: "A Measurement of Insecurity for Imperfect Erasure" (U),

[ ] G4: "A Variable Length Output String PTAH" (title U, paper S).

Third prize ($25) was awarded to the authors of the following joint essay:

[ ] R5: [ ] (title S, paper TSC).

The prize-winning essays have been released (within limits dictated by classification and need-to-know) by the sponsoring organizations indicated, but have not yet been published in journals.

(SECRET)

CRYPTO-LINGUISTICS ASSOCIATION

The following awards in the 1976 CLA Annual Essay Contest were made at the annual CLA banquet held at the Trojan Horse Restaurant on 27 May 1976.

First prize ($100):
Doris E. Miller, P16 (retired): "Language as a Bulk Commodity" (title U, paper TSC), *NSA Technical Journal*, Vol. XX, No. 3, Summer 1975.

Second prize ($50):
[ ] G95: "RAPIDTRAN: [ ] (title S, paper TSC), *CRYPTOLOG*, July 1975.

Third Prize ($25):
John B. Thomas, Jr., A9: "A Fix for the Language Problem?" (title U, paper S), *CRYPTO-LOG*, August-September 1975.

Honorable mention:
[ ] "To Pull a 'Ponyal'" (title U, paper TSC), *CRYPTOLOG*, March 1976.
[ ] P16 (retired): "Freedom in Translation" (U), to be published in *NSA Technical Journal*.

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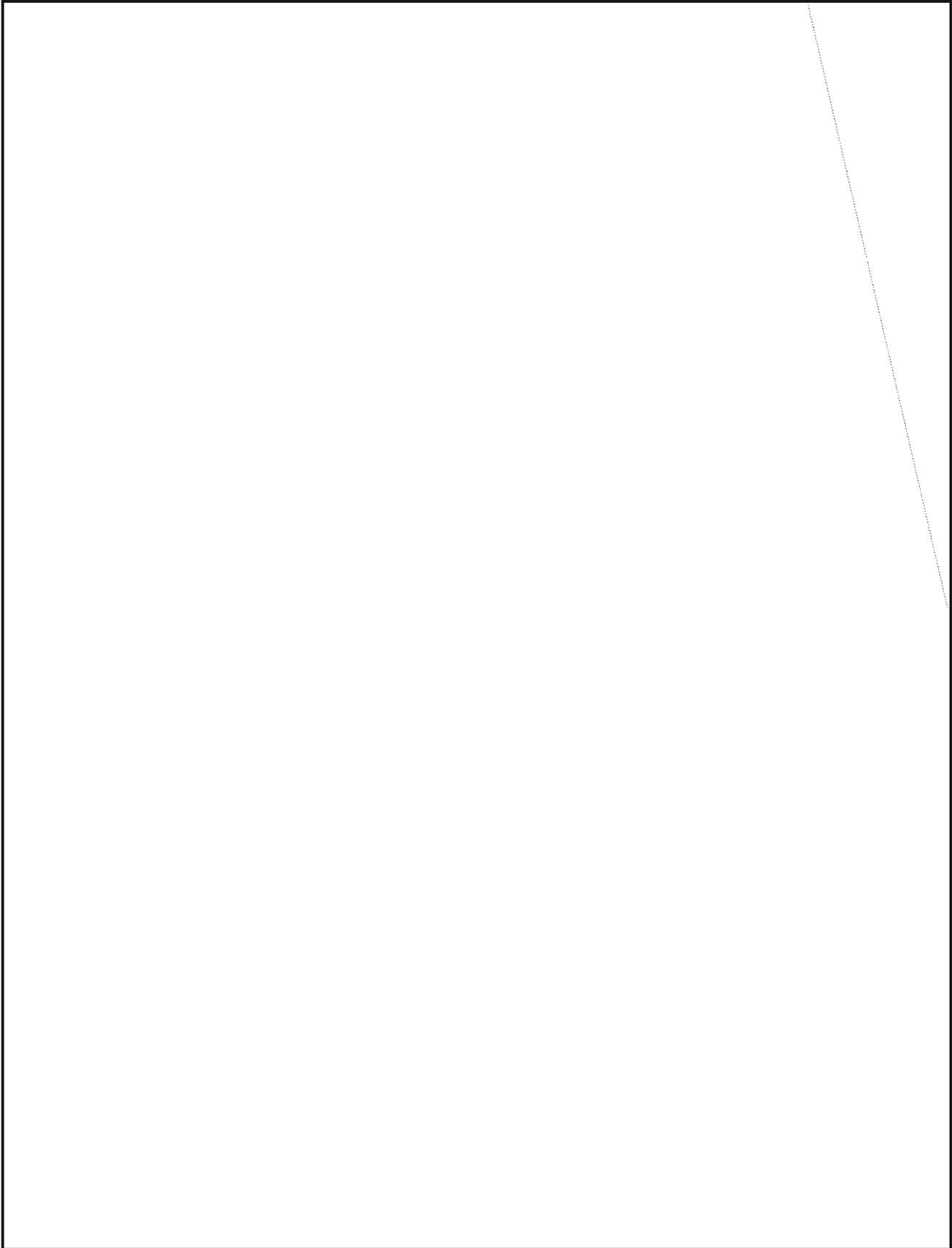
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MACHINE-PRODUCED AIDS FOR THE LINGUIST

