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18 December 1957

MEMORANDUM FOR THE RECORD

SUBJECT: Hagelin Negotiations

1a. After Mr. Barlow left Stockholm to visit the Hagelin Laboratories in Zug, Mr. Hagelin urged that I <sup>to, the Laboratories</sup> visit ~~him~~ in Zug as soon as convenient, <sup>not only</sup> for the purpose of continuing our talks with regard to the "Gentlemen's Agreement" and also to see the progress that had been made in the development of <sup>his</sup> new apparatus. Accordingly, after spending a few days on holiday in Scandinavia, I proceeded to Frankfurt for preliminary talks with the <sup>the Chief of</sup> Chiefs of NSAEUR and ASAE to ascertain what late information was available concerning developments in <sup>Europe and especially in</sup> Germany in the cryptologic field which might have a bearing upon the talks which would later ensue between myself and Mr. Hagelin. The information gleaned from <sup>the</sup> ~~this~~ conference with the aforementioned personnel turned out to be quite useful in my talks with Mr. Hagelin. After a few days holiday with friends in Frankfurt, on 22 September I proceeded to Zurich where I was met at the airport at 1800 hours by Mr. Hagelin, who took me to Zug by automobile. Mr. Hagelin insisted that I be his house guest, which necessitated cancellation of a hotel reservation which I had made. After dinner we had a brief talk among which the following were the principal items of concern:

b x. He astonished me by handing me a copy of U.S. Patent No. 2,802,047, issued on 6 August 1957, on an "Electric Switching Device for Ciphering Apparatus". A copy of this patent is attached

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as Exhibit I. The reason for my astonishment was that this patent covers the re-entry principle in electric rotor machines, a principle first thought of, at least in the U.S., some time in 1940. It was conceived by Mr. Albert Small in connection with the efforts of the Army Signal Intelligence Service to solve the Japanese highest level diplomatic cipher machine (the so-called "Purple"). The idea had, at my insistence, been written up, an application for patent thereon had been filed, and the application and all papers connected therewith in the Patent Office had been placed in secrecy. So far as I am aware, this application is still in a secrecy status, ~~and~~ and according to U.S. Patent Law, the Patent Office should not have issued any patent on the re-entry principle and mechanism therefor without going through the mechanics of a "declaration of interference". It is probable that there was a slip-up in the U.S. Patent Office and this will have to be investigated. This phase of the matter has been turned over to Mr. Stauffer, Patent Counsel, Office of Research and Development. Naturally I did not disclose to Mr. Hagelin that we had a real interest in the re-entry principle or that an application for a patent thereon was pending in the U.S. Patent Office and was in secrecy status. He did make a comment to the effect that even though he had the patent, he was pretty sure that he could not obtain royalties from the U.S. for its use. I thereupon asked him what made him think we <sup>had used or</sup> are using such an idea and his reply was something to the effect that he assumed that we too would have thought of such a neat and simple thing long ago. He went on then to add, with a smile, that his application for a patent on this re-entry principle, filed in

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Japan at the same time <sup>that</sup> ~~as~~ it was filed in the U.S. (October 1953) had been rejected by the Japanese Patent Office. At this writing I think Mr. Hagelin's patent is broader than the U.S. application in that his covers the situation

[REDACTED]

<sup>briefly referred to a</sup>  
~~Col.~~ Mr. Hagelin ~~mentioned a very important~~ decision which had very recently been handed down by the Bonn Government to the Siemens Company with regard to the <sup>(OTT)</sup> sale of one-time-tape teleprinter ciphering apparatus. The Bonn decision permits the Siemens Company to sell their aforementioned apparatus to all customers except the Soviet Union and ~~the~~ Satellites thereof. I went into this in ~~much~~ greater detail ~~in~~ <sup>in</sup> subsequent conference with Mr. Hagelin and this report will deal with this <sup>subject</sup> later on.

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it emerged at a contact-point on the output stator.

d. There was considerable detailed information from him about the radiation studies which had been made by the Siemens Company and which was reported ~~on~~<sup>by</sup> in Mr. Barlow ~~in~~<sup>in his</sup> trip report. I deliberately asked Mr. Hagelin to tell me about these studies, as though I had not heard about them already from Mr. Barlow.

f. He had heard several times about complaints of NATO users of the U.S. AFSAM-7 machines. Mostly, he said, operational failures were due to dirty contact surfaces on the rotors. This comment, incidentally, was a repetition of an identical one made by an old friend, a Captain in the U.S. Navy, who is on duty with Allied Forces in Northern Europe (AFNE) and whom I visited in Oslo just before going to Zurich, and by a Navy Communications Security officer in SACLANF HQ in London.

g. Mr. Hagelin told me in some detail of the deterioration in his business and social relations with his son Boris, Junior, in Washington. Later I learned from Mrs. Hagelin that their poor relations with their son began soon after the son's marriage apparently because of in-law/daughter-in-law incompatibility. I was to learn more about this later, too.

