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# CRYPTOLOG

## DECEMBER 1983



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P.L. 86-36

P.L. 86-36

THE ISLAMIC TIME BOMB (U).....	[REDACTED]	1
OUT OF MY DEPTH (U).....	[REDACTED]	5
NON POSSE VS. POSSE NON (U).....	H.G.R.	7
SOVIET PSI EXPERIMENTS (U).....	[REDACTED]	9
[REDACTED].....	[REDACTED]	14
SHELL GAME: SYSTEM SHELLS (U).....	[REDACTED]	20
DCL: THE DIRECT COMMUNICATIONS LINK (U).....	[REDACTED]	21
NSA-CROSTIC NO. 51.....	David H. Williams	28

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P.L. 86-36

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One of the first articles we published after I took over as editor of this magazine was Ken Williams' piece documenting the decline in technical reporting (October 1982). One of my original reasons for getting into this magazine business was to explore whether technical reports could be produced by an analyst with access to a TSS. The challenge was to see if the "office automation" tools that were already on the TSS/UNIX systems could produce something like this magazine. Looking back over the last two years, my personal verdict is that those tools are sturdy enough to do almost any technical reporting that I have ever had to do.

Consider this magazine: all the layout and formatting is done using the UNIX package 'nroff' along with several related tools. Until recently, each article began on one system (at FANX-III) and finished on a second (at Fort Meade). Except for the titles and graphics, which are added in at the end of the process, all of the layout, including the provision of white space for graphics, is done "on line" at a Delta Data 7000 terminal; the final form of the page is called up onto the screen for a visual check before any printing is done. When the image on the screen looks right, the page is printed out on an Anderson-Jacobson 832 printer, the graphics and titles are added, and the result goes to the printshop for the final production.

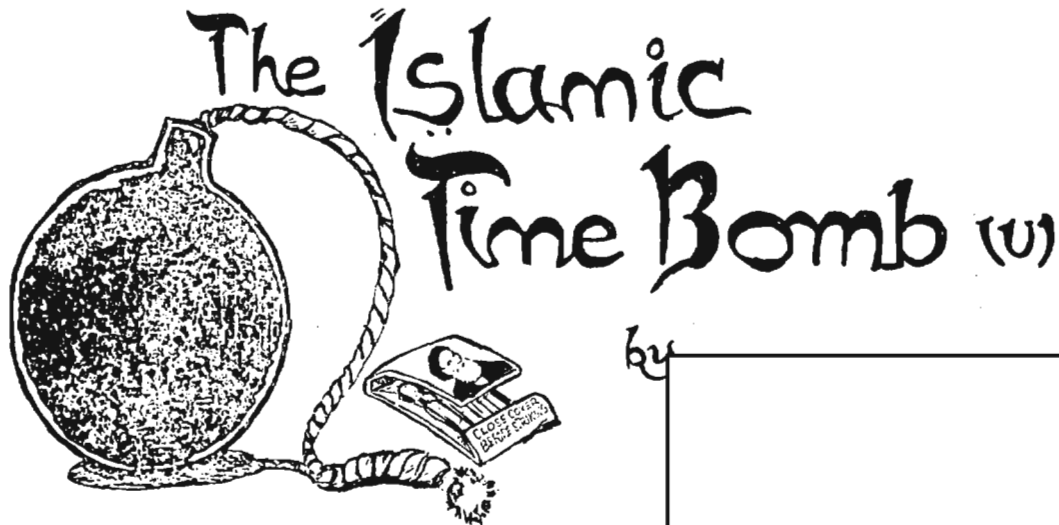
Many articles come in over PLATFORM, some from outside the continental US. Thus the words you see are often the author's original keystrokes.

There are presently three of us who keep the magazine rolling. All three do it on a part-time basis, and none of the three of us is a programmer. You don't have to convince us that UNIX/TSS can be used for technical reporting...we are doing it!

\* \* \* CORRECTION \* \* \*

The cover of the October 1983 issue of CRYPTOLOG and the article by [Redacted] titled "Banners, Cowboy Hats, and ELINT Notations" should be marked "REL UK CAN AUS NZ"

P.L. 86-36



P.L. 86-36

**A**ny understanding of the current unstable situation in the Middle East necessarily requires a basic knowledge of the past. Let me give you some historical background as a prologue to the present—a historical perspective.

In the great medieval French epic of the wars between Christians and Saracens in Spain, the Chanson de Roland, the Christian poet endeavors to give his readers, or rather listeners, some idea of the Saracen religion. According to this vision, the Saracens worshipped a trinity consisting of three persons: Muhammad, the founder of that religion, and two others, both of them devils, Apollin and Tervagant. To us this seems comic, and we are amused by medieval man unable to conceive of religion or indeed of anything else except in his own image. Since Christendom worshipped its founder in association with two other entities, the Saracens also had to worship their founder, and he too had to be one of a trinity, with two demons co-opted to make up the number. In the same spirit one finds special correspondents of the New York Times and of other lesser newspaper describing the conflicts in Lebanon in terms of right-wing and left-wing factions. As medieval Christian man could only conceive of religion in terms of a trinity, so his modern descendant can only conceive of politics in terms of a theology or, as we now say, ideology, of left-wing and right-wing forces and factions. [1]

Seven centuries after the birth of Jesus Christ, a new monotheistic force sprang forth from the deserts of Arabia called Islam (which means submission in peace to the will of God). Islam was destined to become the third great monotheistic religion of the world to be founded in the Middle East, along with Judaism and Christianity. To Muslims, Muhammad was

the last true prophet of God on earth. Muslims refer to Muhammad as Al-Khatim, "The Seal of the Prophets." His message was simple: "There is no other deity but Allah (God) and Muhammad is His Prophet."

The year 622 AD is the starting point for the Muslim calendar because it is the date of Muhammad's pilgrimage from Mecca to Medina. By the year 632 AD the Muslim conquest of Arabia was complete and the Prophet died. The Period of the Rashidun, or Rightly Guided, Caliphs lasted from 632 AD to 661 AD and saw a remarkable expansion of Islam from Persia to Spain. This was due to the phenomenon of Jihad, or Holy War. Fighting Holy Wars to expand Islam was not only considered ethical but was seen by all Muslims as a sacred duty as the following quotes from The Glorious Qur'an will amply attest:

190. Fight in the way of Allah against those who fight against you, but begin not hostilities. Lo! Allah loveth not aggressors.

191. And slay them wherever ye find them, and drive them out of the places whence they drove you out, for persecution is worse than slaughter. And fight not with them at the Inviolable Place of Worship until they first attack you there, but if they attack you (there) then slay them. Such is the reward of disbelievers.

192. But if they desist, then lo! Allah is Forgiving, Merciful.

193. And fight them until persecution is no more, and religion is for Allah. But if they desist, then let there be no hostility except against wrongdoers. [2]

As early as 632 AD the seeds of a great schism with the Umma, or Community of Believers, occurred. The vast majority of Muslims felt that the successor to Muhammad, the Khalif (usually spelled "Caliph" in English), who would become the new spiritual and political leader of Islam, should be elected by a consensus, ijma', of the believers. Also, to these believers, contact between God and man was to be direct and personal. These became known as the Sunnis, or Orthodox Muslims. A minority of Muslims felt that the successor should be a blood relative of Muhammad through the Prophet's son-in-law 'Ali and his wife 'Fatima, the Prophet's daughter. These became known as Shi'ites, or Partisans of 'Ali. Later progeny of 'Ali came to be known as Imams who provided a spiritual bridge between man and God. Today, most of the Islamic world, which numbers between 700 and 800 million adherents, are Sunni. Only in Iran is the majority Shi'ite, 93%, compared to 5% Sunni. [3] 'Ali and his son Husayn were assassinated by their political opponents. Their martyrdoms have caused the Shi'ites to remember such massacres during the holy period of when they mutilate their heads with knives and beat their backs with chains.

From 661 to 750 AD the Umayyad Empire was centered in Damascus and the Arabian conquerors intermarried and converted Persians, Syrians, Copts, and Berbers. At the same time, the philosophy, mathematics, and science of the time were assimilated. Most of the Shi'ites were located in what is now Iraq and Iran. "Many of the heterodoxies which arose in the first century of Islam and were themselves a veiled protest against the victorious religion of the Arabians" gradually gravitated to Shi'itism. Hence, the Ismailis, the Qarmatians, the Druze, the Nusayris were all Shi'ite offshoots. [4] The Umayyads reached the greatest peak of their civilization during the reigns of the Caliph, 'Abd al-Malik (685-705 AD) and his son Al-Walid I (705-715 AD), and are perhaps best personified by the beautiful Dome of the Rock Mosque in Jerusalem and the Umayyad Mosque in Damascus. [5]



From 750 to 1258 AD the capital of the Muslim world shifted from Damascus to Baghdad under the 'Abbasid Empire. The first 'Abbasid Caliph Abul 'Abbas (750-754 AD) referred to himself as as-saffah, the bloodshedder, and the executioner's carpet became a necessary adjunct to the throne. The 'Abbasid Empire was more international than the Umayyad Empire and was a Shi'ite-dominated institution, unlike that of the Umayyads who were Sunni. [6] The 'Abbasids were characterized by magnificent achievements in literature, art, architecture, science, medicine, mathematics, and philosophy. This empire reached its zenith in the period of Harun ar-Rashid (786-809 AD) and his son Al-Ma'mun (809-833 AD). The 'Abbasids did not fall from power until Baghdad was sacked and burned by the Mongol hordes in 1258 AD. [7] The fall of the 'Abbasids did not mean the disappearance of Islam. The Mongols and the Ottoman Turks were also converted to Islam. In fact, by the middle of the 15th century the Islamic world stretched from Spain in the west across North Africa and the Middle East, northward to Vienna, Austria, and Russia, and eastward to China, Indonesia, Malaysia, and the Phillipines.

It is against this historical background that the Shah of Iran fell in 1979 and a new Islamic revival and state under the leadership of the Ayatollah Ruholla Khomeini came into existence. The Ayatollah Khomeini, whose thinking is more appropriate to the 7th century, has become the popular 20th-century spokesman for the Shi'ite world of Islam today. Although he is proclaimed as the Imam in Iran, not all Shi'ites follow his lead; but his rejection of the West and his virulent anti-Americanism, anti-Zionism, and anti-Communism have struck a responsive chord in millions of Muslims, Sunni and Shi'ite.

What are the objectives of the new Islamic revolution?

- [ ] The elimination of undesirable or immoral behavior such as gambling, alcohol, sexual promiscuity, prostitution, pornography, and corruption;
- [ ] The conformity of secular law with Islamic law; and
- [ ] The establishment of Islamic governments. [8]

One reason Islamic society did not accept Western values is that there has never been a clear separation of the powers of church and state in Islam comparable to that in the West. Muhammad and his successors were spiritual as well as political leaders. This, in part, explains why the Shah's push for secularization and modernization was rejected by the Iranian

people. It is also one reason, in addition to atheism, why Soviet-style Communism has not taken hold in the Muslim Middle East.

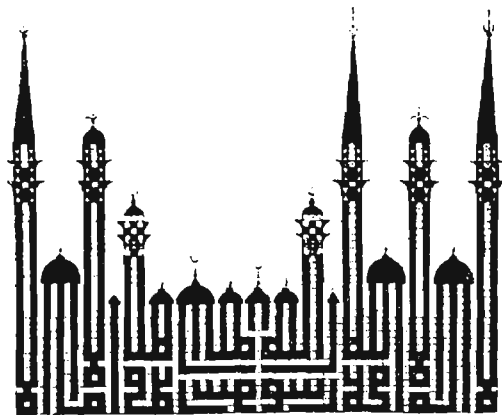
Another reason for rejecting modernization is that although Islamic societies admire technology, political and military power, and scientific achievement, many Muslims feel humiliated and inadequate in the face of an economically superior West. [9] This attitude has persisted to some degree in the Islamic world ever since the Napoleonic invasion of Egypt in 1798. The military superiority of Israel and the humiliating defeats of the Arabs in 1948, 1956, and 1967 added further aggravation. Additionally, Jewish nationalism and Arab nationalism have been at loggerheads with each other, especially since 1948. Some two million Palestinian refugees continue to evoke great sympathy for the Palestinian national cause. The Muslims see the Israelis in Palestine, as "intruders" (like the Crusaders several centuries earlier) who must be removed, especially from the control of Jerusalem, which is also a Holy City for Islam.