The following article is a slightly revised and updated version of the article "Machine-Produced Language Aids," which appeared in the NSA Technical Journal, Vol. XV, No. 3, Summer 1970.

A. J. Salemme, P16
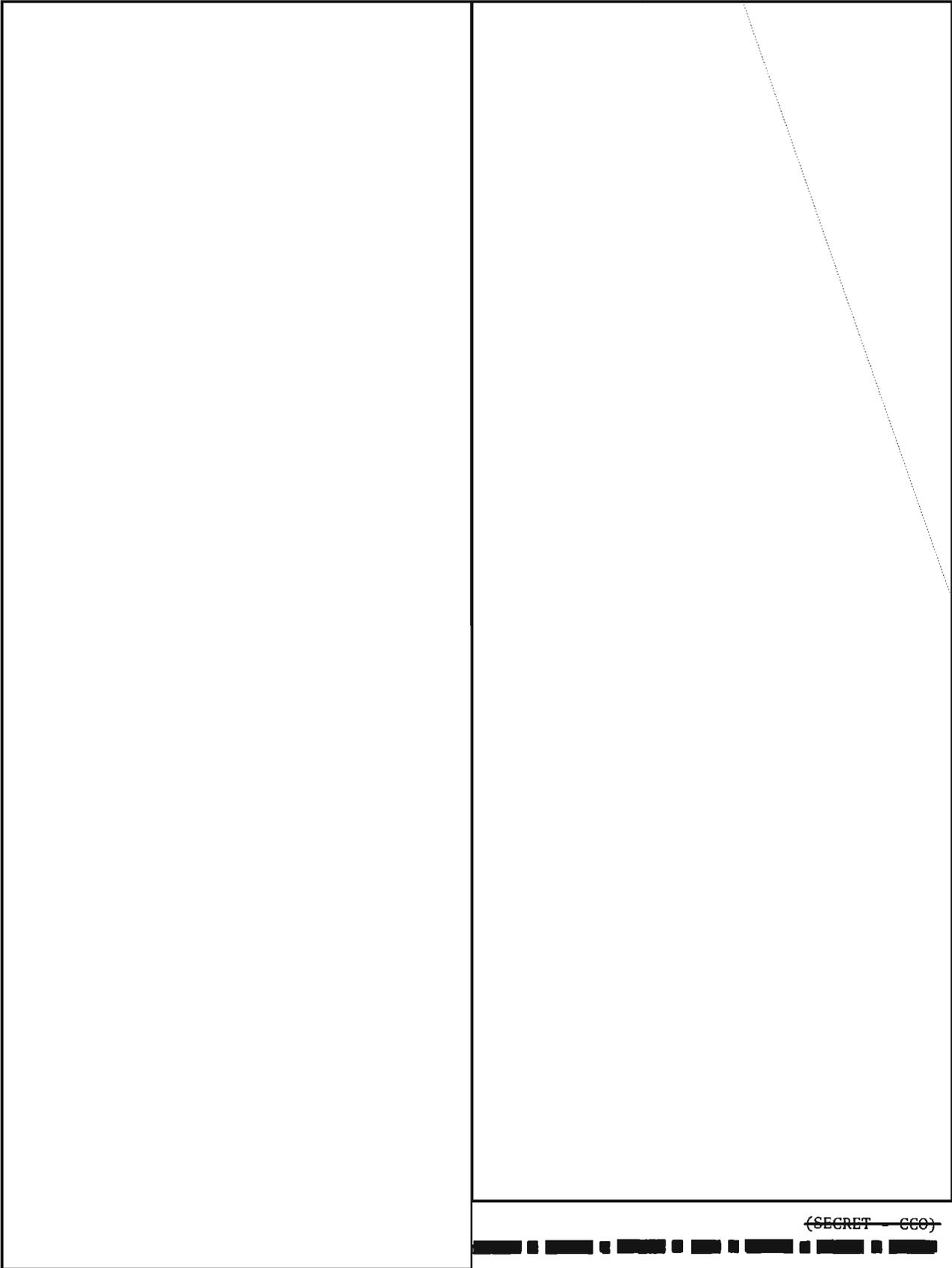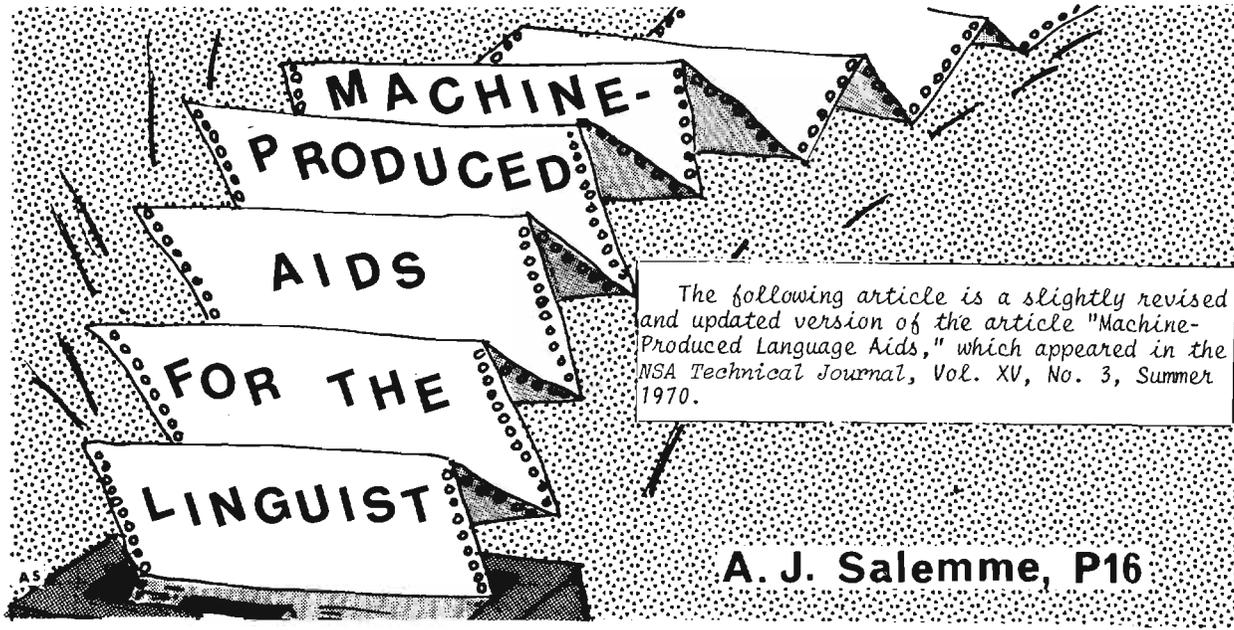
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