2. The next day, Monday 23 September, was spent in friendly chatting with Mr. Hagelin, in the course of which the following items of information were learned or discussed:

a. He once again referred to his "re-injection" patent, this time with some pride in accomplishment or achievement, so that it was obvious that he wanted to talk about it some more. I therefore

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asked how he happened to think of, or hit upon, the idea of "re-injection"; whereupon he told me: In 1952 he'd been to Bonn and had seen Dr. Huettenhain et al (he referred to the group as "Die Studien Gesellschaft" ~~of~~ <sup>in</sup> Bonn), and that during this visit Dr. Huettenhain had said something in regard to [REDACTED]

[REDACTED] Mr. Hagelin told me that he wondered how this was possible but he did not ask Dr. Huettenhain to explain. When he returned to Zug he began to ruminate and to think about this point; he made sketches and drawings, but couldn't figure out how one could do such a thing as Dr. Huettenhain had mentioned. Finally, he showed his drawings to his Chief Engineer, Stürtzinger, who immediately said: "You can do it by [REDACTED]"

[REDACTED] Mr. Hagelin said that he didn't quite understand what Stürtzinger meant by [REDACTED]

[REDACTED] It developed, Hagelin said, that this was exactly what Stürtzinger had in mind, but Hagelin was careful to tell me that he'd thought of this neat trick by himself and before Stürtzinger could explain what he meant by the word

[REDACTED] in this instance. I then took up Mr. Hagelin's last-night's reference to the fact that he failed to obtain a patent in Japan on his idea: "How was it that the U.S. Patent Office cited <sup>a</sup> ~~the~~ Japanese patent against you and still gave you a U.S. patent on

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your 're-injection' circuitry?" He replied: "The Japanese patent wasn't cited by the U.S. Patent Office; it was cited by the Japanese Patent Office itself when my application was filed in that country". I asked Mr. Hagelin if he could give me the Japanese patent number and he courteously supplied me not only with that information but also with a copy of the Japanese patent. (Exhibit II, attached hereto.)

b. We talked again about the Bonn decision mentioned above in paragraph <sup>c</sup>14. Mr. Hagelin stated that he had recently visited the Siemens people in Munich in connection with their sale of one-time-tape cipher teleprinting machines. (Apparently the occasion for this visit was to tell them that he had heard of their sales of such equipment to certain countries which he thought were <sup>already or new</sup> iron-curtain countries, or were inclining in that direction.) He told them he wanted to find out whether there was any basis for these stories. It was then that he learned from them of the Bonn decision to allow Siemens to sell their OTT teleprinter equipment to all countries except the U.S.S.R. and its satellites. Mr. Hagelin told me that he expected to follow suit. I thereupon asked him when or under what circumstances a country is to be regarded as a satellite of the U.S.S.R. How about Egypt? Or Syria? Or certain other Middle East countries? He shrugged his shoulders and asked me in turn "How indeed? I don't know the answer to that. But of this I'm sure as regards Siemens: They've <sup>already</sup> sold some of their OTT teleprinters <sup>to certain governments.</sup> ~~to Egypt. And I think they've sold some to Yugoslavia.~~" When I expressed some astonishment at the sale to Yugoslavia he said:


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c. Mr. Hagelin told me--and this he requested I keep from

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his son Boris, Junior, until he himself told him--that the entire Stockholm plant was to be moved to Zug early in 1958. The purpose is, he said, to integrate all Hagelin operations and activities in one city, and Zug was best for him. He would try to keep in his employ as many of the Stockholm personnel as would be willing to move to Zug to work for him. It was at this point that Mr. Hagelin stated that he had already invested over \$750,000 in his Zug plant and operations; that \$500,000 of that amount came from his capital; the rest came from profits which his business had earned in the past several years and which he decided to plough back into the business.

d. It was also at some point in the conversation on this day that Mr. Hagelin told me that his son Boris, Junior, demanded and received a lump sum of \$25,000 as an advance payment of the inheritance he is slated to receive. Mr. Hagelin added that since the son's arrival in Washington another \$5,000 was demanded and sent. Mr. Hagelin expressed some irritation at his son's financial conduct, saying that he had bought a very expensive home and two automobiles; it was no wonder he was running short of money, but no more advance on the young man's inheritance would be sent him.

 Mr. Hagelin told me that he regretted that he would not be able to be with me after Tuesday evening because he was scheduled to go to

Paris very early on Wednesday for a business conference with the French Interdepartmental Committee on Cryptography. He added that he expected the meeting to keep him in Paris the afternoon of Wednesday, all day Thursday and part of Friday, that he had planned to be home late Friday night, and that he thought he would have very interesting news for me on his return - that is, if I should find it possible to stay and would accept his cordial invitation to stay in Zug and await his return. After a moment's thought I concluded that it would be advisable to do so: first, it would give me an opportunity to see some of his new developments or models and to discuss them with Stürtzinger and Mr. Nyberg, Hagelin's manager-of-works; second, it would give time for a detailed visit through the Hagelin plant; third, I could perhaps discuss the radiation matter and also the Bonn decision with these two gentlemen and might learn more than had been told me by Mr. Hagelin and by Mr. Barlow; fourth, the news Mr. Hagelin thought he would bring back from his visit to Paris might be of considerable interest; and lastly, perhaps I would learn more about Hagelin's plans as a result of the Bonn decision or about his future plans for his business as a whole. I therefore accepted his invitation to stay until his return. My decision and acceptance of his invitation later turned out to have been a good thing, as I learned considerably more from Mr. Hagelin than would have been the case had I not stayed on.