The 1973 Arab-Israeli War did something for the Arab psyche that eventually led to the Camp David accords between Egypt and Israel. The Arab Oil Embargo and the battlefield performance of the Arab forces finally restored a portion of the pride that had been lost in previous conflicts. The war demonstrated that the Arabs were capable of planning, coordinating, and executing an effective military action. [10]

Muslims conveniently divide the world into two halves: Dar ul-Islam, the sphere of Islam, and Dar ul-harb, the sphere of war. The extremist Muslim seeks to convert the entire world to the Dar ul-Islam. The means to achieve this objective can be peaceful persuasion or violent Holy War (Jihad). It is significant that Iran, a state which has declared Jihad against Israel and the United States, has only one political party, the Party of God (Hizbollah). Incidentally, this is the name of the so-called "terrorist group" thought responsible for killing 241 American and numerous French soldiers on 23 October 1983 when suicide missions used vehicle bombs to attack the American and French Headquarters in Beirut. This attack repeated the pattern of the 18 April 1983 attack on the US Embassy in Beirut. In my opinion, the appeal of the name Hizbollah is more universal than the press has yet realized and in reality is an appeal to all Muslims anywhere in the world. Later, the Israeli Headquarters in Southern Lebanon was attacked. The Palestine Liberation Organization claimed credit for that attack. Also, on 12 December 1983, another so-called "terrorist group" called al-jihad al-Islami, The Islamic

Holy War, attacked the American Embassy and other targets in Kuwait. The ten attackers were later identified as three Lebanese and seven Iraqi Shi'ite Muslims. Again, in my opinion, the appeal of the name of the group is international and pan-Islamic in intent, and its aim is to widen the conflict. These events followed other recent violence against the West or pro-Western governments in the Middle East since the Ayatollah Khomeini has come to power in Iran. For example, we can all recall that 52 Americans were held hostage for almost a year from 1979-1980. Iran and Iraq have been at war for over four years now, with no end in sight. In 1979 the Great Mosque at Mecca was attacked by Islamic extremists, and in 1981 an extremist coup was attempted in Egypt and Bahrain, and President Anwar Sadat of Egypt was assassinated.

Terrorism is not new to the Middle East, and it is certainly not new to Islam. The very term assassin is a corruption of the Arabic plural Hashishiyeen, users of hashish, as an Ismaili Shi'ite sect of Alamut, Persia, was known. These assassins struck terror in the hearts of the world's leaders during the 11th century. The French learned about Islamic terror in Algeria and were finally forced to leave after the endless cycles of violence, bombings, and retaliatory actions made Algerian independence a reality in 1962. Foreign military forces were not welcome in the Islamic world at that time, and they are not welcome now.



Drawing of the cupolas and minarets of Mecca with the Moslem creed  
in Cufic alphabet

Recent press reports disclosed that on 10 December 1983, 1,000 suicide bombers were being trained in Lebanon, apparently by Iranians, to launch new terrorist attacks, possibly worldwide. [11] Fortunately for us, Khomeini is a Shi'ite Muslim so his appeal is somewhat limited by the centuries of conflict between Shi'ites and Sunnis, but his appeals are not confined to Shi'ites alone, as is clearly reflected in the following quotation:

"In many respects Khomeini's ideas are extremely progressive. In his book Islamic Government he discusses subjects such as imperialism, exploitation, and the influence of America in very modern terms, while he introduces the book with an appropriate verse from the Koran: 'If kings enter a village, they will despoil it, loot it, and turn its honourable inhabitants into slaves.' In this book, as elsewhere, he emphasizes his main themes--hostility to the United States, which he regards as Iran's arch-enemy, and hatred for Zionism and Israel. One of his fetwas (legal opinions) was that it was right that some of the money due to the Imam should go to the Palestinians; this of course pleased the Arabs.

"It was characteristic of Khomeini, and one of the reasons for the growth of his reputation, that his interests extended far beyond the confines of Iran; he was never parochial. He tried to address people not just as a Shi'a ayatollah, not just as a Persian, but as a Moslem leader who could speak with authority to all Moslems. Islam, he said, made a man free in all that he does--in his person, in his reputation, in his work; in where he lives and what he eats, provided that he does nothing that is contrary to Islamic law, to the Sharia." [12]

Prior to 1979 Khomeini's forces would welcome being killed. During his fight against the Shah, Khomeini offered the following philosophical advice to his adherents:

"Do not attack the army in its breast, but in its heart' was his message. 'You must appeal to the soldiers' hearts even if they fire on you and kill you. Let them kill five thousand, ten thousand, twenty thousand--they are our brothers and we will welcome them. We will prove that blood is more powerful than the sword.'" [13]

When dealing with such religious fanatics, we should remember that they will welcome death as an instant path to eternal paradise and

martyrdom. Khomeini's own son, Mustapha, was killed by an act of terror by the Shah's secret police, SAVAK, so why should Khomeini avoid such means against his perceived enemies? It's clear that, with such a philosophy, terrorist acts could widen significantly. After all, why should the number of suicide terrorists be limited to only 1,000? Why not 10,000, or 100,000, or even a million? It would appear that a new approach to the complex problems of the Middle East is in order. The injustice of the Palestinian issue must be faced. Israel and Syria must play key roles in the peace process. Israelis have learned that violence for violence has not stopped more violence. Most Muslims are not terrorists or extremists, but I think the forces of extremism worldwide could become an "Islamic time bomb" caused by actions that unnecessarily provoke undecided Muslims to actions that they would otherwise abhor. In such a situation, Islamic states that are currently pro-West or neutral may be overthrown or forced into the extremist camp. Recent comments by Iran's Ambassador to the United Nations indicated that Iran does not feel responsible for whatever happens. If terrorism expands, even to the territory of the United States, it is Allah's will. Iran is not to blame. People are simply reacting to the "Imperialistic" policies of the United States. Need I say more?

#### Footnotes

1. Lewis, Bernard, "The Return of Islam," Religion and Politics in the Middle East; Boulder, Colorado, 1982. p.9.
2. Pickthall, Muhammad Marmaduke, The Glorious Qur'an; New York, New York: Muslim World League, 1977. p. 29.
3. The World Factbook, CIA Document No. CR83-11300, 1983; p. 104.
4. Hitti, Philip K., History of the Arabs; New York, New York: Macmillan, 1967. pp. 240-249.
5. Ibid. pp. 263-265
6. Ibid. pp. 288-289
7. Ibid. pp. 288-298
8. Curtis, Michael, Religion and Politics in the Middle East; Boulder, Colorado, 1982. p. 3.
9. Ibid. p. 3.
10. Stookey, Robert W, America and the Arab States; New York, New York: John Wiley & Son, 1975. p. 246.
11. "Reagan Says 1,000 Readied as Mideast Suicide Bombers," The Washington Post, December 10, 1983, pp. A1, A14 Col 1.
12. Heikal, Mohammed, Iran, the Untold Story; New York, New York: Pantheon Books, 1982. p. 139.
13. Ibid. pp. 145-146

**OUT OF  
MY DEPTH (U)**



# Correspondence

To: Cryptolog

(S-CCO) In his article, "Tips on Topical Reporting (U)" in the October 1983 edition of Cryptolog, [redacted] states that "the National SIGINT Requirements Lists (NSRL) are only general guides to themes of continuing interest" to analysts. He also states that, while analysts should become familiar with requirements, they should not regard the requirements as "crucial" in deciding what topics are reportable. He goes on to say that anything in a "military context" is covered by a requirement.

(U) I submit that the words "guides" or "guidance" and "requirement" have quite different meanings. "Guidance," according to Webster, is "the act or process of guiding" and a requirement is "something wanted or needed--a necessity."

(S-CCO) The requirements in the NSRL are intended to be expressions of the needs of our customers. Guidance went out with the demise of the ICP. NSA has agreed to use the requirements to direct its collection, processing, analysis and reporting efforts. Also, the requirements are statements of specific needs and not just "themes."

(S-CCO) The priorities associated with line items in requirements are assigned after careful deliberation by the SIGINT Requirements and Validation Subcommittee (SIRVES) of the SIGINT committee. NSA uses them as a basis for assigning the Agency's limited resources. SIRVES ensures that NSA abides by the priorities by conducting evaluations of NSA reporting.



(S-CCO) I recommend that [redacted] read the Handbook for the National SIGINT Requirements System.

[redacted]  
P051 3803s

P.L. 86-36

[redacted] replies:

(S-CCO) [redacted] criticism of my points about the National SIGINT Requirements Lists (NSRLs) reflects his more detailed knowledge of the process than mine. At his invitation, I have read the Handbook for the National SIGINT Requirements System, a publication not widely distributed--and rightly so, I believe--to working-level analysts at NSA. (Its technical details need to be known intimately on a day-to-day basis by specialists in NSRL development and implementation.) I also appreciate the time and care that goes into formulating the NSRLs and assigning priorities to the line items in them. In the spirit of fostering better understanding of our SIGINT world, I suggest that [redacted] expand on his letter and develop a full Cryptolog article on the National SIGINT Requirements System.

(S-CCO) A few comments from [redacted] invite specific rebuttal. Having been in this business for a long time now (in collection, processing, and analysis), I know what a SIGINT user needs--or requires--is not necessarily what NSA can provide in great detail. In this intelligence business, we target our resources, then take what we can get, sometimes in huge quantities but often in quite meager amounts. So, what a user requires serves to guide us in our search for good information. But we are not held responsible for producing required data if it is just plain unobtainable or acquired in an unusable form ..., nor are we exempted from using good judgment in interpreting the urgency of the requirements we are tasked to fulfill.

(S-CCO) I disagree that the word "specific" is applicable to most of the National SIGINT Requirements. Some items are quite to the point, but the large majority are couched in such terms as "systems studies," "data base," or threat analysis information." That gives a lot of leeway for subtopics that are not spelled out.

P.L. 86-36

(S-CCO) [redacted] missed an important point in my article said "almost anything ... in a military context is covered by at least one requirement." Also implied--but I thought it unimportant to spell out--was that this statement applied to a military force regularly targeted by SIGINT resources. EQ 1 seriously doubt that most readers of the Article would get excited about the order of battle of a [redacted] unless the area, [redacted] became the focus of a crisis. If that were the case, the other advice in my article would be pertinent.

[redacted]



# NON POSSE vs. POSSE NON



BY



P16

**W**hen Saint Augustine back in the fifth century wrote in his City of God about the differences between angels and human beings, he never realized that he was laying the groundwork for a QRL article in the 20th century. But a distinction that he pointed out was related to a grammatical point that gave a lot of NSA linguists trouble on a Spanish Professionalization Qualification Examination, so this article is being written. The purpose is not to point the finger of scorn at those who made the error, but rather to point out the distinction in the hope that linguists who have not yet made the mistake will have the information to avoid making it.

Reprinted from QRL, The Quarterly Review for Linguists, November 1972.

The same distinction can be made in a number of other languages, including Spanish. It was the crux of a sentence in PQE #2, given in February 1969. In a selection entitled AGRESION, there were two paragraphs about "the starting of armed struggle," "offensive action of a country which attacks the territorial integrity of another," and "a declaration of war," and then this sentence:

Augustine said that angels NON POSSUNT PEC-CARE while humans POSSUNT NON PECCARE. A novice translator might translate both expressions as "cannot sin" and thereby miss the point entirely. Even writing "angels cannot sin" and "humans can not sin" would escape the average reader. It is necessary to use circuitous phrases such as "angels are incapable of sinning" or "it is impossible for angels to sin" and "men have the ability to avoid sinning" or "can refrain from sinning." The idea is that while an angel couldn't sin if he wanted (and probably wouldn't want to anyway), homo sapiens is a sin-inclined creature who has it in his power to "not sin" if he tries. The linguistic distinction depends on whether the negative NON refers to being able (POS-SUNT) or to sinning (PECCARE).

La agresión internacional puede no revestir la forma de operaciones bélicas, sino traducirse en presión de otra índole (bloqueo, amenazas, campaña difamatoria y provocativa, etc.) que obligue por seguridad o dignidad a reaccionar armadamente al agraviado en sus intereses o en sus derechos.

This states that, in contrast to the "offensive action" and other hostilities described in the preceding paragraphs, "Aggression between nations does not have to take the form of (PUEDE NO REVESTIR) warlike acts, but can be expressed by other types of pressure (a blockade, threats, a campaign of smears and threats, etc.), obligating the aggrieved party to react with arms in its own interests or for its own rights."

Many people translated PUEDE NO REVESTIR as if it had been NO PUEDE REVESTIR. There were test papers that said "international aggression cannot be in the form of ..." or "cannot assume the appearance of ...", etc. Maybe in their own minds, the translators were making the distinction outlined above, but it didn't show through to the readers (i.e., the graders). The simple translation of PODER NO as "cannot" or "can not" did not suffice. As I recall, one person did say, "... can take the form not of ... but can be ...." This was acceptable and, incidentally, took advantage of a linguistic clue: the infinitive TRADUCIRSE later in the sentence, which needs some reason for being there in the infinitive form. It is a complement to PUEDE ("can") and might cause a careful translator to take another close look at PUEDE and its immediate complement (REVESTIR, actually NO REVESTIR) and possibly reevaluate the meaning of the whole clause.