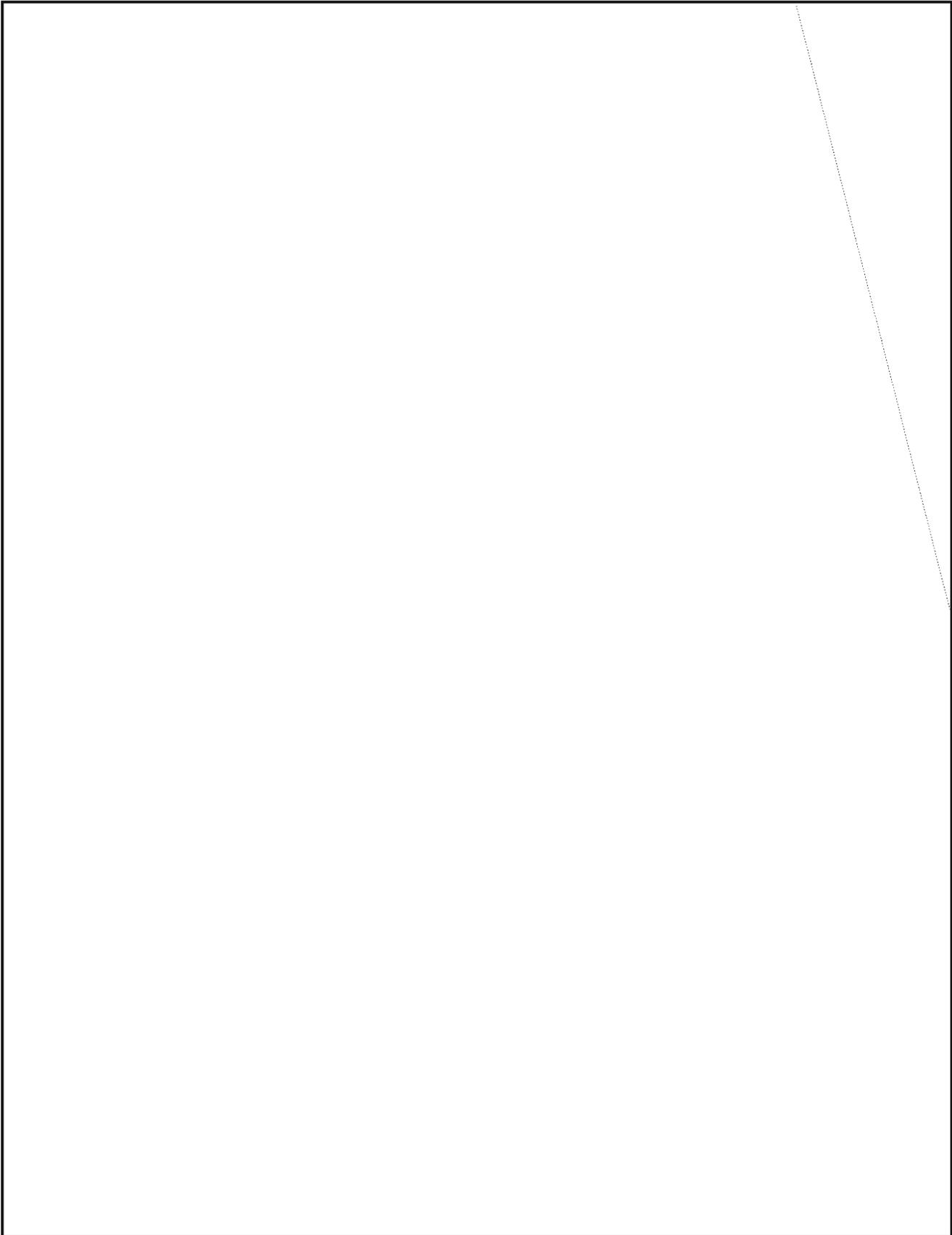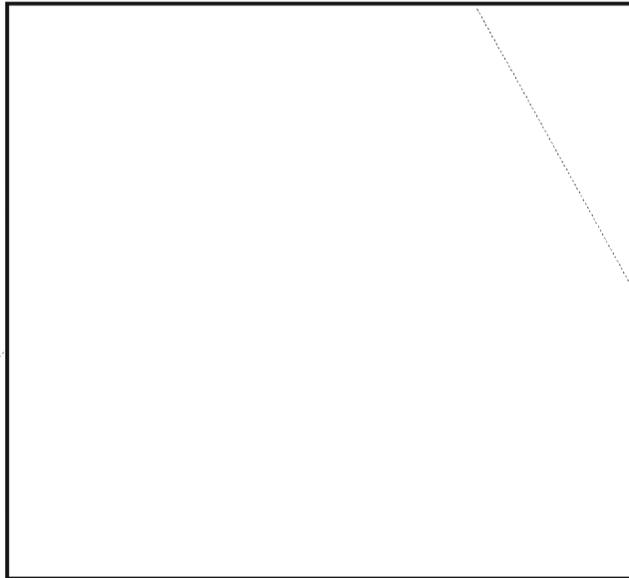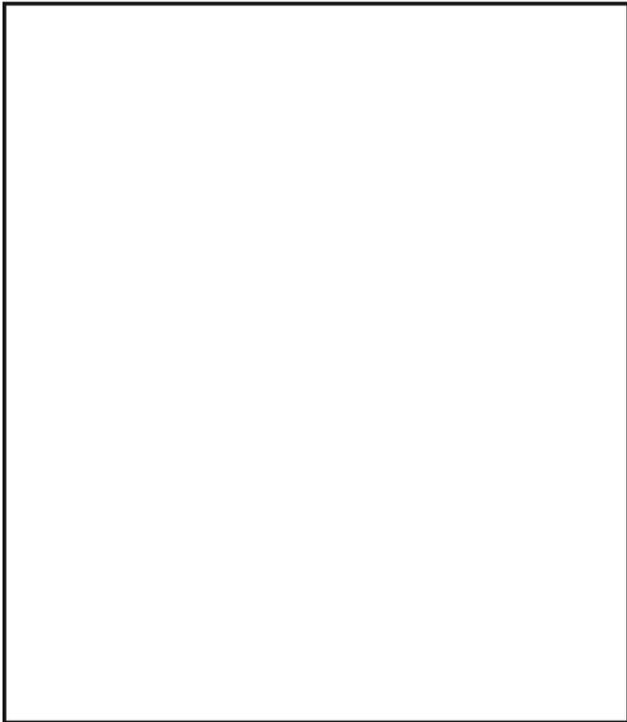
(TOP SECRET UMBRA)