37 a. The next day, Tuesday, 24 September was spent in further leisurely discussions with Mr. Hagelin, during the course of which the following items of interest in this report are set forth below.



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b. I asked Mr. Hagelin if he knew whether or not the Bonn decision referred to above was in writing. He said he could not give a positive answer, either negative or affirmative; he didn't think it was. "But," he went on, "The Siemens people told me that they <sup>had been</sup> ~~were~~ told that new security regulations were being or had already been drafted but <sup>has</sup> not yet <sup>been</sup> acted upon. They will be acted upon presumably after the election, in which Dr. Adenauer is almost sure to be re-appointed. The Siemens people were told that the new regulations might change the whole picture and bring about a new situation.

c. I queried Mr. Hagelin again as to ~~whether~~ <sup>sales of</sup> Siemens ~~had already sold~~ <sup>any</sup> OTT teleprinter equipments and if so, did he know to whom they had been sold. "To Yugoslavia, for sure; and I suspect also to Egypt. I think they sold some to India, too." When I expressed astonishment at the sale to Yugoslavia, since it seemed to me to belong to the Satellite category, he said: "That sale was made a year or more ago, when relations between Yugoslavia and the U.S.S.R. were not so good as they are at present. Well, I guess one could still say that Yugoslavia is no satellite of the U.S.S.R. -- isn't that so?" I told him I didn't really know. (In any case the sale to Yugoslavia was confirmed by Mr. Nyberg the next day, when I visited the Hagelin laboratories.)

d. I asked Mr. Hagelin whether Siemens had developed a key-tape generator for sale to their customers who purchase their OTT teleprinter equipment. He told me that Siemens were making a tape generator for the Bonn Government but according to a design and specifications by Dr. Hüttenhain. Hagelin didn't know its characteristics, except that it was  type. When I asked what the other Siemens customers would use to manufacture

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key tape, Mr. Hagelin said: "Well, I suppose at first they will produce them by hand--punching the keys of a keyboard perforator. But Siemens is going to make tape generators of a type I am developing. In fact, I expect them to make generators for my customers, of course according to my design and development. My prototype is almost finished."

e. I asked whether Siemens had any competitors in Europe ~~who are~~ making and selling OTT teleprinter equipment. Mr. Hagelin stated that the Lorenz Company were competing but their equipment is usually much more <sup>and not as good as</sup> expensive than <sup>the</sup> equivalent Siemens equipment. He understood that Lorenz was still in the developmental stage as regards their OTT generator; the product of their first attempts was not good. When I asked about other competing firms, Mr. Hagelin said that the Italian Olivetti Company <sup>is also</sup> ~~are~~ putting out <sup>key-tape</sup> OTT teleprinter equipment and <sup>generators</sup> but he didn't know much about them /except what can be gathered from an advertising leaflet. OMI, he said, was still "playing around" with their off-line cipher machine.

f. I asked what he thought were his prospects for selling his <sup>own</sup> new

[redacted]

Mr. Hagelin stated that he was of the opinion

that he would sell enough of them to get back <sup>the cost of its</sup> ~~his~~ development costs for it.

<sup>I learned that</sup> So far he has sold only two, and I gathered that these were sold to the French

for study. I expressed <sup>my feeling that</sup> ~~some doubt about~~ the financial prospects for this <sup>were not good because I thought the price to the customer would have to be</sup> development ~~because of the probable high cost of the machine~~ none of

the European Governments could afford to buy many such machines. Mr. Hagelin made no comment on my remark. It was my feeling at the time that he was continuing this development more out of pride and a determination to produce a good off-line machine than for financial returns he might garner for this development.

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g. We talked once more about the testing of his new rotors. I had asked Mr. Hagelin the first time he boasted of having put a circuit through

[redacted] what voltage was being used for this testing and he <sup>had</sup> replied that he did not know. <sup>the answer to my question</sup> But today he told me that he had inquired about this point and now had <sup>the</sup> answer: ~~to my question~~ Only 24 volts; yet the current on each transit went through

[redacted] He seemed to be very proud of this showing. *(But it developed later that the current*

h. The subject of the <sup>European</sup> TELEX communication system came up. I commented that I thought that the use of OTT teleprinter equipment in TELEX communications boded no good for off-line cipher machines because of the lower cost of such

equipment, its simplicity and ease in use, its security, etc. Mr. Hagelin agreed with my view (but see <sup>subpara. 5f</sup> below for comments on this point by Messrs. Nyberg

and Sturtzinger). I asked Mr. Hagelin about <sup>the problems of</sup> maintenance and servicing of equipment for TELEX communications, just to <sup>hear</sup> see what he would say <sup>on this point.</sup> He gave

the obvious answer: Since in Europe the telephone and telegraph services are operated by the government, maintenance would be by government servicing

men, and that such servicing would include looking after the teleprinter machines. *(What prompted my question, of course, was the possibility that*

i. I referred to his statement yesterday that Siemens had sold some OTT teleprinter equipment to the Egyptian Government and asked Mr. Hagelin if he knew what agency or department of the government was concerned. He stated that he thought it was for internal use by the Egyptian Army but maybe some of it was for the Foreign Office. He added quizzically that I ought to be in a better position than he was in respect to the latter question.