This reinforces a point I've been trying to make to translators over the years: ALL PARTS OF A TEXT ARE RELATED! Words don't stand by themselves; they're usually in sentences with other words. Sentences don't stand alone; they're usually in paragraphs with other sentences. Even paragraphs don't stand alone; they're quite often just a part of a longer text, and it is this whole text that should be thought of as the thing to be translated, not just the individual words in it. [1] A good translator tries to make sure that all the pieces hang together in a finished translation. If two or three paragraphs say one thing, the next paragraph shouldn't say just the opposite.

Machines may have to translate word for word, but humans are capable of thinking and reasoning. If you consider word-for-word translation to be a sin, we might say that human translators POSSUNT NON PECCARE.



Dec 83 \* CRYPTOLOG \* Page 8

NOTE

1. Another error in the same selection of the same PQE is related in meaning to the PODER NO mistake, but is also attributable to "word-for-word" translation. Switching from the international to the personal sphere, the text points out that aggression

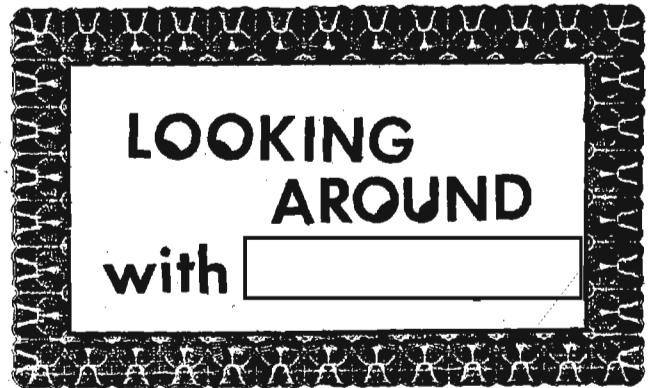
... existe en el acometimiento o acto de fuerza y también en el propósito evidente de realizar aquél o de recurrir a ésta; por ejemplo hay agresión tanto en el disparo como en el hecho de buscar y sacar una arma de la funda o del bolsillo.

(There is aggression in an assault or an act of force, as well as in the clear intent to carry out an assault or have recourse to an act of force; for example, there is aggression both in firing a gun and in looking for a weapon and taking it out of a holster or pocket.)

While this sentence should have cast some light on the PUEDE NO REVESTIR passage (or vice versa), it didn't help very many of those taking the test. Of course, besides failing to recognize the similarity of the underlying thought, several testees forgot about TANTO ... COMO meaning "both (this) ... and (that)" so they translated individual words. Since TANTO means "so much, as much" and COMO is often "as," they rendered the part after the semicolon as "for example, there is as much aggression in a shot as in the act of looking for and taking a weapon out of its sheath or pocket."

In addition to the fact that this translation disregards Spanish grammar—it doesn't say "hay tanta agresión ..."—it just doesn't make sense and should have made the translator sit up and take notice just because it was so patently illogical. As [redacted] (the Chairman of the PQE Committee) pointed out, "There is not as much aggression in shooting someone as there is in waving a gun at him. There's a whole lot more!"

P.L. 86-36



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 Anomalous Phenomena, in the Xerox center at Leesburg, on 1 December 1983 by Doctor Russell Targ, who had just returned from Russia where he visited several Soviet Psi facilities.

experiments in Russia, the US, and elsewhere which appear to show precognition do not fit this radio model and produce curious reactions by the Soviet scientific community, as noted below.

(U) The Soviet scientific community is rather hesitant about Psi research, (telepathy, clairvoyance, poltergeists, etc.), but a theory of low-frequency radio propagation has been devised to justify some telepathy phenomena, and the Soviet Academy of Sciences (SAS) has established a separate department to deal with this work. The "Department for Research on Theoretical Problems" is headed by Professor Andrianka, who is an Academician and who is the only member of this unusual department.

(U) The concentration of the Psi research in hospitals is also based on this radio model, for the Soviet medical researchers have been doing a lot of work in treating cancer patients and others with low-frequency radio waves (in the 10-Hz to 100-Hz range) and have discovered that during this treatment the patients have mystical experiences, relax, and some appear to experience cures. The experiments are conducted without any specific theory. Targ found that this resulted in a lot of hospital visits in the Moscow area, to see the ELF (extremely low frequency) equipment and hear about the experiments.

(U) Much of the unclassified Soviet work takes place in hospitals around Moscow and is concerned with measurement of subtle physiological changes, particularly in GSR (galvanic skin response), that would correlate with response to some stimulus, including the onset of hypnosis.

(U) Dr. Targ, the visiting scientist, had worked in various areas of hard science, including lasers and wave physics, for GTE before moving to SRI in the early 1960s to pursue a NASA-funded project for an ESP teaching machine. Since then he has worked on a number of Psi projects at SRI and recently formed a company to do applied Psi work. His emphasis has been on controlled experiments in remote viewing and precognition.

(U) There are apparently problems of image and semantics, for the research center in the hospital is called the "Center for the Non-Drug Treatment of Mental Problems," while the Academy of Sciences calls it the "Department for Special Problems." There are also doctrinal problems, for a Soviet scientist named Kagan published a definitive book on information theory in which he explained Psi phenomena in terms of low-frequency radio propagation. Psi

(U) At the August 1983 meeting of the International Society on Psychic Research, a Soviet theoretical physicist, Guberev, suggested he come to Moscow as a tourist to see the Soviet work. Targ, who had worked on Defense contracts, refused to go to Russia as a tourist, fearing that the Soviet authorities might detain him, but said that he would be happy to go as an officially invited guest of

the Soviet Academy of Sciences (so that the Soviet authorities could not misconstrue the purpose of his visit). The official invitation arrived two days after the KAL 007 shoot-down. Targ decided to accept the invitation, he said, because he felt the KAL incident was a result of a refusal to communicate (viz., neither the Japanese nor Soviet air controllers would notify each other of the divergence from the flight path), and he thought his visit would help to counteract the deterioration of US-USSR scientific communications. He took his daughter, who is fluent in Russian, as a translator. At the end of September Targ, his daughter, and a colleague arrived in Russia via Interflug. (The other airlines had suspended service to Russia.)

(U) Targ was careful to preface his exposition with the caveat that he could report only what the Russians had told him of their work. He did not see any experiments conducted and, although he had known Guberev for about ten years, he could not prove that all the results reported to him were not intentional disinformation.

(U) His impressions were that the Russians had a number of smart people, such as Guberev, doing good controlled experiments on remote viewing. A 1976 IEEE paper by Targ on remote viewing had been translated into Russian, as had the 1982 paper on Psi phenomena by Dr. Robert Jahn, Dean of Engineering at Princeton, which was published in the prestigious IEEE Proceedings and soon translated. In general, Targ found, the Russians were up-to-date with US work in this field.

(U) Psi work is regarded seriously at high levels in the Soviet scientific (and defense circles, Targ found, because the scientists had to clear their work with the Soviet military authorities before disclosing it or letting him into their labs. Targ found that there were closed facilities, unambiguously presented to Targ as not permitted for him to visit.

(U) Most of the experiments are done in or near major hospitals in Moscow. One large experiment in "rat telepathy" was disclosed to Targ. Rats raised together were separated into two groups. They were shock-conditioned separately, in standard Pavlovian fashion, by being shown a light, followed soon afterwards by an electric shock. The rats learned that the light was associated with the shock and would manifest fear at the light. Then two cages were connected by a modem, at various distances. Some experiments used cages more than a kilometer apart. A computer would call up one of the cages and shock one of a pair of rats. Apparatus measured the galvanic fear reaction of the unshocked rat when the warning light was turned on in the other one's cage.

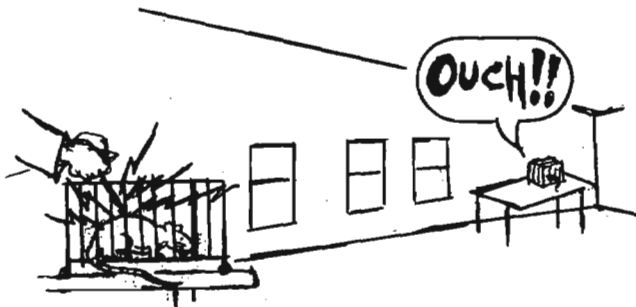
(U) A large computer in the hospital was used to process the galvanic response data. Fast Fourier Transforms (FFTs and autocorrelation were used to detect changes in the GSR (galvanic skin response) in response to some stimulus. Targ said that the computer looked like a PDP.

(U) The signal-to-noise ratio of the GSR data in the rat experiment was clear and the analysis was considered (by the Russians apparently) as a trivial application of a mathematical algorithm. The experimenter was apparently Guberev, whom Targ has known for a decade. Targ could not vouch for the experimental data. The experimenter wanted to use computer analysis of GSR data to find the exact instant that a subject drops into a hypnotic trance. This is somewhat controversial, because it is apparently widely believed in the US that there are no known physiological correlates to the hypnotized state, i.e. no measurable difference. Guberev claims that there are unambiguous GSR changes at the crossover point.

(U) GSR changes are also monitored in medical experiments which use 10-Hz to 100-Hz radiation to treat various illnesses. Because of translation problems, the Russian descriptions of the experiments were incoherent to Targ (his daughter translated), however cancer treatment was one of the ELF applications. Targ said that different stochastic modulations, including high-frequency noise, were impressed on the ELF carriers.

(U) Their Soviet host, Barazin, took them on a tour of "the Department for Research on Special Problems." Targ thought this was the Soviet analog of the US phrase "anomalous problems" that masks Psi experiments with an ambiguous, scientific-sounding name.

(U) Targ and his party presented the SRI work in remote viewing to two kinds of audiences:



- [ ] medical people and psychologists, and
- [ ] physical scientists.

The standard format was for Targ to give his talk in English, after which his daughter would give the same material in Russian. The medical people had good questions on experimental technique; e.g., the signal-to-noise ratio of the data, the mental processing, how the remote viewers felt during the viewing experiments, etc. Targ felt that they had all read the relevant US papers. But the physicists were another matter.

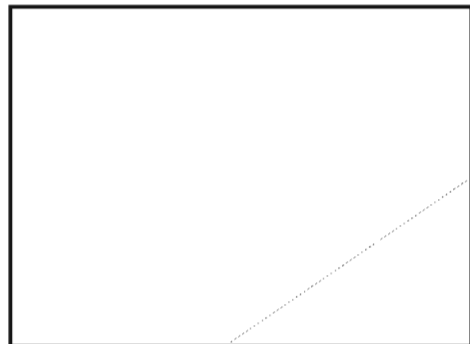
(U) When Targ's daughter began to present the Russian-language version of the SRI work to the audience of physicists, all went smoothly until she reached the part about precognition, at which point there was an uproar. She could scarcely finish a sentence. For two hours the physicists interrogated her mercilessly, demanding an explanation of how the Psi subjects did the precognition; i.e., a physical theory that would account for the phenomena. Because Kagan's book on information theory explained Psi phenomena as ELF radio, the SRI precognition results conflicted with this (approved) theory. The Soviet physicists refused to hear any data until Targ could provide them with a theory which they could accept, one that provided a model for precognition.

(U) The Targ party visited Yuri Guliyayev, an Electrical Engineer who is the director of "the Soviet version of the IEEE" (probably the Popov Society). There was noticeable antagonism between the Academy of Science people and the electrical engineering society. His SAS host drove him to the door of Guliyayev's institute but would not enter. Yuri Guliyayev wanted to know who Andrianka was, looked him up in a directory, and announced to Targ that he was an Academician and that his Department in the Academy had only one member.

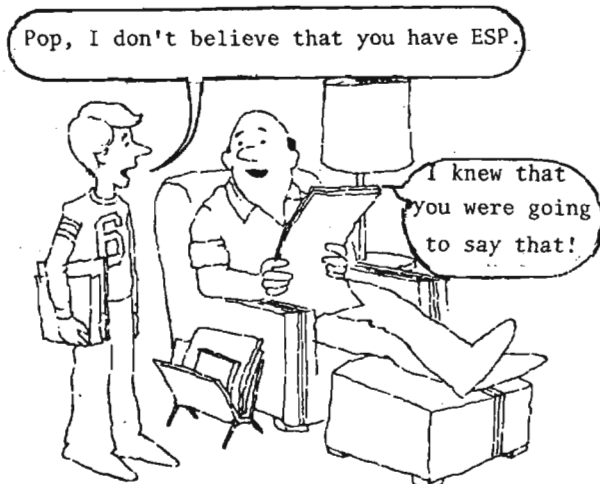
(U) Guliyayev knew all about US Psi work, including Psi experiments on US submarines. Targ found that the Russians seemed to know everything that was going on in the US, (apparently even unpublished work) but wanted to talk about what the Russians were doing. Yuri Guliyayev is doing tests in bioradiation, repeating what Vasiliev did, to see all the RF, IR, and other electromagnetic energy coming out of people's bodies, and to correlate this with different physical states. Yuri kept saying that he was doing physics, not ESP. But Targ noted that Guliyayev's work is almost the same as what "aura readers" are doing in spectrophotometry. The Targ party was given a paper that rather sketchily described the Soviet work in bioradiation.

