

LECTURE

GIVEN AT

MONMOUTH SIGNAL CORPS PROCUREMENT DISTRICT

BRADLEY BEACH, NEW JERSEY

6 MARCH 1944

SUBJECT: ORGANIZATION AND FUNCTION OF THE SIGNAL CORPS GROUND SIGNAL AGENCY.

REPORTED BY
ALFRED F. GOLDSTEIN
Stenotypist

SPEAKERS:

Colonel Van Ness Philip - MSCPD

Colonel R. V. D. Corput - SCGSA

REAR ADMIRAL JAMES H. HANCOCK

8 MARCH 1944

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Signal Corps

The meeting was called to order at 3:15 p.m.

COLONEL PHILIP: This afternoon we have the pleasure and privilege of having Colonel Corput with us. He is the Commanding Officer of the Signal Corps Ground Signal Agency and he has kindly consented to come over and tell us a little bit about his organization which comprises all of the laboratories. Colonel Corput.

COLONEL CORPUT: The Signal Corps Ground Signal Agency has as its assigned mission the control of the development of all Signal Corps equipment except that equipment actually used in aircraft or in connection with the navigation of aircraft. That eliminates airborne equipment and also eliminates such things as radio beacons and blind landing equipment. We are in on that one with one set only. You notice I said, "Control development." Actually we are doing very little development in the Agency. Carrying on from there it is also my responsibility to furnish to the Procurement District the necessary information to permit them to place a contract, to assist these procurement districts during the fabrication of the equipment, to see to it that engineering bottlenecks are corrected, and when deliveries of equipment start, to work with the Procurement District and the Inspection Zones to see to it that the Government gets value received. Therefore, taking a unit of equipment from the time of its inception until the time it wears out and becomes obsolete, it is mine except that I do not sign a contract, I do not do the expediting or any of the various negotiations and renegotiations you go through and I do not do the routine inspection, but the technical responsibilities for the equipment are mine, with those exceptions, from the cradle to the grave.

I came to the organization in 1936, at which time it consisted of eighty-two civilians and six officers. It reached its peak strength last summer before the Procurement District was taken away, a peak strength of approximately fourteen thousand. Our figure now is approximately eight thousand civilians and three hundred officers. To compare it with the peak strength we had before you would have to add Colonel Philip's strength to that. Between us we probably have about nine thousand civilians. That is a difference of five thousand from the peak.

I think the next thing is to give you a brief discussion of what the table of organization is. You have been given copies of it. I will go over it on the board and explain why it is set up in this way. In that connection I would like to point out that since I have been in the organization it has been reorganized, has had about four or five major reorganizations, and minor reorganizations continuously besides. The organization has not remained static. It has to be fluid to adopt itself to changing requirements. It has had four or five major reorganizations. This present organization is the outgrowth of my personal experience with the organization since 1936 when I came to it.

To start at the top of this organization, you will find right along that it is a little bit different from what you normally find. One reason for the difference is the number of officers and number of civilians I have. In a standard Army outfit where you have the Articles of War to back up your demands and don't have to worry about Civil Service Regulations, you give an order and that is an order and you don't have to worry about it. They still operate with one officer responsible for ten men whereas I am operating with one officer responsible for twenty-three men; so I have had to be rather judicious in the use of my officers. We start at the top with the Commanding Officer (See Organization Chart-Exhibit I) and we go down to the Executive Officer and to my four major operating branches. I would like to point out right here that my Executive Officer has a de-toured path that comes around like this (illustrating on blackboard). The only time that my Executive Officer is involved in the job is where it affects more than one of the major operating divisions. If it affects only one, it does not go through him, it goes direct; in other words, he is my man whom I have between me and my operating people so that when matters come in he sees that the ball isn't dropped. It only goes through him if it concerns me and more than one of my operating divisions. It is a little different from the normal setup where you think of everything going through the Executive Officer.

We start out with the Engineering Division and that is broken down into various groups. I will discuss those in detail later, but in this division all the actual engineering work is done, all of it. Remember that!

We come to the Quality Control Division. This is the outfit that I hold responsible to see to it that what this bunch over here (referring to the Engineering Division) invented is produced. They are not an engineering outfit. They do no engineering. Remember that!

And I have my two overhead outfits over here, the Service Division and the Materiel Division. The Service outfit is my overhead group and takes care of the Adjutant's Office, my guards, motor transportation, personnel, payroll, intelligence - all the dirty work necessary so that these people (referring to the Engineering Division and Quality Control Division) can concentrate on their own specific jobs. The Materiel Division is my own private procurement and distribution service to take care of my Laboratory. I buy my own development models, also my housekeeping materials. I have this divided up into two major groups, the Procurement and the Storage and Issue. I have these normal appendages up here, Fiscal and Control. They are no different from what they are supposed to be anywhere. The Control outfit is supposed to be my planning outfit. Actually the way I am using it I am combining the two, Executive Officer and Control Division. The Control Division only comes in on something that "covers the waterfront", because these outfits have control divisions of their own. The only time the Control Division comes into the picture is where two of the divisions, two or more, are concerned. The Fiscal outfit keeps track of my cash and my cost accounting and budgets, and things like that.