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See subpara. 4f below.

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j. Referring to the possible sale by Siemens of OTT teleprinter equipment to the Indian Government, Mr. Hagelin said he thought that ~~that~~ government was in a good position to manufacture tape because, he said, they had lots of IBM machines. I said I didn't see that IBM equipment would be practical for producing tape; Mr. Hagelin said that the cards could have holes for random letters and then you would print up sheets of those letters; finally, some clerk would use these sheets to punch up a tape on a keyboard perforator. I commented that it seemed a round-about way of getting ~~key-~~ <sup>teletyping</sup> tape for a ~~OTT~~ <sup>teletyping</sup> machine.

k. When I talked with the people in ASAE at Frankfurt, I was told about a certain Willi Reichert who had been salvaging and selling some of the World War II German geheimschreiber machines to the French ("Tunny", "Sturgeon", "T-52e", etc.). I asked Mr. Hagelin if he knew a "Willi Reichert". "Yes, but not personally and unfavorably--he sells to both sides, the Western or Nato countries and also the Satellites." Mr. Hagelin went on to say that ~~he understood that~~ <sup>Reichert had some sort of a secret cache from which he gets these old or parts for them, and that</sup> Siemens machines. ~~but~~ his supply has practically run out.

l. Mr. Hagelin said that the Siemens people had him to thank for the Bonn decision which permitted them to sell their OTT teleprinters to all except U.S.S.R. and its Satellites. I asked how that came about. He answered:

~~Siemens~~ <sup>them</sup> with Siemens. I suppose my needling ~~the U.S.~~ <sup>them</sup> caused ~~the U.S.~~ <sup>them</sup> to have the Bonn Government do something which would make things easier for ~~Siemens~~ <sup>them</sup> to get business; ~~and~~ this in turn ~~would~~ help me because I have an agreement with Siemens

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according to which they are to sell only OTT equipment but no off-line machines, whereas in my case its the other way 'round in my relations with them." I did not quite follow <sup>his meaning</sup> but decided to drop the subject. <sup>fitted into this picture</sup>

<sup>French Army</sup>  
m. Lieut. Colonel Arnaud, ~~of the French Army~~, with whom Hagelin had dealings for several years in regard to French orders for Hagelin equipment, <sup>Government</sup> from Paris. "He's no longer with the Commission du Chiffre." <sup>was gone.</sup> He was sent to duty with troops because he was so indecisive about what he wanted or should do in regard to cipher equipment. He just couldn't seem to make up his mind, so his superiors got him out of that

Commission du Chiffre. He was replaced by a Colonel Ribadaud-Dumas. And <sup>while I think of it and because it may interest you,</sup> incidentally, Colonel Verkuyll of the Dutch Army, was replaced a couple of years ago by a Colonel Schalkwijk." <sup>(This must have followed soon after the Petersen episode in NSA's history.)</sup> m. Hagelin having left for Paris)  
4a. The next day (Wednesday, 25 September, <sup>was spent in visiting the</sup> Hagelin Offices, laboratories and workshops, and in talking with Messrs. Nyberg and Sturtzinger. Principal items of discussion and of apparatus viewed are set forth below:

b. For several years now the Hagelin firm has been working on a modification of the C-type machines so as to make them operate with perforated tape (OTT encipherment) instead of with pin-wheel and drum-bar mechanisms.

(NSA has tried, too, but I am not clear as to how successful its own attempts <sup>have been.</sup> <sup>try to make some use of</sup> ~~Here the idea was to be able to use~~ the large stock of Converter M-209 machines in storage depots.) At the Hagelin laboratory I was shown a <sup>old C-type machines and also the</sup> working model of such a modified C-type machine. With the <sup>new</sup> C-52 or CX-52 machines, the pin-wheel assembly can be removed and replaced rather readily; when removed, the new component for taking a perforated tape can be inserted and the machine is ready for use as an OTT machine. This, of course, is true also of the keyboard-operated C-52 or CX-52 machines, since

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the new Hagelin electric keyboard is designed so that it will take a C-52 or CX-52 as its crypto-element. The modification of the latter machines for OTT operation appears to be neat and of excellent workmanship. *(I think we have reason*

*C.B.* I was shown the work bench on which the new rotors were undergoing test, as described above.