(U) There was also an experiment with a noted psychic, Nina Kalada. The Russians report that she can read a page in a book in another room, with results well above random. For example, she might be asked to read the first line of page N of a book with a certain title in a library in the next room. Her results were well above random, according to the Russians, as long as she had feedback of results, i.e., could see immediately how close she came. When she was sent out of the room during the verification and not allowed to know how well or poorly she had done, her results were no better than random. Dr. Targ felt that this meant that documents in locked in safes in the US Embassy in Moscow were safe from Ms. Kalada, since she would not get the feedback necessary to produce successful results. He said he assumed that espionage was the point of the research.

(U) One of the asides in the journey was a trip to a "free market" in Leningrad, where fresh fruit and vegetables can be purchased by approved people at black market prices in large armory-sized covered markets. Because of the shortage of fresh fruit and vegetables in Russia, only certain foreigners and Russians are allowed into these markets. Russians approached the Targ party before they went, in an effort to get them to change some money or make some purchases on their behalf. Targ, fearing he was being set up for a police trap, refused. His scientific friends then confirmed that this was a standard ploy, to implicate visiting foreigners in some illegal activity. At the food market, the police refused to allow Targ to take any photographs at all and interfered with his efforts to do so. Apparently fresh fruit is so hard to obtain that they did not want any photographic evidence that it was available at all.



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P.L. 86-36



(U) From Leningrad their Russian hosts took them on an unscheduled side trip to Yerevan, capital of Soviet Armenia. Targ, apprehensive about what might happen, resisted, saying it was not on his itinerary and he would not go to Armenia. The Russians replied that there had been a large-scale experiment in remote viewing and the Armenian scientists wanted to see Targ and his party—in Armenia. Professor Rubiky Gasumsan, of the Department of Psychology, had done experiments with graduate students. Apparently they were given no choice, and had to go to Armenia. In the remote viewing experiments, an architect picked a number of sites in the city that had distinctive features. These locations were sealed in envelopes and picked at random. Students, called "guards," were used to escort the "agent" to the site, which they only learned about by opening the envelope while on the way. The other member of the RV (remote viewing) pair sat in a lab and waited until the "agent" reached the site. Then he described what he thought the agent was looking at. (This is similar to the SRI experiments.) The Armenian scientists described work which had strikingly successful results.

(U) Targ and his party were then taken on a brief holiday, still protesting, to a remote place in the mountains of Armenia to see "the church at the end of the world." It was only when they were in the back of the Intourist bus, far away from all witnesses, that the Armenian scientists revealed what they really wanted to talk about. They had encountered precognition of targets before the "agent" reached the site to be viewed. The student in the lab, even when he was told that the agent was not yet in place, would go ahead and describe the remote site anyway.

(U) The problem for the Armenians was what to do with the data. They have trouble deal-

ing with the data at the labs in Yerevan and in the Academy of Sciences. Targ and the Armenians had a long discussion on protocol, i.e., the form for such experiments, similar to US protocol analyses.

(U) (Obviously, they were using Targ to "publish" results that they could not publish in Russia, because they conflicted with accepted theory, and staged his visit so they could talk to him and still deny things afterwards, if there were any repercussions. Add in the potential for disinformation, and the situation has various possibilities—a commentary on being a scientist in Russia.)

(U) Summarizing, Targ said there were a lot of hospital visits to show ELF signals and apparatus which caused the subjects to have mystical experiences, and so on.

(U) In reply to a question, Targ said he had made informal agreements to do long-distance remote viewing experiments between the USSR and the US, providing the "communications" between the US and Soviet scientific parties were good enough. He has not started this work because of communication problems.

(U) What the secret Soviet work in Psi applications might be was neither known nor hinted at in Targ's exposition.

(U) Apparently there were no live demonstrations of anything for the Targ party and no detailed papers that they could take out.

(U) Other papers at the SAAP meeting covered a lot of US work in sensing objects underground, or at some distance, and also covered criminological applications to get clues to serious crimes. The Chinese had also reported experiments in seeing printed materials through sealed envelopes, in which a successful "read" set off a number of field sensors and also gave a "blurred photographic impression" of the string of five Chinese characters when a success occurred. There was audience interest in using these remote sensing and underground and undersea detection techniques to find submarines and missile silos. Possibly the Russians, who seem to be abreast of US work, have similar interests.

(U) A recent Congressional Research Service (CRS) study by Christopher Dodge (83-511 SP) cited other Soviet Psi work, noting considerable Soviet interest in remote hypnotic manipulation and dowsing for water, oil, and minerals. This is referred to in Soviet literature as the "biophysical or biolocational effect." Psychokinesis (PK or Polterism, in which the mind affects physical objects) and psychic healing have also attracted Soviet interest. The Soviets claim that

scientific studies of dowsing have yielded significant results. (US researchers make the same claim.) Therefore, dowsing is taught to professional mineralogists and geologists at Tomsk Polytechnical Institute. The CRS report says there are various speculations that the USSR is spending tens of millions of dollars on Psi experiments and applications directed to military research, but this is unconfirmed. A paper, "Psi in the USSR: Applied Aspects" by L. Vilenskaya, Applied Psi Newsletter, Vol. I, no 1, 1982, pp. 4-5. Bulgaria and Czechoslovakia also conduct Psi research and applications, according to the CRS report.

P.L. 86-36

Analysis

~~(FOUO)~~ The ability to read a page of a book in another room (the Kalada experiment) would have security implications for COMSEC if it worked reliably. The Russians could, for example, use such a technique to determine whether a pinched keylist was in use

~~(FOUO)~~ The GSR research, using FFT and autocorrelation to detect the instants at which subjects are responding to stimuli or becoming hypnotized, could be applied to electronic interrogation and debriefing techniques. One of the key factors in Psi experiments is determining when the Psi subject is reliably reporting Psi experiences, and US experimenters have been using voice tremor analysis and pupil dilation photographs to bracket valid episodes. The Russians are undoubtedly aware of this work, and if they are able to develop very good methods for determining when people are responding correctly to an interrogation, they would be able to apply it to non-Psi interviews. The rat telepathy experiments, if applied to humans, might give them ways of determining when agents are under stress, e.g., after they have been arrested. The dowsing (i.e., biolocation of specific distant objects such as ships, computers, nuclear weapons, etc.) would have obvious intelligence applications if it worked as well as conventional intelligence techniques.

~~(G)~~ Recent US experiments, presented at Leesburg, showed that PK subjects could affect the performance of random noise generators in subtle but persistent ways. However, the observed effects would not appear to jeopardize well-designed cryptographic devices. In another reported experiment, a subject was able to guess 2,000 random dibits correctly out of a stream of 6,000 dibits, which is fairly significant statistically but not of much use in cryptanalysis. Generally, there is a problem in getting the Psi subjects to repeat their work because of emotional factors--at least in the US.

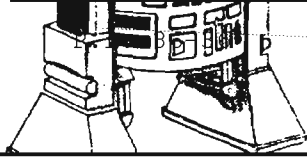
~~(G)~~ Summing up, Psi work is still very nebulous and unpredictable. There is a lot of doubt about it. In spite of this, the Russians are openly experimenting in certain areas where they apparently feel there is an acceptable theoretical base (e.g., ELF radio and biolocation), while they reject other unacceptable Psi effects. They are obviously keeping up with the work in the US and other countries. The establishment of a one-man department in the Academy of Sciences implies that the established disciplines don't want to be closely associated with Psi work, but possibly the Russians feel the experimental results are too strong to be ignored. The difficulty Russian scientists are having with precognition, for which there is no approved theory, is somewhat comical, but probably no different from the general attitude in Western science.

~~(G)~~ One of the subtle undercurrents of Targ's visit was his concern about being arrested, the arbitrary way in which the Russians made him go to Armenia (as if he had no more rights than a Soviet citizen), and his inability to get sufficiently detailed expositions of the Russian work--in a field in which he has been a leading researcher for over 20 years--to determine whether anything he was told was true or false. If he actually does some joint experiments with the Russians, the nature of the results and their interpretation should be interesting.

~~(G)~~ Another subtle point, noticeable because it was never mentioned, was the "human element" of Soviet Psi work. In the US, much of the current work is in trying to improve the rapport between the experimenter and his subjects, trying to find more people with Psi abilities, and then getting them to cooperate in Psi experiments. The key to success in US experiments has apparently been the emotional factors of getting the Psi subject to feel the work is important, and also for the experimenter himself to be equally committed to the importance of the work. This of course makes it difficult to repeat experiments, because the emotional charge cannot be sustained. On the basis of Targ's exposition, this matter of subject cooperation and the emotional component of the work did not come up at any point in the Soviet work.

(U) There is probably food for thought, on several levels, in this unconventional Soviet development. What are they up to? What does it mean? Where will it lead?