Coming back to Engineering, I have the engineers scattered. That was done for a purpose. I have three major branches of engineering that interfere with each other, radio communication, radio direction finding, and radar. Those physically have to be separated. If you are trying to line up a radio direction finder and somebody is sitting in the next lot hammering away with a 2.5 kilowatt set, obviously that is going to "jazz" up what he does and radar interferes with everybody. Though it was necessary to have three major separations, we started out with Squier Laboratory at Fort Monmouth, and it wasn't big enough, so that means I have four laboratories. I originally had a nice building there which I couldn't throw to the wolves, but which could not hold any of these three (referring to radio communication, radio direction finding, and radar). So I have Fort Monmouth Laboratory - that was the original laboratory, which these three outgrew - Eatontown Signal Laboratory, Camp Coles Laboratory and Camp Evans is radar. Eatontown is RDF and Camp Coles is radio communication. They have other things which have been fitted in there, wire and meteorology, sound and light, etc.

These three laboratories I have here are my major development laboratories (referring to Eatontown, Camp Coles, and Camp Evans). They develop equipment. The requirement comes in for a telephone central. That will go in to the Eatontown Laboratory which have RDF, wire, sound and light, etc. So the switchboard would go in there. The switchboard, one of these rear area switchboards, involves a lot of things besides just a switchboard. It involves a truck, maybe. It involves batteries. It involves power units. And anyone of those three we will find in a radio set and also in a radar set. I watched the people build radio sets, radar sets, and wire equipment. They sit there in their lovely laboratories with a nice big bench and a lot of electric outlets along their wall. They design the electrical parts of the set proper, the radio receiver and transmitter, but they don't design a power unit or any trucks for it; they forget about the new battery pack necessary. The chances are they forget about the cordage. In other words, the development engineer that worked on a radio set wants to work on a radio set and nothing else. What happened was they rushed around at the last minute and started to pick up the "bits and pieces", and came out with a set. The result was that we had many different power units, many different types of cordages, etc. So I took Fort Monmouth and gave them all the things that "cover the waterfront", power units, batteries, microphones, headsets, facsimile and also components like condensers, resistors, sockets, etc. In other words, this outfit up here (Fort Monmouth) is my laboratory of "bits and pieces."

Now if I get a requirement in to build a new radar set - let's take an elaborate radar set - it will include the radar set proper; it will include possibly a radio communication set, wire communication equipment, truck, trailers, power units, and that will involve batteries, microphones, headsets, and all this other junk over here. The way that is handled is this. The prime responsibility for the development of the radar set goes to the Radar Laboratory, but they sub-contract the development of the

radio communication which goes to this outfit (Camp Coles), the wire communication equipment to this outfit (Eatontown), and all the "bits and pieces" down to this outfit (Fort Monmouth). This gang here (Radar) is responsible, you might say, for writing the specifications for these other people (Camp Coles, Eatontown and Fort Monmouth) to go under. Then it is all supposed to come out the far end of the spout with the right answer. One advantage of that is that the man who designed the power unit is a man that designs power units for a living, that is his hobby and he is interested in getting out the best power units and as few power units as possible. The same thing is true about batteries and microphones and headsets. I have been trying to put this into effect about a year and a half. Every once in a while I find a power unit in one of the laboratories hidden away so I come out and take it to Fort Monmouth. I found one laboratory that was growing fungus in three places. It wasn't a laboratory that was supposed to be doing it. It was this one (Camp Coles). Every room you went in there they had a little box, all kinds of glass, sweat all over the walls and lamps - they had the most uncoordinated fungus program. I can't afford to have that. I don't have enough people. Certainly I don't have enough supervisory personnel.

Now before I get away from the Engineering Division are there any questions on that.

Q. Did I understand that your fungus growing function is in Fort Monmouth?

COLONEL CORPUT: Yes. This is my "bits and pieces" and, my Bureau of Standards.

Q. Colonel, the fungus, was that for the testing of the different sets?

COLONEL CORPUT: One of the things they got into in the South Pacific with their equipment was that it grew long whiskers inside. They have some bugs that like to eat varnish, paraffin and things like that, and the set comes out with whiskers; it becomes short-circuited.

Q. Where do you handle tubes?

COLONEL CORPUT: Tubes should be in Fort Monmouth, but since my tube facilities were in Camp Evans, I had to put it over in Camp Evans. It should be at Monmouth but I physically don't have the space to put it in Monmouth.

Now, so much for the Engineering. Remember this is the outfit that does all the engineering. They have all the micro-volters and monkey wrenches, soldering irons, etc., over here in this Engineering Division, these various laboratories.

Now, the other outfit you are interested in is the Quality Control Division. That is the outfit you will meet face to face most often. The Quality Control Division has four major branches - Specifications Clearance, Field Engineering, Maintenance, and Project One. Let's take them in order.