*said, were because immediately*  
~~were due to warping of the rotor~~ adjacent

*had become a bit warped.*  
 to the output stator.

d. I was taken on a tour through all other parts of the laboratories, machine shop and offices. The plant as a whole is now at least three times as large as it was when I visited it in February of 1955. Everything and every area seemed to be spotlessly clean and the whole place *gave external indications* ~~I saw~~ *presented* and *reflection of quiet, knowledgeable, and efficient direction.*

5/a. We proceeded next to Mr. Nyberg's office for a talk and it was then I learned for the first time about the three slightly different versions of machines in the several categories of Hagelin machines in production or under development. *(This point treated will be described in detail later in this report.)*

~~But~~ The fact that Hagelin was planning to put out three different versions of his new machines astonished me greatly, as Mr. Hagelin had not made a

single reference to this in any of the talks we had. *private had thus far during my visit; nor*  
*do I think that he had* Also, I do not recall Mr. Barlow mentioning that told Mr. Barlow about this, neither had Nyberg or Sturtzinger told Barlow

*had told him*

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*I think, quite important*  
~~about this new~~ *the point came up*  
~~when he visited the laboratories early in September.~~ *when I asked*  
~~when, on~~ *they hadn't told Barlow they stated that he didn't ask the questions I*  
~~they hadn't told Barlow they stated that he didn't ask the questions I~~  
~~asked, which centered about~~

b. The discussion now took the form of a sort of lecture by Nyberg and Sturtzinger to acquaint me with the facts about electromagnetic radiation from crypto-apparatus, facts discovered by Siemens researchers and communicated to the Hagelin firm. I "took it all in" (as though this was all news to me). *Mr. Barlow had told me all that he had learned about this during*  
~~It is~~ *quite clear that the Siemens and now the Hagelin*  
~~engineers know about all forms or sources of intelligence from radiation of~~ *electromagnetic*  
~~COMINT concern~~ *I think, radiation* ~~except acoustical through glass windows or thin walls;~~  
~~and even in that case I cannot be certain that they do not know of this source,~~ *this*  
~~because it was not mentioned and, of course, I was not in a position to ask~~  
~~the proper question).~~ *pick-ups* Nyberg did mention one form of acoustical radiation--  
~~that which could be gained by focusing a large parabolic microphone on~~  
~~person speaking to another, say in a box in the grandstand of a football~~ *directed toward*  
~~stadium. He also mentioned the fact that if one was in close proximity to a~~  
~~teleprinter one could learn things from the sounds made by the relays as they~~  
~~opened and closed.~~

*Two weeks to Long early in September, and two  
 report confirmed in detail during my  
 talk with Nyberg and Sturtzinger in which it*



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c. Based upon the discoveries made in regard to radiation, the

Hagelin firm

d. What Mr. Hagelin had told me on the first day of my visit, in

regard to the Bonn Government decision as to Siemens' sales of telecrypto

apparatus was repeated by Mr. Nyberg. He added <sup>a bit more</sup> this information, however, when I asked him if the <sup>didn't have</sup> Hagelin firm was supposed to apply for and receive from the Swiss Govern-

ment export licenses for the external shipment of <sup>their own</sup> equipment made in Switzerland.

"Yes, of course.

But as a general rule this requirement <sup>is</sup> not enforced. They most often

wink~~ed~~ their eyes, but every once in a while Mr. Hagelin has trouble on this

score." I asked about the current Swedish Government policy in regard to

export licenses, <sup>for Hagelin equipment but it appears that</sup> Mr. Nyberg did not quite get the drift of my question, <sup>for</sup> he

~~and~~ replied somewhat as follows: "The Swedish Government has no control over

the shipment of our OTT equipment made in Switzerland, of course; but we

conform to the wishes of the Swedish Government purely in consideration of

our obligation as patriotic Swedish citizens, <sup>so far as practically, us to do,</sup> to do what they want and not do what they don't want us to do."

e. I asked whether the rules imposed upon the Siemens firm by the

Bonn Government were also imposed upon the Lorenz or other German firms <sup>making</sup> ~~CONSEC~~ equipment.

Mr. Nyberg replied that he supposed they were all treated the same way.

"But Lorenz has been trying hard and pushing the sales of their equipment,

though their prices are not only considerably higher than Siemens but also

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their products were not as efficient as Siemens' products."

f. I discussed with Mr. Nyberg his estimate or prognostications for the sale of their new off-line rotor machine the development of which is nearly complete. I said that it seemed to me that the trend was now away from off-line apparatus and toward on-line teleprinter cryptographic machines. He countered by stating: "I ~~find that~~ <sup>get</sup> the contrary <sup>point of view</sup> ~~as the impression I meet~~ in talking with military people in various countries. They feared that dependence upon on-line wire-circuit teleprinter systems <sup>is</sup> ~~was~~ very dangerous; paratroopers could put communication lines out of order very easily and then what would commanders do for communications?" I conceded the truth of the contention if the apparatus is worked over standard wire lines; but it doesn't apply in the case of radio teleprinter communications. "However," I continued, "I think your rotor machine is going to be too expensive for your customers' <sup>resources</sup> financial ability. I assume that one unit will cost around \$3,000, though this could be much less <sup>of course,</sup> in case large numbers of machines could be produced and sold." Mr. Nyberg countered: "Your estimate of \$3,000 is too high. <sup>I feel sure that</sup> ~~Anyhow,~~ if we produce a first-class machine we shall not lack customers."