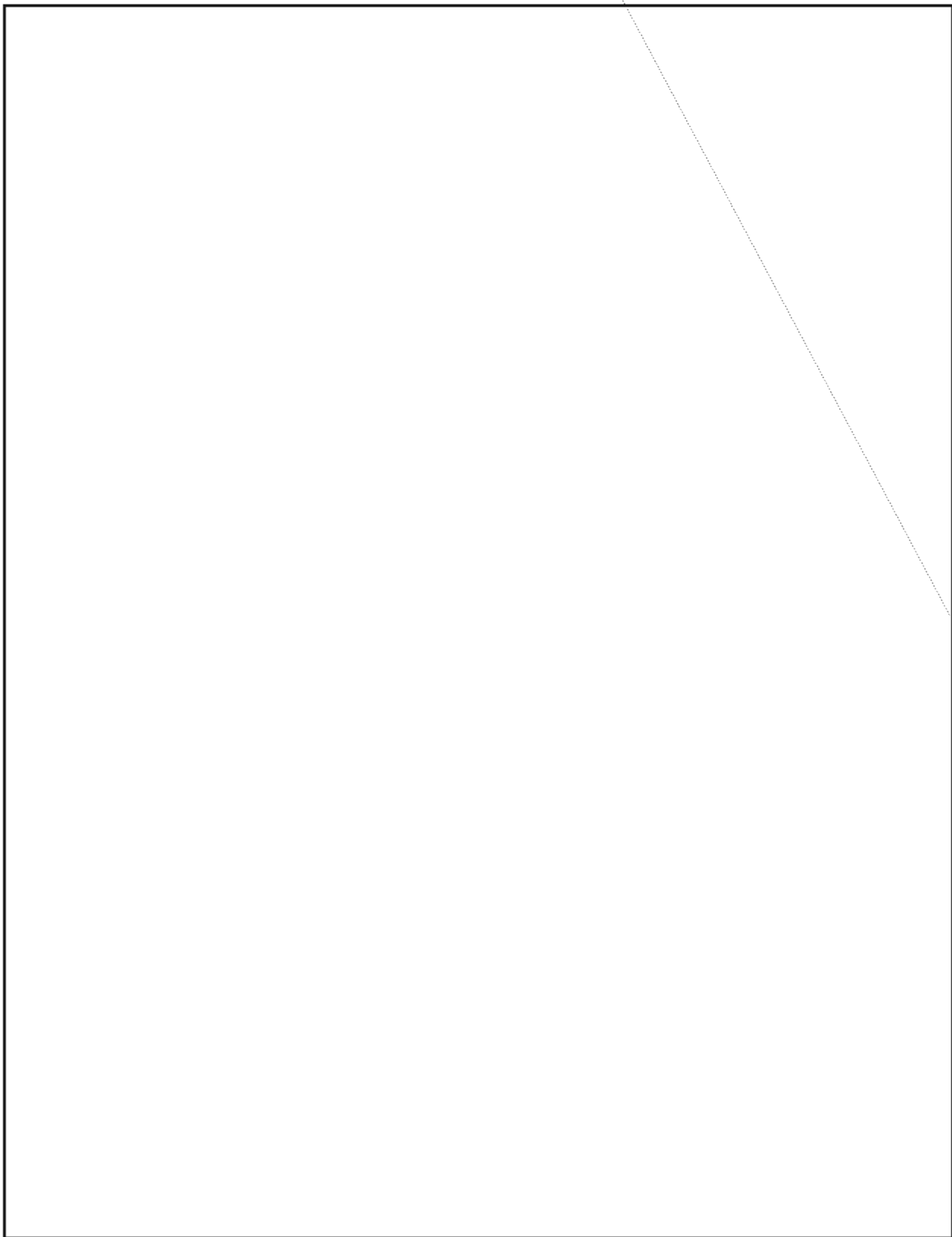


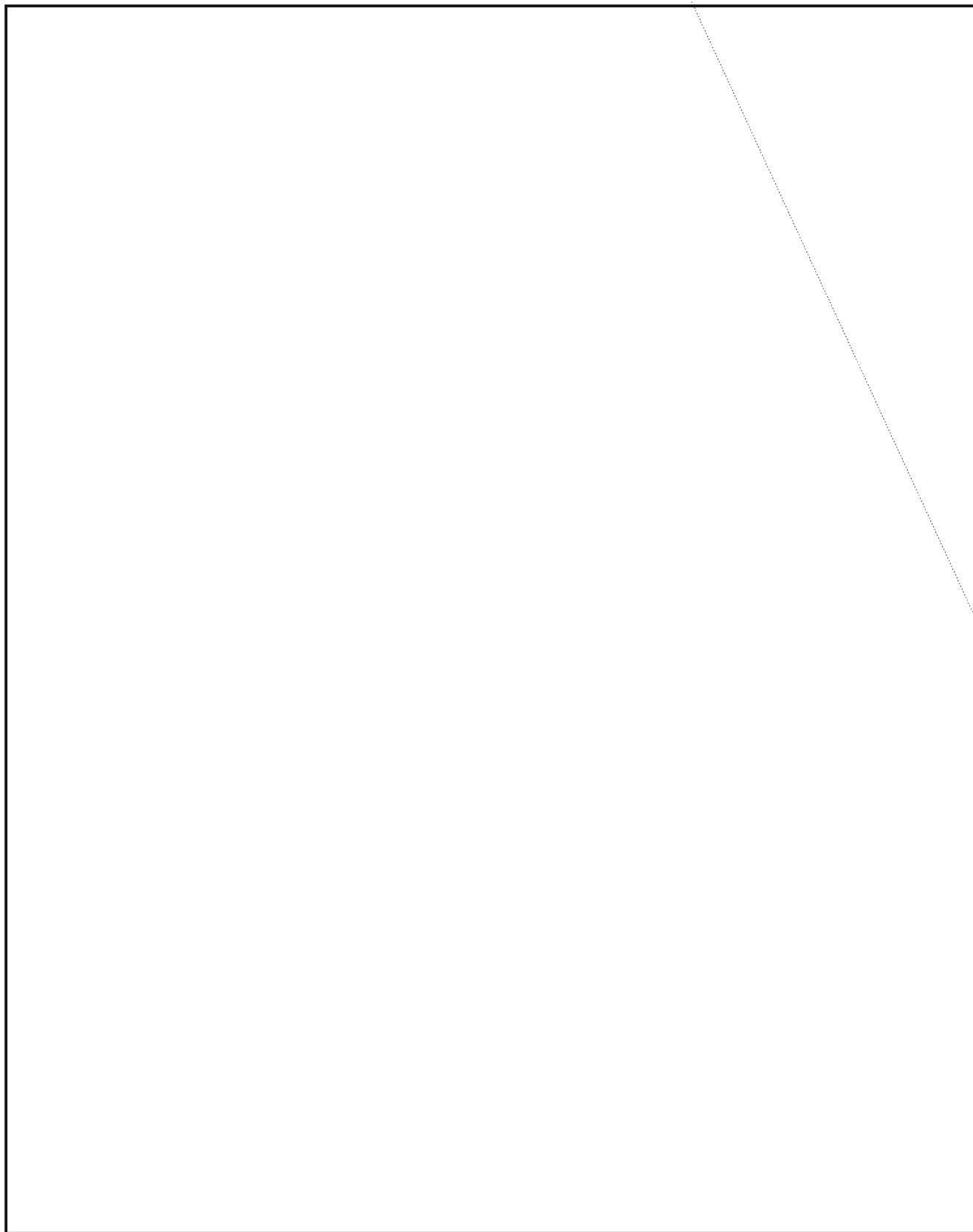


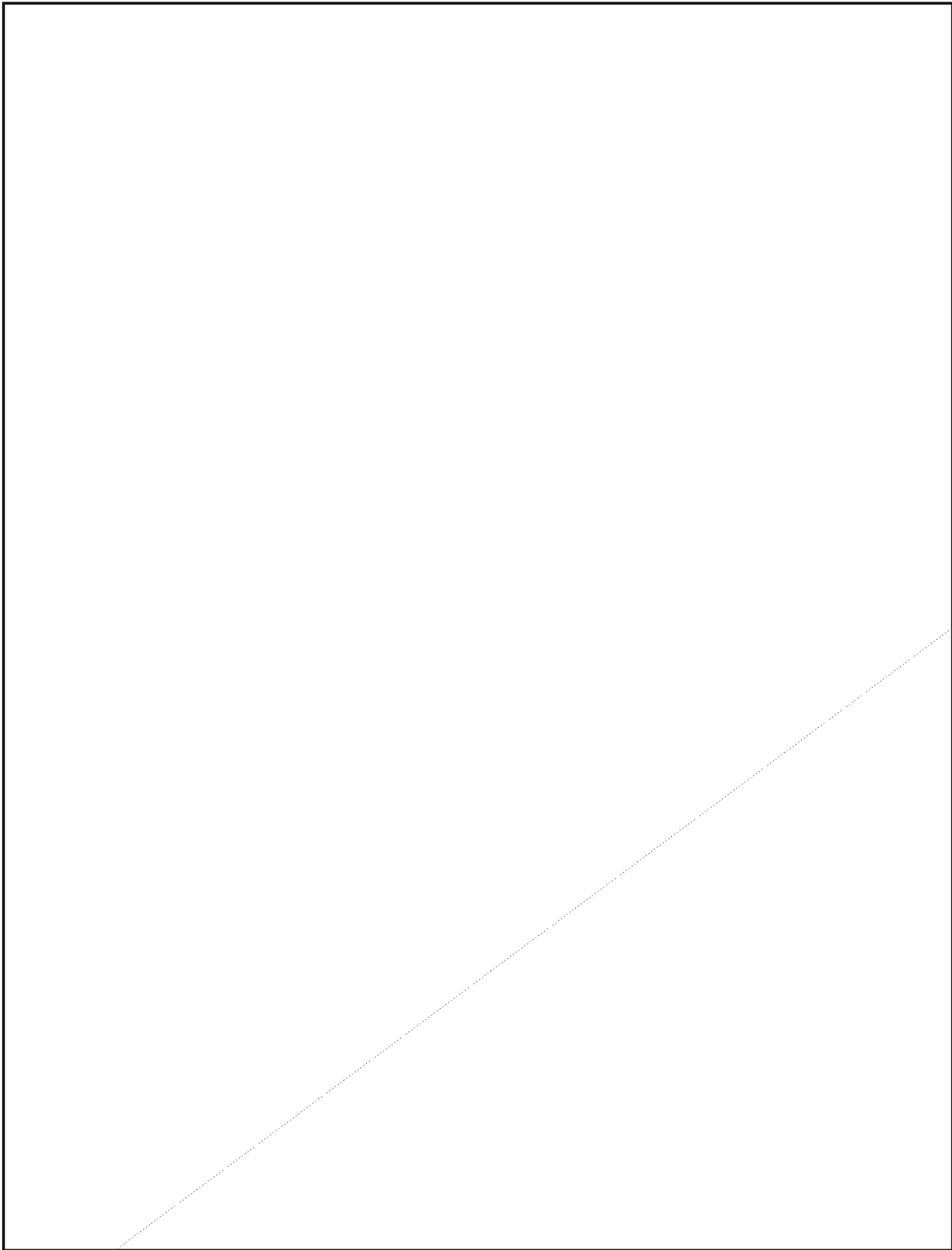
by

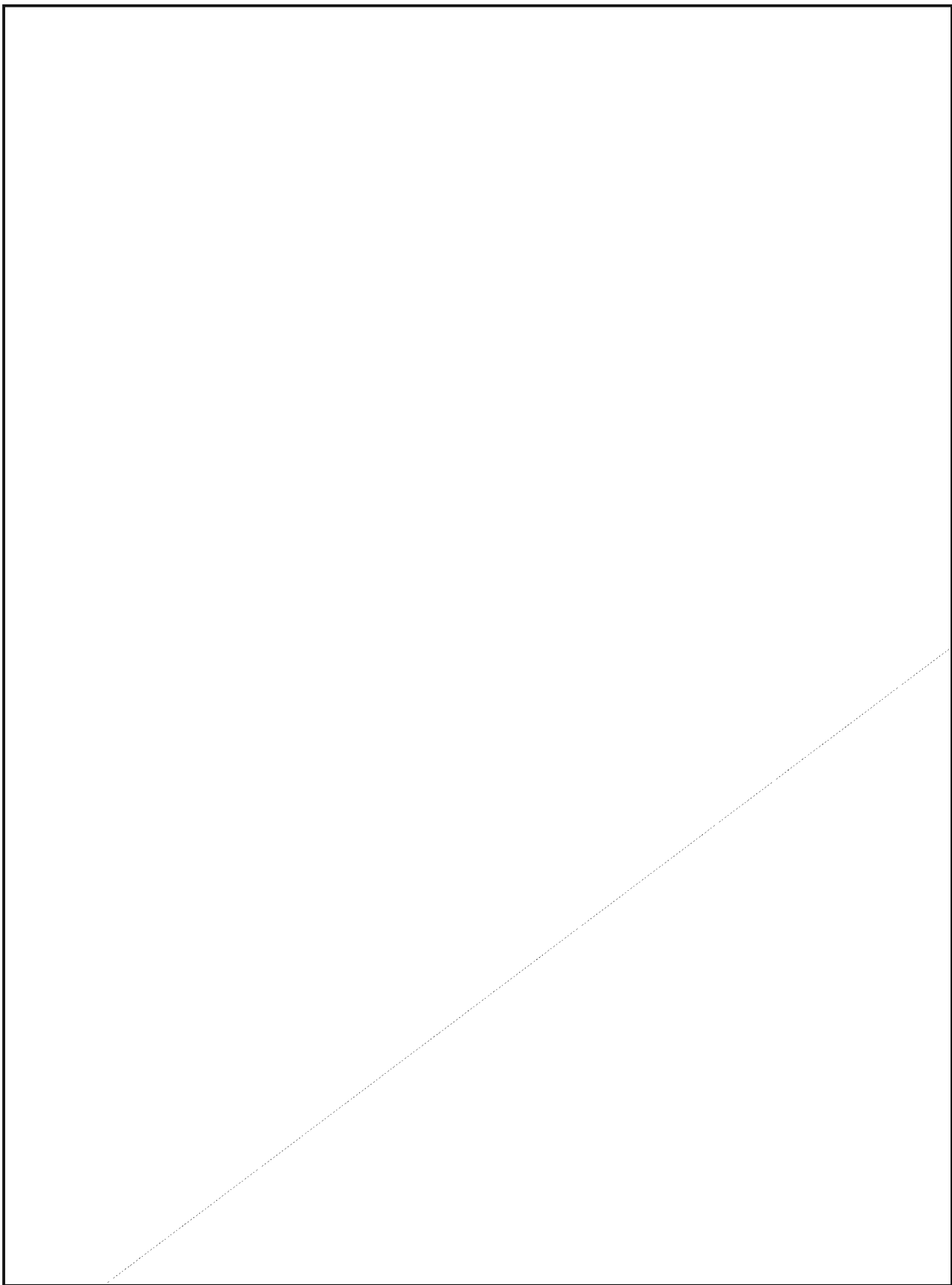


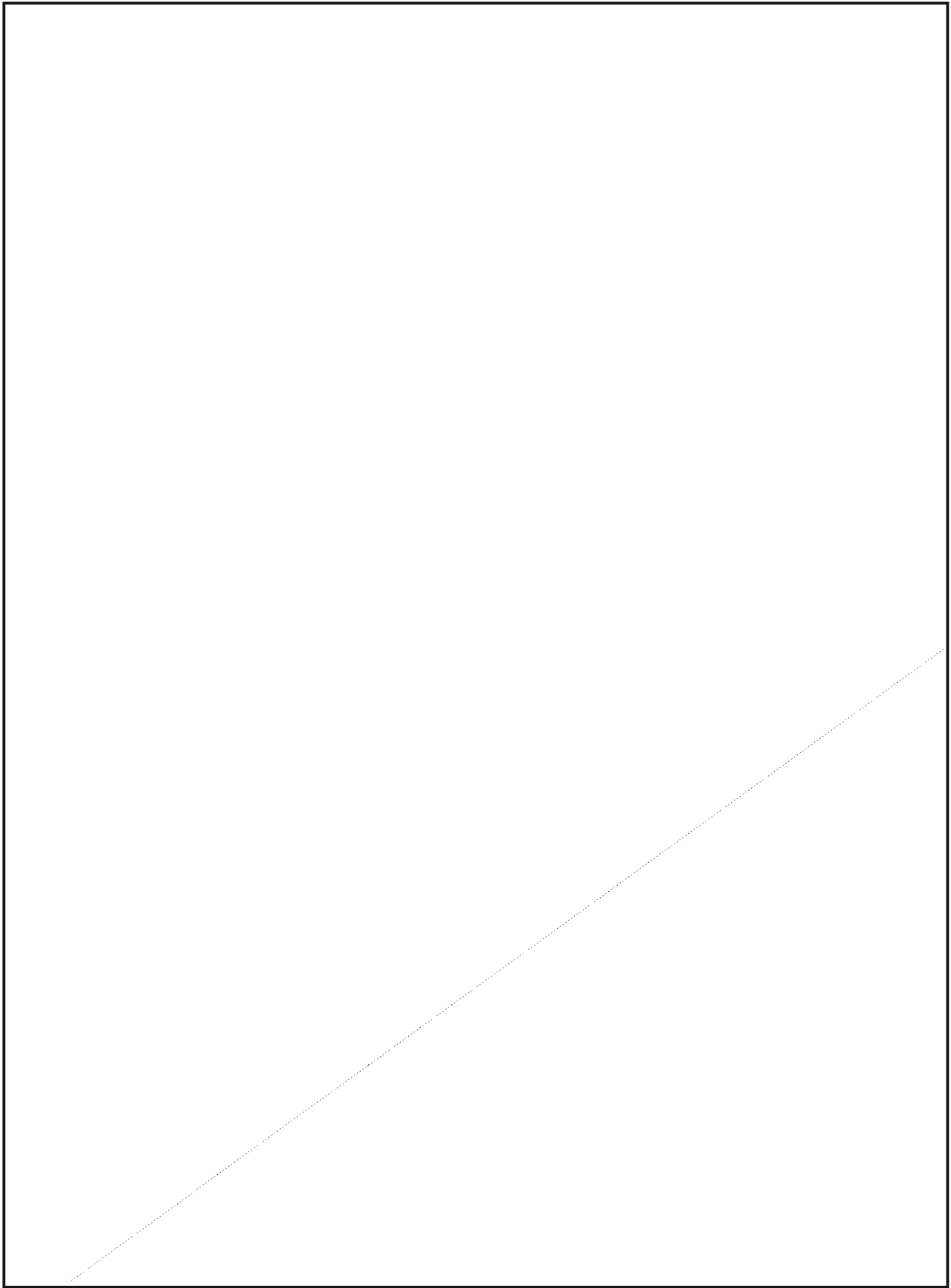












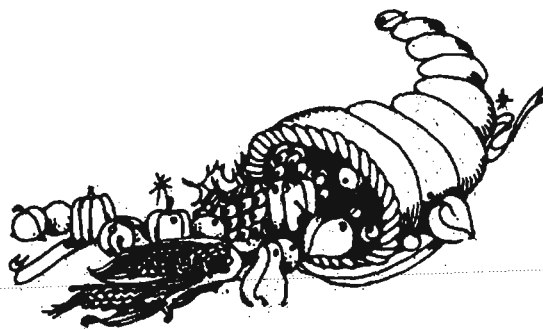
# SHELL GAME:



## SYSTEM SHELLS (U)



by



P.L. 86-



One of the best ways to learn about shells is to look at shell files that other people are using. Some of the commands on the UNIX system (U) you are using may well be shell files. Shell files execute more slowly than compiled files, so most of the executable commands will be in binary form, the kind that does strange things to your terminal screen when you try to look at them.

(U) The UNIX command

file filename

can be used to determine (or make a pretty good guess at) whether 'filename' is a "commands" (shell) file. Prowling around the places where the system commands are stored, one can turn up a number of shell files. Some of these files are complex and require some extra effort to understand, but others are short and relatively easy to read.

(U) We found the following files on our system, all of which are shell files. They are grouped (roughly) according to complexity. You ought to be able to find most of them (and possibly others) on your system. Have fun!

### Easy

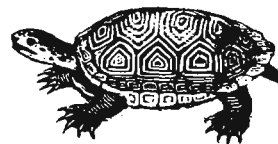
```
/bin/lsm
/usr/bin/mrsinputcvt
/etc/sched
```

### Intermediate

```
/usr/bin/commands
/usr/bin/doc
/usr/bin/news
/usr/bin/suggest
/etc/labelof
```

### Complex

```
/bin/csplit
/bin/diff3
/usr/bin/diction
/usr/bin/fixpib
/usr/bin/guidemaker
/usr/bin/help
/usr/bin/lorder
/usr/bin/man
/usr/bin/mm
/usr/bin/notate
/usr/bin/sccsdiff
/usr/bin/spell
/usr/bin/style
/usr/bin/xfer
```





P.L. 86-36

**T**he Direct Communications Link (DCL) earth station at Fort Detrick, Maryland, is the tracking and communications station of the United States for the intercontinental link which in 1978 replaced the terrestrial "Hotline" linking Washington and Moscow. (See Figure 1.) The DCL is a direct private communications link between the President of the United States and the President of the of the Soviet Union. [1]

(U) This paper covers the DCL earth station at Fort Detrick, including its link with Moscow and Washington. The Intelsat system of the United States, whose earth station is located at Etam, West Virginia, is covered only as necessary to understand the entire concept.



#### I. WHAT WAS AVAILABLE BEFORE THE DCL?

(U) Prior to 1963 the United States and Soviet Union had no real-time communications with one another. The original Hotline was first proposed in 1960 by Jess Gorkin, the editor of *Parade* magazine. Because of the lack of direct communications, the need for a direct-communication Hotline between Washington and Moscow first became obvious during the October 1962 Cuban Missile Crisis. Misunderstandings caused by the lack of direct communications could have led to a nuclear confrontation. [2] A direct communications link was finally approved by President Kennedy and Premier Khrushchev shortly after the Missile Crisis.

(U) The United States and the Soviet Union signed the "Hotline" agreement in 1963. This agreement established a direct communications link between Washington and Moscow for use in emergency situations. [3] The terrestrial US-USSR Hotline system was designed and put into operation in the fall of 1963. In addition, a back-up radio link was established. Both the direct-communications link and its back-up were duplex teleprinter circuits which made use of cable and high-frequency radio links. The circuits used a speed of 50 baud/66 words per minute. The original US "Hotline" printer now sits in the Smithsonian Institution.

## II. HISTORICAL EVENTS

(U) During its years of existence, the "Hotline" was used many times. The first well-known use was by President Johnson during the Arab-Israeli Six-Day War in 1967. He advised the Soviets of US ship and aircraft movements in the Mediterranean following an Israeli attack on the USS Liberty. President Johnson also sent several Hotline bulletins to notify the Kremlin of crucial Vietnam developments later on.

(U) In April 1969, when North Korea shot down an American reconnaissance plane, President Nixon used the Hotline to ask the Soviets to help search for survivors. Apparently President Ford did not have occasion to use the system during his administration, but the White House disclosed that President Carter and President Brezhnev used the Hotline several times to exchange messages. [4]

(U) The original "Hotline" consisted of undersea cables, radio links, and landlines, all susceptible to mishap. During the years which followed its beginning, several accidents occurred: a fire in a Baltimore manhole caused the line to be out of service temporarily; a farmer in Finland dug up the cable with his tractor; and both a deep-sea fishing trawler and a bulldozer in Copenhagen cut the line. [5]