Specification Clearance Branch - the responsibility for digging up the engineering data for a specification rests with the Engineering Division. Remember I said that the responsibility of these people (Engineering Division) was to tell what was to be bought. They do that by preparing a spec., but engineers are lousy spec. writers. They forget all the nice little standard paragraphs. They will tell a man that he will have to use standard condensers, but they forget to tell him the specification number. They turn out a lousy spec. These people (Engineering Division) prepare an outline of the specification and cover the engineering requirements and then it goes over to this outfit, Quality Control Division, and the Spec. Clearance Section gets it. This outfit (Quality Control Division) doesn't have any authority to do any engineering. They cannot change any engineering requirement set up by this one (Engineering Division). They can make sure that the spec. is in the proper form, that it is complete and all the proper clauses are in there. It is a review of what is done by this group (Engineering Division) and also the processes of printing are taken care of, etc. That makes people very unhappy. It makes Washington unhappy and sometimes the procurement districts unhappy, but in the long run it will mean less trouble because the chances are you will come out with a better specification. For every time it causes delay, it will save time ten times over because it is written down according to the "rules of the Medes and the Persians." That is the reason why the Procurement Districts have negotiators and contract writers. The negotiators don't write the contracts. You have specialists for those, to take an analogy. My Field Engineering are the people that you are going to be dealing with a great deal. These are the "Indians" that are out in the field to see that the stuff that is manufactured is manufactured in such a way as to have usefulness in the hands of troops. That is their primary mission in life. Equipment that we have bought in the last few years, in many cases, has never been built before. There have been many contracts where we haven't even had a model. We had a desire and have written that desire up in a performance specification and it has been necessary for the development to take place at the same time that the production did and that is a very tricky setup. The normal procedure of having the drawings and specifications has practically been non-existent for the last three years. It is necessary then for somebody to run out to the manufacturer's plant and interpret the specifications. And that is done by the Field Engineering Branch of the Quality Control Division. Now you might say, "Why don't we take the engineers out of the laboratories to do that?" Actually we do, but when I take the engineer here (Engineering Division) to go to the manufacturer's plant he walks over here (Quality Control Division) and goes out that door and not this one because this man's primary responsibility is seeing that the Government gets what it pays for. This man (Engineering Division) says what it is and this man (Quality Control Division) sees to it that they are delivered. The minute this man (Engineering Division) starts out to a manufacturer's plant, his responsibility is to this man (Quality Control Division) to see that the Government is not getting short changed. This fellow over in Quality Control has all the setup for making things legal. If the engineer walks out of this door (Engineering Division) he is apt to obligate the Contracting Officer for a half million dollars on a change.

You, gentlemen, have been watching Industry work in the bounding days of peace and you know that Industry never sent an engineer out by himself, except very seldom and then they would call him a sales engineer. In peacetime, they would send a man out of the commercial part of the firm along with the engineer to make sure he didn't talk out of turn. That is the same thing. That is the purpose of this. Now, these boys of the Laboratory, as I say, are not frozen. If Colonel Philip has trouble with one of the contracts and wants help, I go to Colonel Raynsford and he goes to his commercial man and also borrows some men here (Engineering Division) and they go out together. Like this man Peterson. He was out for about a month and a half and is going out again. He came from here (Fatontown) and went out as a representative from this section (Field Engineering Branch).

Carrying that back to an individual set, if we start to buy a set that is still rather nebulous, the people that know the engineering phases of it are apt to be transferred over here (Quality Control Division) look, stock, and barrel and work for this man (Field Engineering Branch) until production is underway and then go back home and become engineers again. But when they cross the borderline, they leave their monkey wrenches and screw drivers behind. That is another reason for not sending engineers out in the field unattended. Engineers always want to change things. Therefore, they always go out from Quality Control and not as engineers. The Maintenance Branch is designed to see to it that the necessary ritual is gone through with to see that the equipment operates satisfactorily after it is delivered. They prepare and keep up to date the maintenance list, lists of spare parts, "bits and pieces," etc. Also their basic directive, which I am not able to do very much about because I haven't enough personnel, calls for them to rush around and inspect the shops in the interior, and the shops over in the theaters of operation. Again I have trouble with people wanting to do engineering. I find them inventing test sets, but if they need a test set invented they should go back to the laboratory here (Camp Coles). Everytime I find one of these men with a microvolter in his hand, I transfer him over to the Engineering Division. This (Ground Maintenance Branch) is a paper work organization as it is setup now. Their responsibility is to see to it that maintenance lists are made up for every piece of equipment so we know what to buy to keep them going and the maintenance lists are made up for every piece of equipment so we know what to buy to keep them going and the maintenance lists are kept up to date.

Then I have a Project One group which they call Equipment Improvement Branch. That is a misnomer. I don't like that. That is what we call it, but nevertheless it is wrong. Just by calling it Project One and remembering the discussion is better than thinking about it by that title. We get a great many reports back on equipment. We get log sheets back. We also get letters "belly-aching" about things. We send observers out to the maneuvers and overseas to get information about the equipment and they write reports. All that information is no good to us unless we do

something about it. So this is the filter place (Equipment Improvement Branch) where all the information comes in. It comes in to the Project One gang, the so-called Equipment Improvement Branch. The unsatisfactory reports all come in to them. When a given piece of information comes in, they can do one of three things with it. If it is an isolated instance they file it away and don't do anything. If it comes in many times, there are two possible courses of action. They can either change the set or change the maintenance list. That decision has to be made, whether the set should be changed or whether the maintenance list should be changed. Now, suppose, for example, that we assume on a given set the life would be five hundred hours and we find that in that set one particular tube has only a life of three hundred and fifty hours. They will have to analyze the situation and see what will be involved in re-designing the set or whether it wouldn't be preferable to buy some extra tubes. If it was five hundred hours that dropped down to three hundred and fifty they would probably tell the Maintenance people to change the tube practice. If it was one hundred and fifty they would probably tell the Engineering Division to change the set; probably get out a modification kit to take care of the difficulty. This Project One gang has to maintain a case history of every set. Also they have to prepare "bed bug" letters because there is nothing that gripes the people in the field as to write in and not get any answer. We get, however, letters at the rate of three or four hundred a week and you can't give them each a separate answer. So we are trying to get up "bed bug" letters. You probably know the story about the man who wrote to the Pullman Company complaining about a bed bug he found in his berth. Back comes a letter from the president of the company saying that they were indeed very sorry to hear that such a thing could happen, that they had never had a complaint of that kind in all the forty odd years they had been in business, that they had fired the staff, and had fumigated the car, etc. It just happened there was a little slip of paper clipped on to the letter which said, "Joe, send this guy the 'bed bug' letter."