6. The following sub-paragraphs summarize the most important points covered in conversation with Messrs. Nyberg and Sturtzinger in regard to forthcoming developments and new equipment:

a. The Hagelin T-55 (cryptoteleprinters) machines will be ready for sale early in 1958. They are making an initial series of 30, and these will be of three types as regards the degree of security afforded by them:

(1) Type I (or Category 1) - Machines for the West or West-oriented countries. This includes NATO members and countries friendly thereto. These machines will be the very best that

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Hagelin can produce; [redacted]

*and*  
~~they~~ will embody all the

flexibility, as regards usage, that Hagelin has worked out.

(2) Type II (or Category 2) - Machines for the Friendly Neutral Countries. Machines of this category [redacted]

[redacted] and are not so flexible as Category 1

machines. The countries belonging to or falling in this category are not yet firmly fixed in mind. Finland might be considered one such country.

(3) Type III (or Category 3) - These machines are <sup>to get only the</sup> ~~third~~ best in ~~any~~ Hagelin model. They are [redacted] and lack flexibility. Countries of doubtful orientation or countries leaning toward the U.S.S.R. block fall in this category: Indonesia, India, Egypt, and all Near East Countries.

b. Literature corresponding to these three different types or categories accompanied the <sup>advance</sup> ~~brief~~ summary of this detailed trip report, dated 1 November 1957. The literature is referred to in paragraph 3 of the aforementioned summary and formed Inclosure 5 thereto. The different brochures are distinguishable only by "secret marks" printed thereon.

c. With regard to the "pocket machines", types "CD", I learned that here again more than one model was to be <sup>produced and</sup> sold. The CD-55 (in a green case) is saleable to all countries that have the old C-type machines, such as C-38, C-446, M-209, [redacted] The CD-57 is the newest model of the CD. [redacted] and can be equipped also for OTT operation. This model is to be sold only to NATO or NATO-friendly countries. It is of interest to note that whereas the CD-55 is in a green case, the CD-57

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is in a gray case; ~~but~~ this seems to be the sole difference between the two models so far as "the outsider" can tell. In other words, although cryptographically the two models are quite different, they look quite alike externally except as to color of case. The "segment", that is, the part which is pushed to operate the device, is different in the two models; and this difference can only be seen by taking the machines apart.

*(This, I think, is very important.)*

d. As noted above, the CD-57 can be used with a one-time tape. The tape-reader is inserted in the space occupied by the key-wheel assembly; the latter comes out quite readily.

e. There is one additional important difference between the CD-55 and the CD-57.



f. The CD machines are now in production; a series of 5,000<sup>is</sup> to be made initially.

g. It is possible to equip every type of C machine with a OTT reader. These will be called C/RT or CX/RT, or C4/RT. The C4/RT (old C446 equipped for OTT operation) is now in production. The firm has two phototype models of the CX52/RT; these were to be delivered to "a certain country next week". I did not inquire as to the country but I think those two machines, as well as a CD with seven disks instead of (the standard) six, are intended for

and also I learned later that Hagelin  
h. It was stated that the firm already has a good-sized order for the C4/RT devices, but I did not ask, nor did Nyberg volunteer, for whom these are intended.

i. Mr. Nyberg told me that he had been recently on a visit to Belgrade and I gathered that he had either sold or had tried to sell the

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*reference  
was planning a visit to  
London.*

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*Hagelin's*

Jugoslav Government some of ~~their~~ OTT equipment. He told me only that he saw (the Jugoslavs had shown him) an order to Siemens for their OTT mixer and teleprinter machines; but *he did sell (on this or on a previous) trip* ~~a sale was made for~~ some C-52 type machines (not CX-52) to the Jugoslavs.

j. Descriptive literature on the new Hagelin <sup>*key-*</sup>tape generator is in preparation. The development of the generator has been completed but there *and development* still remains the design <sup>*packaging.*</sup> of the ~~package, case, etc.~~

k. The "BY" machine will be roughly like the CX type machine but

The keyboard

and base will be the same as the present Hagelin keyboard and base unit, but will be modified for high-speed operation. This BY machine can be developed and produced rather quickly because all the components are already available. The stepping of the rotors in this machine  can be determined by the customer. *For example,*

Work

on this machine is now being given first priority at the plant.

1. An interesting feature of the proposed new Hagelin ~~Tele~~cryptograph machine (T-57) is its flexibility in usage. There are 8 different ways of using it

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and I was given a diagram showing these 8 ways. (The diagram accompanied <sup>advance</sup> my summary report <sup>dated</sup> 1 November 1957). This sort of flexibility in usage is being incorporated in other Hagelin machines; one interesting way is to

assembly, for example). This sort of thing was termed "stretching out the one-time-key tape."

m. I asked who thought up the idea of having different categories of security for Hagelin equipment and was told that this was <sup>suggested</sup> ~~thought up~~ by their friends in NATO. They had, of course, no <sup>contacts with</sup> ~~official~~ <sup>only personal</sup> ~~only personal~~ contacts, <sup>their</sup> with French, Belgian, Dutch friends — <sup>only personal contacts.</sup> (But I [over])

n. When I asked if Siemens was giving  to different customers in regard to protection against radiation, the answer was sketchy--the Siemens firm is very secretive about such things and therefore Hagelin, Nyberg and Sturtzinger know little, if anything, in regard to this point.