## III. WHY THE DCL CAME INTO BEING

(U) In each of the above cases the back-up radio system took over, but concern over the mishaps led to a US-Soviet agreement to create a pair of independent, but parallel, satellite communications circuits, each using a separate communications satellite in each country. [2]

(U) Advantages of the new system are:

- [ ] it is less vulnerable than the older system;
- [ ] it depends less on extensive terrestrial microwave or cable relays;
- [ ] it eliminates dependence on third country facilities
- [ ] it is not subject to interruptions caused by atmospheric interference.

(U) As a result of the 1971 Strategic Arms Limitation Talks (SALT), a supplemental 1971 accord (signed in Washington, September 1972, and in Moscow, December 1973) resulted in a new agreement which provided for two separate satellite circuits to replace the existing circuits, permit multiple teleprinter termi-

nals and reduce the vulnerability of the terrestrial direct communication facilities. [6] An annex to the 1971 SALT agreement stated that the Hotline would be deactivated upon mutual agreement that it was no longer required.

## IV. HOW THE DCL CAME INTO BEING

(U) Technical negotiations between the US and USSR involved US Departments of State and Defense officials and representatives of the Soviet Ministries of Foreign Affairs and Communications. Through a series of technical discussions, the new satellite system was jointly engineered, resulting in a Molniya earth station being constructed in the US at Fort Detrick, Maryland, and Intelsat earth stations being constructed in the USSR Moscow and L'vov. [7] Teams from each country were exchanged to familiarize the operators with some equipment differences, procedural rules, and other factors that were needed to ensure complete understanding of the system.

(U) The US portion of the link between the US and the USSR (which uses the Soviet Molniya II satellites) was awarded by the US Army Satellite Communications Agency to be built by the Harris Corporation on a 15-acre site at Fort Detrick, Maryland, at a cost of \$7.5 million. Construction of the Fort Detrick DCL station began in October 1972 and was completed in April 1974.

(U) All the equipment is housed in a prefabricated steel building located between the two antenna subsystems on grounds enclosed by a security fence. The building provides a floor area of 7,000 square feet. The control room, which seems small considering the importance of its duties, measures approximately 20 by 60 feet and contains the computer, transmitters, receivers, and other equipment necessary to maintain the system

(U) After an extended period of testing between Fort Detrick and its sister station in the Moscow area, the line became fully operational in January 1978. During the testing years the older Hotline and new DCL operated in tandem. The original baud/wpm rate was retained; [7] also the older Hotline link was retained for emergency back-up.

(U) The Russians employed their Molniya and the Americans the commercial Intelsat satellites (both of which operate simultaneously) so that if one system fails, the other can be used. [8]

(U) The Fort Detrick DCL station consists of two identical and independent communications systems, providing simultaneous transmission and reception of C-band, FM-modulated



signals through its tracking communications antennas. Both communications systems interface via baseband processing equipment with government telephone cables that complete the Washington-Moscow connection. [8] The final telephone cable link from Fort Detrick to Washington goes first to the National Military Command Center in the Pentagon and from there directly to the White House. The telephone company has the responsibility for this final telephone cable link. If the US President wanted to converse with the Soviet Premier, a link would be established between Fort Detrick and the Pentagon, where communications experts can patch the President in to anywhere. [9]

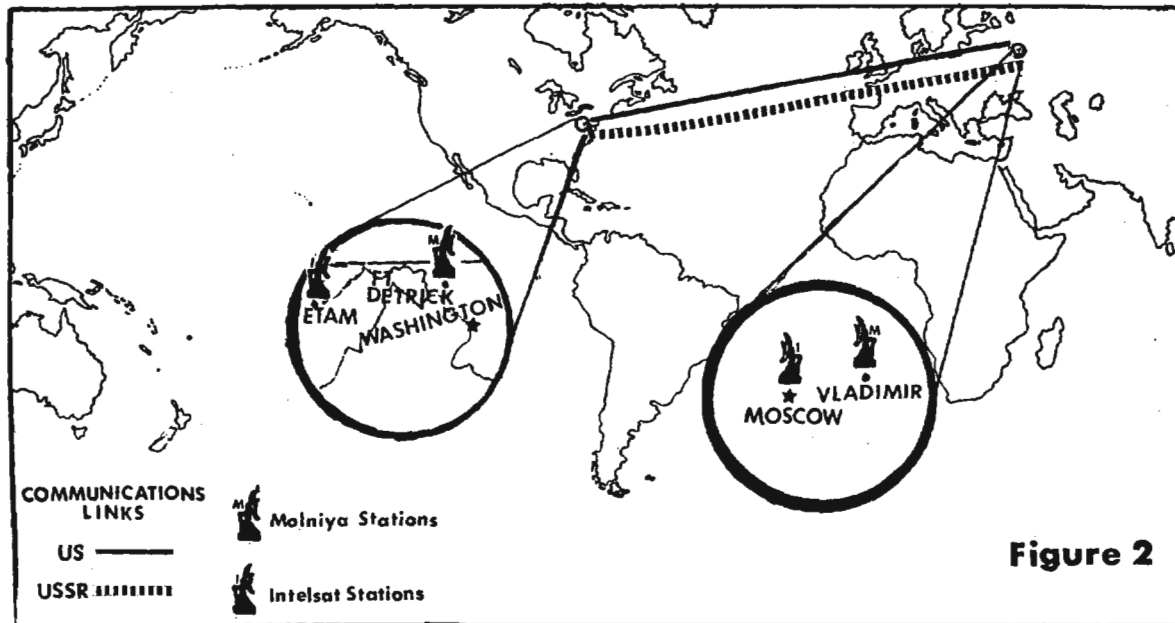
V. THE PHYSICAL LOCATION OF THE DCL AND ITS ALTERNATE SITE

(U) The satellite portion of the United States is a leased duplex voice bandwidth circuit from a Comsat earth station at Etam, West Virginia, over an Intelsat IV satellite to a USSR-provided earth station at Moscow. The USSR satellite portion is a duplex voice bandwidth circuit from a Molniya II earth station at Vladimir, USSR (about 100 miles east of Moscow), through the Molniya II satellite to a US-furnished earth station at Fort

Detrick. [8] Sending the traffic over those two routes minimizes chances that the messages will be distorted or lost. (See Figure 2.)