Now, one of the questions that comes up is when does the responsibility go from this outfit (Engineering Division) to this outfit (Quality Control Division). It is very hard to decide sometimes. This is development up to the time the draft of the specification is turned over to this group (Quality Control Division). Then this group (Quality Control Division) is supposed to "herd it" on from there.

Now, for reasons of continuity even though we are dealing with something that is still very much in the engineering stage, the Procurement District is going to have to keep this outfit (Quality Control) in mind also because eventually this outfit (Quality Control Division) is going to carry the ball and we don't want to send a man in there without his knowing the story. Even on a brand new piece of equipment, where this gang (Engineering Division) haven't even started a specification, it is necessary to involve Quality Control in it the minute we start dealing with the Procurement District so there will be a case history built up on the equipment and Quality Control will be able to take the ball when this fellow (Engineering Division) finishes carrying it. It won't be dropped in the middle of the play. The fact is that I have Colonel Maier and Colonel Raynsford running these sections and they are very cooperative and I maintain no

water-tight compartments. With a little experience the friction that has existed in the past between the Procurement District and ourselves, will iron out. The Procurement District's channel of communication is normally through Quality Control and they should have Quality Control in on it because if they don't there will be a time when the Procurement District will have to deal with Quality Control and they won't know what they are talking about.

Now, let me see, I have an outline of points they wanted me to cover, "Functions and responsibilities of laboratories under SCGSA." Well, the laboratory, as I said before, is responsible for what it is and for doing only engineering. Therefore, under the heading they have here, "Design", the Laboratory Engineering Division is responsible for design. The next subject heading was "Test." By "test" now we are distinguishing that from inspection. "Test" is to determine what it is the first time around. Inspection merely means, "Keep it the same way." Incidentally, this outfit here (Quality Control Division) is forbidden by law to own microvolters, monkey wrenches, and screw drivers. If they want something tested, they have to send it to the Engineering Division. And obviously the gang that tests it must approve it. This outfit (Engineering Division) is responsible for what it is. On new development until specifications are jelled, the channel is more or less between the Procurement District and the Engineering Division with liaison to the Quality Control Division. Gradually it shifts until in the final stages it is over here (Quality Control Division) with the channel back to the laboratory. As I said before it is difficult to say in a given contract just when you shift over. It is a game that has to be played with a lot of cooperation and if it doesn't operate with cooperation it won't work. There is a fundamental difference between paper work and engineering and they are both involved in any contract we have.

"Changes in equipment under contract" - the changes in equipment under contract can come up through various ways. It can come up as an unsatisfactory report, in which case it goes through Project One group, and if they decide a change is necessary it goes to the Engineering Division. They design the change, make the necessary changes, and come out with a draft of the specification which goes over to the Quality Control Division and down to the Procurement District, the same as a new piece of equipment. There are changes that come up from the manufacturer. The manufacturer finds out he can't get that and asks, "Can he use something else?" That has to come back here (Quality Control Division) and go over here (Engineering Division) and back again. Now, if it were to go from the manufacturer direct to the laboratory, it is very apt to result in the laboratory saying, "Oh yes, that is fine," and then a few weeks later the manufacturer points with pride and says, "The laboratory told us to do it, so we won't deliver any sets this month," or "The sets are going to cost twice as much." So we don't let the engineer in the laboratory talk to the manufacturer about things like that without having the commercial man with him. Everytime this man (Quality Control Division) authorizes a change he is either going to pay for it, in which case it is going to be sent over to Colonel Philip, or he is going to say that the change will not involve any increased cost or change in delivery or some such "eye wash" as that. In other words

the lawyers have to get their finger on that.

Waivers are with us always. A manufacturer can't get a certain definite kind of a gadget that we call for. So he calls in with tears running down his face, "I would like to have a waiver. I'd like to use something else," or he takes a contract and then he can't deliver just exactly what we called for. We call for a transmitter that puts out a hundred watts and his transmitter puts out seventy-five, so he weeps bitter tears and calls for a waiver. Colonel Philip has the "P" Line hanging over his head and he wants the manufacturer to deliver. He calls me up and says, "Can we waive?" I have to consider the service usefulness of the equipment. If I think it will impair the service usefulness I can't grant a waiver without going to the ultimate consumer might be the Air Force. If the Air Force asks me for a hundred watt transmitter and I waive it down to fifty, they get very mad about not getting value received. If the case is sufficiently grave, I refer it back to the Air Corps and say, "A hundred watt receiver can't be delivered for six months, but you can get this fifty watt receiver." They either come back and say, "We want them at fifty watts," or "Nothing doing." I can't make that kind of a decision myself. On the other hand, there are some kinds of decisions I can make. The question came up on a certain direction finder being bought for two purposes, one was for air navigation and the other was for a radio intelligence company. The specific requirement was that it should be accurate, let's say, plus or minus a half degree, or something like that, and the manufacturer was coming along with most of them that good, but some of them running up as high as two degrees. Colonel Philip and I talked it over and I told Colonel Philip that all the ones that were over the original requirement, but under the two degrees, provided they would send it to the radio intelligence company, would be all right because the range they were going to use it for was short; if you are just worrying about some enemy radio station over on the other side of the hill, a couple of degrees doesn't make much difference. But we couldn't waive for the other purpose. In that particular instance I would waive for one branch but not for the other. It was unfortunate that they all were going to the Air Corps so it didn't help Colonel Philip any. I have to limit my waivers to decisions that don't materially affect service usefulness. Theoretically, I know what the stuff is to be used for, and these points come to me and I either say we can waive it or I will have to go to higher authority.