7 a. On Friday morning, 27 September, I resumed my talks with Mr. Hagelin, he having returned from Paris sooner than had been expected. He <sup>told me rather gleefully that</sup> ~~had~~ <sup>Re</sup> ~~received~~ <sup>on this visit</sup> an order from the French Government for about \$250,000 for <sup>CX</sup> ~~and~~ teleciphering machines, these being for the Army, Air Force, and Foreign Office mostly; a few teleciphering machines were for the Navy.

b. Mr. Hagelin <sup>told me that he had</sup> discussed briefly his "Gentlemen's Agreement" with the French. He was told that while they could of course apply neither legal nor moral pressure at all, they would be grateful if he would refrain from

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Hunt Hagelin's Swedish personal contacts are involved in this, too. Incidentally, Mr. Hagelin and Mr. Rossby, Civilian head of the Swedish Government's COMINT organization, are close friends; Rossby was to visit the Hagelins a few days after I left (Aug.).

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selling to all Arab countries, especially Egypt, any of his CX machines or any of his OTT generators. He could, if he wished, sell his C-type machines; also his OTT attachments for working them, so long as did not sell ~~them~~ any of his new OTT generators; in fact, he could sell his old (and imperfect) generators. (I took this to refer either to his ball-bearing all-mechanical generator, or to his first model electronic one.)

*commented, quietly and quite gently, that*  
c. Mr. Hagelin ~~complained~~ <sup>commented</sup> although the French asked him to refrain from selling certain of his products to Arab countries, they at least gave him some orders for his equipments, orders in significant quantities, not just one or two, as did the U.S.,  him.

d. A French Company, Compagnie Industriel Téléphonique (C.I.T.), had developed an electronic OTT key generator but this firm was unable to guarantee a delivery date short of two years from now--and the French Government was in a hurry; it could not wait that long.

*Crypt A.G.*  
e. Hagelin has a contract with Siemens whereby ~~Hagelin~~ <sup>Hagelin</sup> furnishes OTT generators to Siemens. Since the Siemens firm is presently permitted to sell to all countries except the U.S.S.R. and its satellites, and since Siemens does not have to tell Hagelin to whom the Hagelin OTT generators are to be delivered, it is easily possible that the new Hagelin generators could wind up in countries where we (the U.S.) would not care to have such machines in use. ~~Although~~ <sup>even though</sup> this is an important point to note, <sup>it</sup> it is clear that there is nothing the U.S. can do about ~~this~~ <sup>it</sup> unless it be to urge the Bonn Government to institute as soon as possible and to enforce the proposed new security rules regarding sales of such equipment.

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f. Mr. Hagelin stated that the French seem to be aware of the dangers of electromagnetic radiation from teleprinter equipment, but that they really weren't too knowledgeable about this <sup>source of danger. He thought this to be so</sup> because they had tested certain Hagelin equipment and had passed it as not dangerous from the point of view of radiation, whereas he (Hagelin) knew that that equipment was not provided with <sup>all</sup> the anti-radiation protection which the Siemens firm had found necessary.

g. The CX machines for the French will be ready for delivery in 3-4 months; the teleciphering machines in 4-5 months.

h. Mr. Hagelin stated that he had heard from three different sources that the Americans and the British had alleged that he had sold CX-type machines to <sup>any of his</sup> ~~all~~ old or new customers who wanted them. This, he vehemently averred, was not true. When he tried to trace these allegations to their sources, <sup>he</sup> ~~he~~ was unsuccessful and therefore he was going to dismiss them from his mind, as well as the tales that the Americans and the British had made derogatory comments about the security of the Hagelin equipments. I asked Mr. Hagelin whether it might not be possible that some competitor started such rumors and derogatory statements about his apparatus. Hagelin said "That could not be so, <sup>because I</sup> ~~for I know~~ <sup>have</sup> no competitors in the business I am in; certainly not as regards the manufacture of off-line machines such as <sup>such as my new rotor machine.</sup> of machines of the C and CX-type." I said: "Well, how about Willi Reichert, for instance?" Mr. Hagelin speedily rejected <sup>the</sup> ~~such an~~ idea that Reichert could be regarded as a competitor, or OMI, too, of which firm's accomplishments <sup>there has been a lot of</sup> ~~of which firm's accomplishments~~.

i. Mr. Hagelin told me during this conference that while he was away on his trip Mr. Nyberg had made a sale of \$50,000 worth of equipment to a new customer. I did not ask who it was but I suspected that it was Yugoslavia.