(To be concluded next month)

Language in the News

Only 10% of the universities and colleges in this country now require one foreign language for admission.

Time was when a student had to show knowledge of two foreign languages before he or she was admitted to many accredited U.S. universities.

Since 1963 the number of undergraduate students studying foreign languages has declined steadily. Less than 20% of contemporary high school graduates know a foreign tongue.

Why the change?

One quick answer is that educators are more concerned with teaching students how to structure and write a correct sentence in English than they are in French or Spanish.

AT LONG LAST After 30 years of stationing troops in West Germany, the U.S. Army has finally begun to teach its soldiers German. It is the pet project of Gen. George S. Blanchard, once an outstanding West Point fullback.

Beginning July 2, all new batallion, brigade and division commanders will take 120 hours of German before they assume their positions in Germany.

"A knowledge of German," Blanchard explains, "is essential in attaining better private and professional relations between Germans and Americans. It is also extremely useful for the combined operations of American and German units...Moreover, I've never seen an unhappy GI in Germany who had found and made a good German friend. What better way to make a friend than to speak the same language?"

Blanchard believes that because of changing times, the devaluation of the dollar, and other influences, too many GI's in Germany have been isolating themselves by remaining on U.S. bases. He wants them to get out and mingle with the German population. He realizes, too, that in the past 30 years the German people have changed markedly and now expect more of the Americans living among them...at least a minimal knowledge of the host language.

Both items taken from
Parade magazine, 20 June 1976

(UNCLASSIFIED)

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