The third heading on this agenda is the "Quality Control Division." Item one is "All information cleared through Quality Control Division." I pointed that out before. Officially all information goes through Quality Control, although in the early stages on the contract going through there is largely a liaison matter. That is for the protection of Colonel Philip and the Signal Corps as well as for me.

If he deals with the engineers, no one engineer can answer all the questions but he will try to do it. This group of men (Quality Control Division) know which engineer to go to for what. You take one of the complicated sets like the AN/MPN-1. I defy anyone engineer to be able to answer all the questions on that set. There are twenty-five or thirty distinct types of gears that are going to require distinct engineers to answer the questions on them and it would be asking the Procurement District too much to expect them to know which engineer to go to, unless they go to the Quality Control Division, or unless they want to build up a staff the size of the one I have. They will be apt to go to the wrong engineer.

The next item is "The need for a single clearance point." I have pointed that out. All operations are coordinated.

The next item is "Was the inspection zone properly notified?" I think I will get into that for a minute. Up until a year or so ago, the laboratory up here actually did all the inspection on the production equipment but that was not economical. Now, I shouldn't say the laboratory did all inspection, but a large portion of it. General Farmer of Philadelphia did a lot of it; Dayton did a lot of it. There was one time in the Newark Western Electric Plant when there was a bunch of engineers from Wright Field, from the laboratory and from Philadelphia, all in the same room inspecting condensers to go into the three lines of equipment. It became obvious that something had to be done about it, that all routine inspection would have to be centralized. So they set up the Inspection Agency under Colonel Harris with his headquarters out in Dayton. He has inspection zones around the country and resident inspectors in all the major plants. Remember I told you we bought this from the "gleam in an engineer's eye" standpoint. We don't know what we are going to get until it is finished. Sometimes we have to build a lot of them before we are sure. Colonel Harris, with the type of personnel he has, can't inspect equipment of that kind. Colonel Harris inspects on assembly-line basis. He is operating the thing with "\$25.00 a week" type of personnel. He has to. There is not enough high class engineering help available to do it any other way. So until we find out whether the red light ought to come on or the green light ought to come on, I have to have an engineer out there to check the equipment. So we come then to what we call "a pilot run stage." This operates until a definite inspection procedure is set up complete with chapter and verse in writing, so you can hire Mary and say, "You do this," and you hand her a little sheet of paper and say, "You connect the red wire to binding post one and the green wire to binding post two and push the button on the front of the panel marked 'X' and if the light comes on, the set is all right." That is all she has to know. In some cases I will have a field engineer in the plant and Colonel Harris will have a resident engineer. We won't take anything until both men say it is all right. This man (Engineering Division) says it is okay from an engineering standpoint. This man (Inspection Agency) counts nuts, bolts, and screws. So long as it is in the pilot run stage, we have both these people in the plant and each one has to sign the acceptance slip on a given set. After we get the bugs out of the equipment, get an inspection procedure written up, we kill

the pilot run and put it in a production run. This man (Quality Control Division) comes home. This man (Inspection Zone) carries on. If something goes sour, if it is a minor matter, this man (Inspection Zone) will call back through various channels and gets himself the field engineer back there to get things straightened out. If it becomes very sour we will call it back into the pilot run stage again, and I will move in on the plant with my engineers and actually take over the operation of all inspection and get the thing straightened out and if necessary, change the inspection procedure. I will give you an example of that. We had one manufacturer who, without telling anyone about it, - this is something that happens all the time, they change something without telling you - he changed the material in the grids of his vacuum tube from a hard to a soft platinum. There wasn't a test that showed that, but by the time the tubes were delivered to the depots, eighty per cent of the tubes were broken. There was hell to pay. So a brand new pilot run was started. We had to develop a new test procedure to insure that they couldn't slip a soft grid on us, something that they had never tried to do before.

Every decision that affects production in any way should be made of record because it automatically becomes part of the contract. When you write a specification, and make up some drawings and the drawings say, "This little screw up here is going to be 1/4", 6, 32, round head, brass, black nickel plate, and if a manufacturer wants to change that to 3/8" screw and you authorize him to do it, you have to make a record of that and put it in the file for this reason. There used to be only one reason, now there are two. You have to assume that everybody who authorized that change might die and then the sets would be rejected by the inspector. That was a change in the specification so it has to be made of record. Reason No. 2 is that these damn committees go around investigating from Congress and they'll say, "My, my, he is gyping the Government." So in order to avoid an appearance of evil, the most minor changes must be reduced to writing. Jaw-boned agreements made in conferences are not worth a damn. I have been at too many conferences where nobody decided anything. Then I would prepare myself a lovely set of minutes in which I put down all the things I wanted. Practically everything had been said at one time or another at the conference and that was my understanding of it. I would send it around to all the people who were there and if they didn't kick, that was law.