j. Mr. Hagelin confided that he had originally contemplated putting out only two categories of his equipments as regard the security they were to afford. But it seemed that during the time he was in Sweden in the summertime of this year Sturtzuger and Nyberg established three categories, which, he himself thought, would be one too many. Two categories, <sup>he said,</sup> would give sufficient problems, in keeping track of which customer got what. ~~category.~~

k. I asked Mr. Hagelin if while in Paris he had seen Colonel Black. (Mr. Hagelin had told me some time ago that he knew Black and of his organization). "Not this time," he said. It is clear therefore that Black's influence works through the interdepartmental committee on cryptography, since Mr. Hagelin had on this visit received a rather large order in a very few hours' visit with the members of that committee *and there was talk about their "Gentlemen's Agreement" (see subpara. 7 b above).*

1. An interesting note related by Mr. Hagelin during our conference this day: He had been told of "an amusing episode". The Belgians had asked the Luxembourg Army people why they didn't use the new American cipher machines during a very recent NATO exercise, and "they kidded them about this". "But", Hagelin went on to say, ~~that~~ "during that exercise there was lots of rain and the only cipher communications during the maneuver were those of the Luxembourg forces -- they were using the Hagelin C-type machines!"

d. The matter reported on in the foregoing subparagraphs will be treated further on in this report.

9/ a. Our conference was resumed on Saturday, 28 September, sitting in the Hagelin garden in bright, warm sunshine (the first day of such weather in the whole week). It was an opportune time <sup>for asking</sup> ~~and I asked~~ Mr. Hagelin several more questions.

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b. First, what about the future of his son Boris Junior in the affairs of Crypto A.G.? He answered: "If he proves himself in the U.S. and learns what he should learn, it is possible that he might be able to take over the whole business some day in the future--but not the near future. As a matter of fact, I've been thinking of merging my business in or with Siemens. Then they could take over the headaches which I now have in dealing with my customers under the handicaps imposed by limitations and restrictions as to whom I can sell what machines. I'm tired of being the only whipping boy." (my emphasis.)

c. Second, what could he do to stop Boris Junior from putting out instructional literature about cryptographic communications, the use of insecure crypto-equipment, and the faulty use of good equipment? To this Mr. Hagelin answered: "I should think your authorities would be in a better position to control this sort of thing than I. After all, he is in your country and I am here, in Switzerland." I said: "Boris has been calling in person at every legation and embassy in Washington and I suppose he is "educating" some of them. I know he put out one document that we're not happy about." To this Mr. Hagelin commented: "He should call only upon Central and South American countries. But, of course, he may be called to do repair and maintenance work on our equipment in the legations and embassies of countries other than Central and South American and that is <sup>I think</sup> o.k. My New York repair and maintenance man <sup>A</sup> (Archie Johnson) is sometimes too far away for a job that must be done without any delay." I did not pursue this subject any further but did ask whether he had any special word or message he wished me to convey to Boris Junior? <sup>(I had hoped he'd tell me to tell Junior to stop putting out such literature.)</sup> "None," he said, "except that he wanted to wish him well in his business and hoped that he can make a good thing of it." Mr. Hagelin added by

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and his wife's <sup>their</sup> way of comment that his difficulties with his son began right after the son's marriage <sup>to</sup> with Edith, the American wife, <sup>It was she</sup> who had brought him and Mrs. Hagelin <sup>some</sup> very <sup>new</sup> and trying family problems. <sup>I later learned from Mr. Hagelin that upon</sup> <sup>his</sup> return <sup>in</sup> to Europe from a visit to America in the Spring of 1956, ~~that~~ had told them that Boris Junior was homesick and "would love to come back to Switzerland, but Edith is opposed to this idea."

d. Third, in regard to his thinking about merging with Siemens <sup>(and his having mentioned Dr. Hell)</sup> why ~~wasn't~~ he thinking about merging with Dr. Hell? <sup>why not with Dr. Hell?</sup> "Well, crypto-equipments and communications equipments <sup>are not strictly</sup> ~~is not~~ in Hell's line. Especially not in regard to teleprinter equipment. That's right in Siemens' line."

<sup>2. Two final and</sup> <sup>(1)</sup> ~~to~~ important notes; Mr. Hagelin told me during this conference that, because of technical difficulties, he was giving up the CY-type motion and machine; the firm was going to use  <sup>models; (2)</sup> ~~machine~~.

~~11. Another important note:~~ he had very recently conceived of a way of making his pocket machine (CD) about one-half its present size. It could be just a bit bigger than a pack of king-size cigarettes. <sup>(I think this, if practicable,</sup>

10. } These three paragraphs can be read exactly as  
11. } they stand in the similarly-numbered paragraphs  
12. } of my memorandum dated 1 November 1957, a copy of which accompanies the present trip report.

13. I see no reason <sup>at this date,</sup> to change my views and recommendations on the matters reported on herein and discussed in my summary trip report of 1 November 1957. <sup>It is</sup> ~~is~~ requested that this report be made a part

10 January 1958

WILLIAM F. FRIEDMAN  
Consultant