(U) Messages from Washington to Moscow are transmitted in English, using Latin characters. Communications from Moscow are in Russian, using Cyrillic letters. All the messages, including hourly tests, are automatically encoded upon transmission and decoded upon receipt. [1]

(U) Despite what Hollywood showed in the movie "Fail-safe" starring Henry Fonda, the Hotline is not a red telephone. The fact is that President Reagan and the Russian premier are linked by a teleprinter. When the leaders of the two countries "speak" to each other, their messages are in their own native language, primarily to ensure accuracy. Printed messages have the advantage of overcoming language barriers, avoiding possible misunderstanding by simultaneous interpreters, and providing a written record of the traffic exchanged. [9] The traffic between the two countries is transmitted simultaneously over three independent systems. The United States circuit uses the Molniya II system and a cable system which passes across northern Europe. All three systems use the Pentagon as a central communications point.



## VI. ON-SITE OPERATIONS

(U) At the present time the operation and maintenance of the Fort Detrick earth station is under contract from the Army to the Bendix Field Engineering Corporation at an annual rate of one million dollars. Approximately 20 workers maintain the DCL at Fort Detrick 24 hours a day, seven days a week. [10] The workforce includes Russian linguists, technicians, and maintenance personnel. The staff monitors the signals going to and coming from Moscow, enhancing the power, if needed, and making sure that the antennas remain on target. There is not much chance that automation will reduce the number of people involved because of the terms of the supplemental 1971 SALT accord.

(U) The Fort Detrick DCL Station sends and receives traffic in the Russian language with an interpreter providing the necessary translations. Transmissions concerning technical data are translated into English by the linguists and filed. The setup is reversed for technicians operating the US Intelsat circuits.

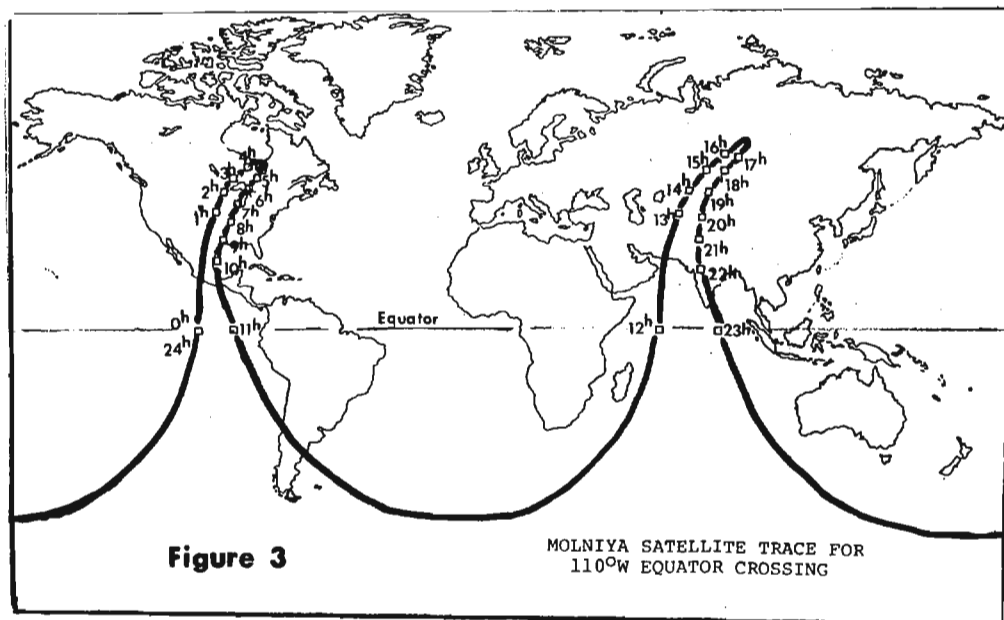
(U) The technicians at Fort Detrick talk to their counterparts in the USSR over a service channel to check the operation of the system. Conversations are always very polite but almost never personal. Nevertheless, a lively

exchange between American and Soviet technicians has been going on since December 1975, when testing first began. "Good morning, esteemed colleagues," the Soviets often open their remarks. [1]

(U) On occasion the dialogue has been very emotional. For example, the Russians send the US congratulations on such holidays as the Fourth of July and the American technicians congratulate their counterparts on the anniversary of such dates as the launching of the first Sputnik. [2] Following each communications exchange, the linguist types the appropriate translation so that this translation becomes part of the official station records. The communications from Moscow are typed in red and the outgoing US texts use black ink.

(U) The technicians at the DCL station cannot read the messages that are sent between Moscow and Washington. All they see are the readings on monitors as the signals are scrambled, with the only decrypting devices located at the terminals used by the two heads of state.

(U) Although the technicians are not military personnel, security is tight. Armed military guards are located directly across the street and the only entrance to the building is electronically operated. The DCL compound, if the need arises, can be sealed off from the rest of the base.



## VII. THE USE AND OPERATION OF MOLNIYA II SATELLITES

(U) Unlike the US Intelsat satellites, the Russian Molniya satellites move in a highly eccentric orbit. This orbit brings each of the eight (four active and four standby) satellites forming the Molniya II operational system over the United States DCL earth station in a high looping arc once a day. Both of the Fort Detrick antennas track the satellite as it moves across the sky, which provides the system a minimum communications interruption, even in the unlikely outage of one antenna. [5]

(U) The reason for the deviation and eccentricity of the Molniya II satellites is essentially geographical. The northern portions of the Soviet Union are not visible to a satellite located over the equator. For this reason, the Molniya II satellites are placed in a highly elliptical orbit with an apogee (high point) of nearly 25,000 miles and a perigee (low point) of only 300 miles. The 65-degree direction provides an apogee over the northern hemisphere and the satellite's 12-hour orbital periods mean that they make two complete revolutions around the earth each day. [11]

(U) When the North American apogee occurs, each satellite remains visible to both Russian and American ground stations for approximately eight hours before the spacecraft moves down to its perigee in the southern hemisphere. By placing four Molniya satellites (plus four spares) in orbit and spacing them suitably, at least one will always be in view and available for communication between the two countries. [8] If the satellites' paths were traced on a map, they would look like two crested waves, one reaching into the center of North America and the other into Asia. [12] (See Figure 3.) These orbits are essential because the Russian satellites carry signals other than those of the Hotline. Therefore, a more conventional orbit around the Equator would make it impossible to reach the most populated areas in the northern part of Russia.

### OPERATION OF THE DCL OPEN GRID ANTENNAS

(U) Twin 60-foot open grid antennas located at Fort Detrick are used to follow the Soviet Union's Molniya communications satellites in their highly eccentric orbit around the earth. Both antennas track the same satellite to provide complete redundancy except during period of handover from one satellite to another. [13]

(U) Shortly before the time when the active satellite moves out of the region of mutual visibility between Washington and Moscow, one

of the two DCL antennas will swing away from it and obtain the next vehicle in preparation for the communications handover. Once a communications circuit has been established through the next satellite, the original DCL circuit will be transferred; the other antenna will move over to provide backup. [12] In this way 24-hour coverage is achieved. Handovers from one satellite to another are accomplished approximately every six hours to ensure minimum interruption of communications capability; usually the interruption lasts only 14 to 20 seconds. In addition, if difficulties prevent maintenance communications via the Molniya system, then the DCL at Fort Detrick has the capability to operate via the USSR Stationstar synchronous satellite, a satellite which orbits around the equator. This procedure is implemented only during emergency conditions and requires the approval of the Federal Communications Commission.

(U) Both DCL antennas at Fort Detrick have the full hemispherical angular coverage and precision tracking capability needed to direct their narrow beams toward the satellites. [8] During the daily period in which each earth satellite is jointly visible by Washington and Moscow, its pilot signal is autotracked by the two DCL antennas. The earth station includes two complete radio frequencies so that autonomous tracking of the Molniya satellite can be achieved.

### AN EXPLANATION OF THE EQUIPMENT NECESSARY TO MAINTAIN THE DCL

(U) In addition to the two communications systems (including the transmitting, receiving, and antenna subsystems), there are ancillary subsystems that serve the earth station. These ancillary subsystems include:

- [ ] a dual programmer subsystem;
- [ ] a control, monitor, and alarm subsystem; and
- [ ] the prime power subsystem. [13]

(U) The dual programmer subsystem is built around twin Datacraft Model 6024/5 central processors operating through multiple parallel channel control buffers. [5] These twin computers provide automatic tracking of the satellites. Orbital variables furnished by the Soviet Union are programmed into these computers. Each processor accepts as input the orbital geometry elements of a satellite, and then the computers automatically generate the attendant look angles for the specified satellite. In addition, one of the technicians manually selects the program track which activates the computer to move the antenna to a preselected position for acquisition. The computers also provide corrections for antenna

error, as well as a real-time servoloop closure for the antennas. [8]

(U) The control, monitor, and alarm subsystem functions as the operator interface for station control status display and provides the logic circuitry to control automatic switchover to standby items of critical equipment in the event of an on-line failure. The occurrence of faults within the equipment of any subsystem activates distinctive audible alarms which sound throughout the DCL station until a maintenance action is started. [8]

#### X. RELIABILITY OF THE DCL SATELLITE SYSTEM

(U) The DCL station also had two prime power generators, each capable of accepting the power load of the entire DCL station. Two uninterrupted power sources (UPSs) give the station the ability to operate without communication channel outage despite any temporary loss of power.

(U) Special redundancy is provided within each of the two antenna subsystems of the Fort Detrick DCL site. For example, standby transmitting and receiving equipments are held in constant readiness so that a failure in any on-line unit can be quickly countered. [7] Monitoring circuits keep a steady watch on the status of all critical equipment within the DCL station. These circuits can switch in a standby unit automatically to prevent all but a momentary loss of communications. By these means extremely high communications link reliability is assured. [5] The DCL system has an efficiency of over 99.99% with a total down time of only 35 minutes for 1983. It would seem that the original concept of creating a more dependable, more reliable system of communication between the two superpowers has been realized. [13]

(U) The longest period of time that the Fort Detrick station has been off the air occurred July 27, 1982, when a bolt of lightning hit inside the compound fence, causing considerable damage. The DCL station was back on the air within seven minutes, with the technicians tracking and working all systems manually.

(U) Even with strict US-USSR requirements that any interruption which exceeds five milliseconds be considered a failure, the DCL system Mean Time Between Failures (MTBF) is greater than 835 hours (almost 35 days). [13] In addition, operational requirements include:

[ ] the need to restore one signal route to operation within 15 minutes of a failure and

[ ] for 90 percent of all failures, the restriction of corrective maintenance to a maximum of 45 minutes.

#### XI. BACKUP CAPABILITIES

(U) Each of the two identical earth station communication systems forms a fully redundant communications path from an interface with baseband processing equipment through its transmitting and receiving subsystems. Dual uplink and downlink communications chains are formed in on-line/standby pairs such that single failures within the equipment of either system cannot cause more than an instant loss of signal continuity. Circuit status is monitored at all times and switchover to a standby chain upon detection of an on-line failure is automatic. [14]

(U) Each of the two channels of baseband information frequency modulates a carrier and is up-converted and amplified within redundant transmitting chains. The output of one of the two power amplifiers is then selected for radiation via the antenna subsystem. [13]

(U) Received signals are routed from the antenna subsystem to one of the two low-noise amplifier channels within the receiving subsystem where four down-converted channels carry the band signals to a signal processor. Two of the four channels normally provide a redundant path for the Moscow link communications traffic. The other two channels (pilot/monitor and pilot) are not directly in the communications path but give the signal processor auxiliary inputs for the earth station frequency and power control and automatic tracking.