Under the next item, "Are changes requested by contractors rapidly cleared?" Changes and requests by contractors obviously must be cleared as expeditiously as possible, otherwise, we don't get production, but on the other hand, sometimes a contractor will ask for a very innocuous change that on the face of it doesn't seem to make any difference and yet might make the difference between a set that will work and one that won't be worth a damn. So the channel on requesting changes is through here (Quality Control Division) to see to it that it goes to the right individual. If possible this outfit (Quality Control Division) will answer it and if they can't answer it they will send it over here (Engineering Division). Occasionally, you will run into an obvious change that we don't

give you an answer for a couple of months because we may have to run life tests, which take time. It is better to wait for a little while and find out something about it. Nine times out of ten when the manufacturer asks for a change like that, it is due to their own carelessness in not placing the orders soon enough, or they would have what they need.

The next item on the list is "Pilot Run vs. Production Run." I think I have discussed that quite a bit already.

Item D is the "206 Form." I am not very clear on that. If it is what I think it is, it is the form that authorizes a change. The purpose of that is to take care of this 1/4", 6, 32, RHE which you want to change into 3/8" screw. Everytime a change is made you have to fill out the form and it becomes part of the contract file. In that connection there are some intermediate steps that I have left out here, particularly in regard to production runs. If there is a production run the theoretical chain of command would be one of two ways depending on how the contract is written. There is a manufacturer and down here (illustrating on blackboard) is the laboratory and there is a question up here. "What will you do with it?" One way of handling it according to Hoyle would be for the manufacturer to ask the resident engineer that works for the inspection agency, ask the inspector, and the resident inspector may be able to answer it. For example, on the substitution of the screw, he might be able to answer that. Sometimes he can and sometimes he cannot. There are places where the change would be disastrous. Some places it wouldn't make a damn bit of difference. The resident inspector goes back to the inspection zone and the zone comes to the Inspection Agency Headquarters and then they come down here to the Procurement District. That is theoretically the way it happens. Then the Procurement District sends it to the laboratory. Practically, however, at each one of the inspection zones, I have an engineer and a liaison officer, so if this man (resident inspector) sends it in to the inspection zone, they can answer it, or if not, they call up on the telephone and get the answer from the laboratory concerned, if the answer can be given that quickly. But if the gang has to make some checks, they say, "I will call you back," and then make the test and furnish the information back. That is one way of handling it. The other way of handling it is if the manufacturer goes to the Procurement District and the Procurement District in turn goes to the laboratory through the Quality Control. In any case, this should be Quality Control and then the laboratory. The contracts are written both ways. In the pilot run stage of the thing, the inspector on the ground, whom I have there, should be able to answer the question and if he can't answer them, he calls up "home base" and gets the answer. But as I say, these telephone inquiries back and forth are usually reduced to writing on the 206 Form. They make a record of them and at the end of the week they write down all the changes they have authorized during the week.

For the "Combined responsibility of SCGSA and the Procurement District," the problem, the combined problem is to see to it that the Government gets equipment that has combat usefulness, at the time when it will do some good, and doesn't pay exorbitant prices for it. My responsibility

is to see to it that it has combat usefulness. Colonel Philip's responsibility is to see to it that it is gotten on time and the Government doesn't pay an exorbitant price. Of course, seeing to getting it on time is also my responsibility because by my engineering decision, I can either see that equipment is delivered, or not, so that Colonel Philip and I really share the responsibility of seeing to it that it is delivered on time. Colonel Philip expedites it from the standpoint of correspondence and also digging up the material necessary to go into the equipment. He takes care of the precedence ratings, WPB and all the other things that it takes to get components and raw materials to the proper place at the proper time. I enter that in the back door, in that if Colonel Philip finds he can't get a certain gadget it may be that I can substitute another gadget that will work just as well and thereby have my share of the expediting. It is a responsibility of the two agencies that cannot be divided. The minute either one of us surrounds himself with a water-tight wall, the thing is going to fold up. Either we are going to get equipment that is no good or we won't get equipment at all. If I quit playing ball with Colonel Philip, he has only one alternative and that is to build up an organization as big as mine and I don't know where he is going to get the people, unless I fire mine. There is a grave shortage of competent engineers.

Do you have any idea what the output of Industry was before the war started on communication stuff? We have gone up something in the order of a hundred in the production of radio equipment and we have gone up considerably greater factor in the operation and maintenance of the equipment due to the different types of equipment we have. The equipment that was built before the war came in three general categories. The biggest market, of course, was the home broadcast set which was built for a price and used for a couple of years and thrown away; the amateur equipment which was a small part of the total output; and the commercial equipment, which was also a small fraction, which was installed and operated and maintained by experts. We have increased the amount of that equipment by a factor of a hundred and we are battling it all over the world so that the maintenance problem, the supply of spare parts, is thousands of times worse than the peace time picture and that has required radio technicians and radio engineers, all that we can get and then it is not enough, both in the Service and out. The Air Service Command, for example, have radio technicians scattered all over the world. Just to give you an idea of some of the little things that you run into -- we have trained and sent off to the "races" something like sixteen crystal grinding teams to grind quartz oscillator crystals, complete with equipment. They were trained here so that when they get out to a theatre and somebody breaks a crystal for a certain channel 32, let's say, they don't have the supply problem of not having spare crystals for that channel, and the crystal grinding team grinds them one right from the quartz blank. We have these teams scattered around the theatres now. Taking crystals, for example, we make more crystals per day now than we made in a year, two years ago. Among the crystal grinding teams we turn out more crystals than all Industry did two years ago. A crystal grinding team consists of one lieutenant, three or four soldiers, with a little truck.

I want to emphasize the shortage of engineers. I was talking with Major Cramer during the intermission about the apparent discontinuity between the Procurement District and the engineers. If we had competent enough engineers, the Quality Control Division would not be necessary. I can count the number of engineers I can trust out alone, to answer questions, on the fingers of my hand. This gang here (Quality Control Division) are my commercial people that I have to have in there to keep the system from falling down.

We are setting up or have set up a system of teams between the Procurement District and the Agency. I am going to have one representative and Colonel Philip is going to have one and the pair of them will follow one given item from the time it is a "gleam in someone's eye" until it is washed up. Colonel Philip's ground rules for his men give him a lot more latitude than mine, because you can write the rules for procurement; the ideas on contracts are pretty well jelled and you can tell a man what he can or cannot do under a given set of circumstances. It is far more difficult for me to set up ground rules on how to answer technical questions. The question may be on the design of a battery that will stand up in the tropics or it may be on a repeater for a wire line, so about all my man can do is to keep a case history of the set he is responsible for, and know intimately all the people that might be involved in it so when the question comes up he can get the right man to answer the question. So this man with his knowledge of my organization and the case history of the case and Colonel Philip's man who has the corresponding knowledge of Colonel Philip's organization and the authority to make many decisions in his own right, the two of them working as a team, we hope, will streamline production a lot more than it is at the present time. The question there is, to build up the personnel. I started mine, in a large number of cases, with engineers. As rapidly as I can train administrative personnel, I am going to substitute them for engineers. In the first place, if this man is an engineer, unless he is a second Steinmetz, he is going to be tempted to answer questions he doesn't know anything about. The second reason is that engineers are too damn rare for me to tie up fifty-three good engineers just playing ping-pong with Colonel Philip's corresponding number answering fool questions about one particular set. This engineer, if he is a receiver specialist, might be answering questions on four or five different sets. We could have him in this lot (Engineering Division) and have the commercial man know where he can get to him. I take the credit for originating this team thing.

I think that covers the agent that you have sent down here. I will be glad to answer any questions you want to ask.

Q. Is a resident inspector in the war plant for the full run of the contract?

COLONEL CORPUT: Yes. He is in there during the pilot run and production run. I have my field engineer in there during the pilot run. As soon as he gets inspection procedures lined up, he comes home and turns the responsibility over to this man (Inspection Zone).

Q. Would you elaborate a little bit more, Colonel, on the extent to which the laboratory as well as the Procurement District work and procure for the Air Corps? You started out by saying we do not do very much for the Air Corps.

COLONEL CORPUT: I am sorry I did not make myself clear there. We do not buy the equipment that is carried in an airplane or, with one exception, used in connection with air navigation. In other words, we do not buy airplane radios that go into planes, and airplane radar that go into planes, nor the interphone system they talk to each other on, nor the blind landing equipment and the beacons, but the ground equipment for the Air Corps I do buy. I buy their direction finders, or design them and Colonel Philip buys them. I buy the ground radar. The air-borne radar they buy themselves. Their wire line equipment is bought by us and while Dayton buys the Met equipment. I develop that also. The dividing line there is the stuff that makes the airplane fly and gets them down to the ground, they buy all that, but all the other stuff I buy. The ground-to-air communications is designed by the Agency here and bought by Colonel Philip or Philadelphia.

Q. I was at Eatontown and I know that there was work done there on Met equipment to be used in an airplane. There was a gadget being built for use in an airplane.

COLONEL CORPUT: Those are exceptions. I am giving you the general rule. In other words, it is like all rules there are variations from it. That one particular gadget you are referring to was built by us because Wright Field would have to set up a Met Section themselves, so they gave it to us and took exception to the rule.

Q. If a piece of equipment is found unsatisfactory or a new one developed while the old one is still in production, how would the Procurement District be informed of a cut-back or change in putting new equipment in production?

COLONEL CORPUT: I will tell you how it is supposed to work. How it works is in the hands of the Gods. That goes back to the fundamental idea of how we get at this equipment in the first place, which I should have touched on probably and didn't. We down here do not tell the Army what it wants in the line of communication equipment. We are working for some customer who tells us what he wants in the line of what he calls military characteristics. He wants a radio set so big that will talk for thirty miles, etc. He will have a brain storm and we build the nearest approximation to that, and we send it back to them for test. The idea from the field trickles into the board of the using arm, for example, Field Artillery, Anti-Aircraft, etc., and they channel the thing down through Washington and Washington sends it up to me, sends it to the Agency, for development. I develop it. It goes back to the board. They approve it. Then it goes over to P&D to buy it. P&D then come to me to find out what it is. What has happened there? The chain has been from the board of the using arm to Washington, to the Agency and then back to the board for approval and through Washington to P&D and then home to roost. I make minor changes as a result of unsatisfactory reports without telling anybody. That will channel sometimes between just the Agency and P&D. Occasionally, on a very important minor change I will send it to the board and it will go around the whole rigmarole again. Of course it is one of the minor changes, Colonel Philip and I agree on when we should put it in production, without saying anything to anybody. We just tell the manufacturer, "When can you change?", and he says, "I can change