(U) The system's success could be attributed to a comprehensive preventive program which includes regular maintenance and evaluation of operating equipment. Several monitoring and control modifications have kept equipment up to the changing levels of technological advancement. [14]

(U) Normally the station operates on commercial power. In the event of a commercial power outage, emergency generators capable of accepting the load of the DCL station are located nearby at Headquarters, East Coast Telecommunications Center. In addition, within the DCL station, two uninterruptible power sources provide the station with the capability to operate on batteries for short periods of time without a communications channels outage despite any temporary loss of prime power. [7]

(U) The technique for automatic frequency and Effective Isotropic Radiated Power (EIRP) are controlled by comparing the received level and frequency of two carriers passing through the satellite. The first of these is a pilot carrier generated within the Soviet Union, while the second is the earth station's own transmitted signal. The frequency and EIRP of the locally transmitted signal are automatically controlled by the signal processor to maintain the frequency and power level at which the two carriers are received in a fixed relationship. [14] Failure of either pilot demodulator chain diverts the standby demodulator from its normal communications function so that frequency, power control, and tracking can be continued.

(U) Each antenna subsystem employs a pseudo-monopulse automatic tracking feed in a Cassegrain configuration within the 60-foot reflector. The feed system, which combines transmit, receive, and tracking functions in a single horn, is a modified version of that used in communications satellites in the Intelsat series. [12] The control system for each DCL antenna operates in both automatic and tracking or computer-directed modes to direct its beamwidth accurately toward a satellite. Antenna position is directed by precision resolvers which supply programmer subsystem inputs, drive illuminated position displays, and furnish (through the computers) a paper-tape record of time-tagged tracking angles.

(U) The antenna pedestals of the DCL earth station are rigged X-Y positioners capable of supporting 85-foot-diameter reflectors. The X-Y axis configuration can track satellites directly through zenith and the near-hemispherical angular excursion capability includes all altitudes at which the satellites are visible in both Washington and Moscow. Neither reflector nor pedestal requires a radome protection to survive winds as high as 150 mph. A deicing system prevents the accumulation of ice or snow on either the reflectors or subreflectors. [14]

#### XII. HOW THE DCL WILL BE UTILIZED IN THE FUTURE

(U) President Reagan proposed several times during 1982 and 1983 that considerations be given to upgrading the Hotline to permit a higher rate of data or, in fact, even voice communications. [16] This change will not take place for several years because, in order to change from the current 66 words per minute to a higher rate, the change must be established with the Russians in a treaty, which takes time.

(U) The establishment of other DCLs with other countries has not been formally proposed to date and does not seem likely for quite some time.

#### FOOTNOTES

1. News, Public Affairs Office, Fort Detrick, Maryland, September 14, 1972.
2. L. H. Whittemore, "U.S.-Soviet Hotline begins operating by satellite," The Baltimore Sun, January 1978.
3. "20 Years of Arm Agreement," U.S. News and World Report, May 1979.
4. George Gedda, Associated Press dispatch, January 16, 1978.
5. John Whitman, "Hotline terminal links U.S.-U.S.S.R.," Radiation Ink, Melbourne, FL, April 1973.
6. Ministry of Communications, USSR, "Organization of the U.S.S.R.-U.S.A. Direct Communications Link Through the Molniya-3 Satellites," 1976.
7. US Army Communications System Agency, "Logistics Support for U.S.A.-U.S.S.R. Direct Communications Link," August 1973, chapter 3.
8. "Molniya Earth Station Becomes Operational for Washington-Moscow Direct Communication Link," Communication News, February 1975, p. 3.
9. "Hotline," The Morning Herald, Hagerstown, MD, September 4, 1979.
10. "Local Bendix Subsidiary Runs Political Hotline," The Baltimore Sun, September 23, 1981.
11. Hugh Hartman, in Bendix Corporation newsletter, Columbia, MD, October 1981.
12. Douglas Tallman, "Fort Detrick 'dishes' link White House to Kremlin," The Post, Frederick, MD, April 21, 1982.
13. Conversation with Hugh Hartman, Bendix Corporation DCL Site Manager, Columbia, MD, December 1982.
14. William Pitman, Harris Corporation Information System, Melbourne, FL, November 1982.
15. Denny Quinn, "Fort Detrick--Hotline to U.S.S.R.," The Post, Frederick, MD, August 25, 1980.
16. Henry Jackson, "Nuclear War and the Hotline," The Wall Street Journal, September 3, 1982.



# NSA-Croctic No. 51

Leonard, Adolph, Julius, Milton and  
Herbert - otherwise known as Word R.

- A. Almond or pecan, for example 143 71 84
  
- B. Lefty 61 59 26 124 76 95 146 28
  
- C. Probably Word R's best movie (1935) (5 wds) 129 100 167 23 157 116 49 184 30 152 18 63  
24 7 140 135
  
- D. She played Word R's mother in the play *Minnie's Boys* (2 wds) 51 62 169 102 4 68 47 138 179 110 87 36 60 72
  
- E. 1946 film with Word R (4 wds) 164 43 130 27 174 14 98 83 122 2 35 57  
147 160 133 183 154 139
  
- F. Given to the use of obscene talk 166 126 94 149 181 125 159 173 117 123 137
  
- G. Reverberate: repeat 148 93 132 77
  
- H. Integer 88 151 99
  
- I. Young; fresh, vigorous 70 53 50 44 33 120 5 25
  
- J. \_\_\_\_\_ mad 112 172 54 40 153 131 144
  
- K. 1930 movie with Word R (2 wds) 13 22 3 45 104 79 81 20 96 48 65 42 56 11
  
- L. The unfunny member of Word R 134 90 19 180 9
  
- M. 1937 film starring Word R (5 wds) 46 170 101 108 114 8 32 31 182 16 109 86 52 75
  
- N. French engineer (1604—1680), built the Canal du Midi, linking the Mediterranean and the Bay of Biscay 69 34 177 38 163 128
  
- O. French historian (1805—1859), who wrote extensively about the United States (*Democracy in America*, etc.) 161 106 58 118 64 37 178 73 67 29 145 115 175
  
- P. Knob, lump; gist, point 141 78 162
  
- Q. Not on 82 119 105

R. American comedy team (3 wds)

171 15 12 41 85 136 168 127 74 91 107 89

176 6 156

S. \_\_\_\_\_ Amin

39 111 121

T. Place where certain refreshments  
are sold

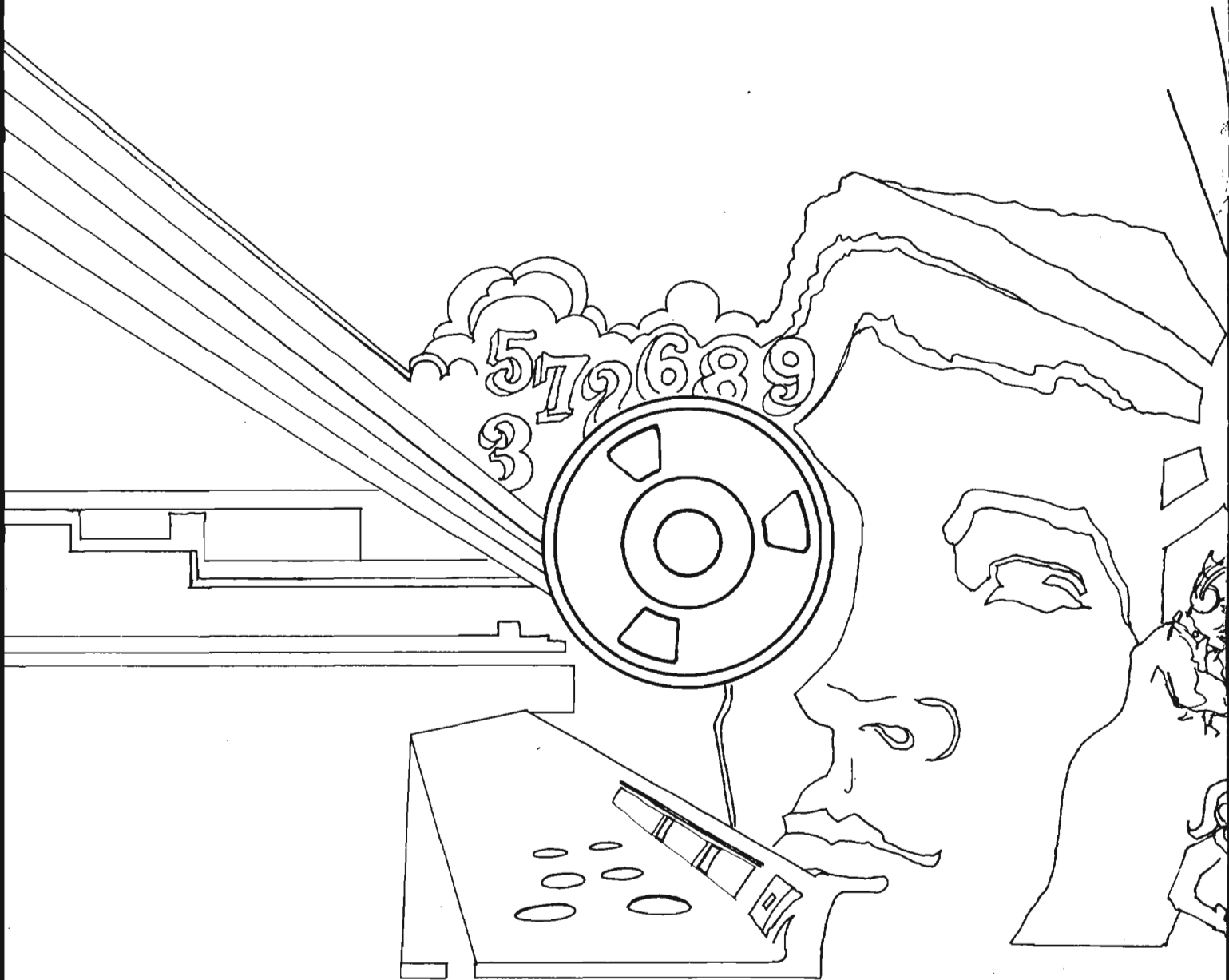
92 158 1 165 66 17 155 21 10 150 55

U. Bluepencils

113 80 142 97 103

■	■	■	1 T	2 E	3 K	4 D	5 I	6 R	7 C	■	8 M	9 L	■	10 T
11 K	12 R	■	13 K	■	14 E	15 R	16 M	17 T	18 C	■	19 L	20 K	21 T	22 K
23 C	■	24 C	25 I	26 B	27 E	■	28 B	29 O	30 C	31 M	■	32 M	33 I	34 N
35 E	■	36 D	37 O	38 N	39 S	40 J	41 R	42 K	43 E	44 I	■	45 K	46 M	47 D
■	48 K	49 C	50 I	51 D	52 M	■	53 I	54 J	55 T	56 K	57 E	58 O	59 B	60 D
■	61 B	62 D	63 C	64 O	65 K	■	66 T	67 O	68 D	69 N	70 I	■	71 A	72 D
73 O	74 R	■	75 M	76 B	77 G	78 P	79 K	80 U	■	81 K	82 Q	83 E	84 A	85 R
86 M	87 D	■	88 H	89 R	90 L	■	91 R	92 T	93 G	94 F	95 B	96 K	97 U	98 E
99 H	100 C	101 M	102 D	■	103 U	104 K	105 Q	106 O	107 R	108 M	■	109 M	110 D	111 S
■	112 J	113 U	114 M	115 O	116 C	117 F	■	118 O	119 Q	120 I	121 S	122 E	123 F	■
124 B	125 F	■	126 F	127 R	128 N	129 C	130 E	131 J	■	132 G	133 E	134 L	135 C	136 R
137 F	■	138 D	139 E	140 C	141 P	142 U	143 A	144 J	■	145 O	146 B	147 E	148 G	149 F
150 T	■	151 H	152 C	153 J	154 E	155 T	■	156 R	157 C	158 T	159 F	160 E	161 O	■
162 P	163 N	■	164 E	165 T	166 F	167 C	168 R	169 D	170 M	■	171 R	172 J	■	173 F
174 E	175 O	■	176 R	177 N	178 O	179 D	180 L	181 F	182 M	183 E	184 C	dhw	■	■

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