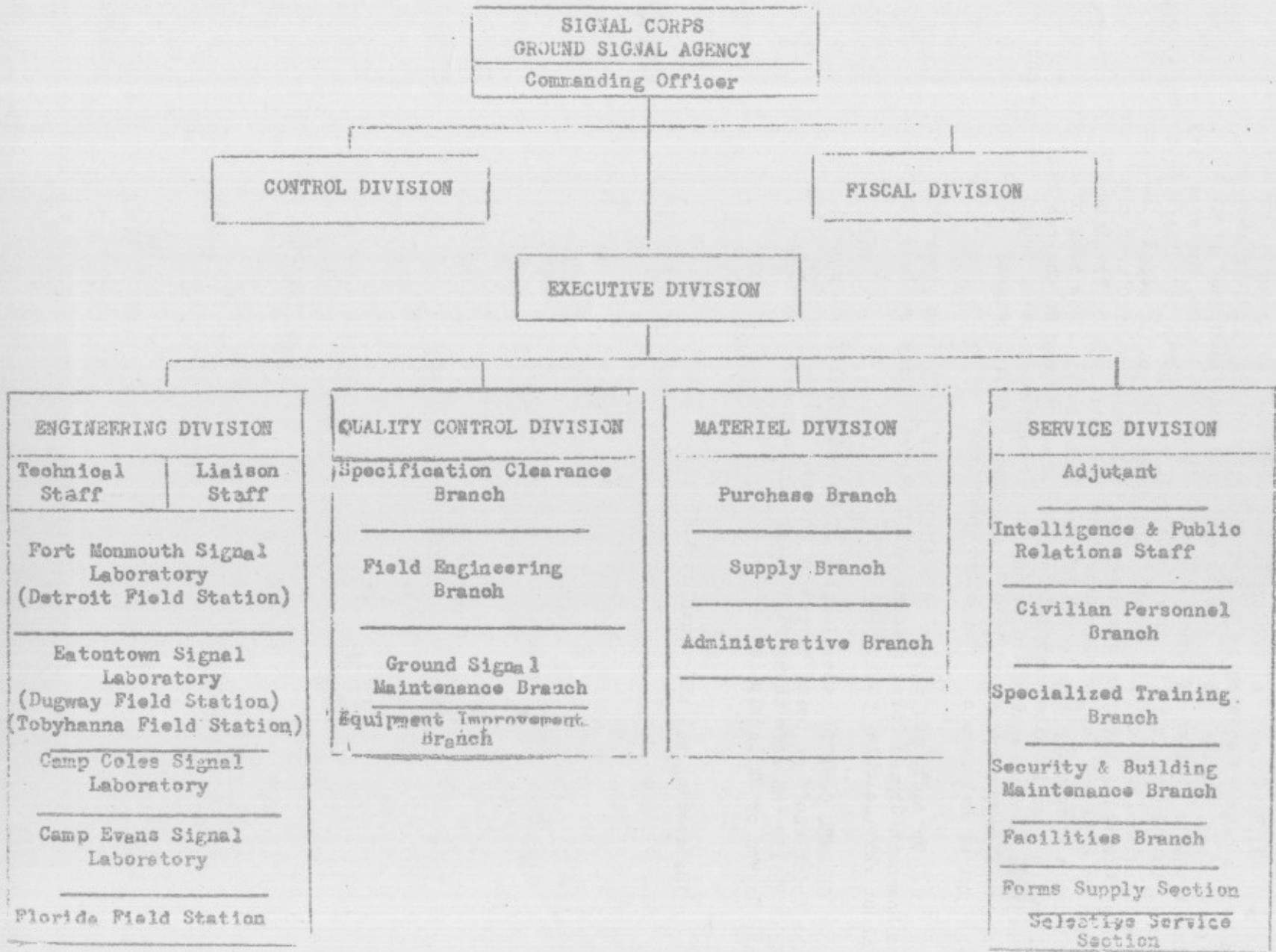
on set no. 900," and set no. 900 comes out changed. On the major changes the board has to make a decision as to how important it is, whether they want to stop production, whether they want to continue production, and eventually the Requirements Section of General Harrison's office issues the necessary orders as to when it is to be done. Theoretically that's it. There is an interesting side light on this thing. The normal length in peace time from the time this thing hits the board - we will put the manufacturer over here and then we will put Joe Soldier over here (illustrating on blackboard), the ultimate consumer - the length of time from the time the idea hits the board to the time it hits some soldier was seven years. So you can see what we have been up against in trying to get equipment being bought now was not in existence in the spring of 1940 in any shape, form or manner. We have had to do a lot of telescoping. Any other questions?

Q. Colonel, you mentioned both Colonel Philip and yourself which means Monmouth Signal Corps Procurement District? These men have heard a bit about Philadelphia, what about them?

COLONEL CORPUS: When I speak of Colonel Philip and myself, most of the trick stuff is being bought by Colonel Philip, but when I say Colonel Philip the same thing will refer to the other Procurement districts, either Dayton or Philadelphia.

The meeting was adjourned at 4:45 p.m.

COLONEL CORPUS: I will tell you how it is supposed to work. How it works is in the hands of the gods. I've got back to the fundamental idea of how we get at this equipment in the first place, which I should have touched on probably the first time. He does here do not tell the Army what it wants is the line of communication equipment. We are working for some customer who tells us what he wants in the line of what he calls military characteristics. He wants a radio set so big that will talk for thirty miles, etc. He will have a brain storm and we will find the nearest approximation to that, and we send it back to them for test. The idea from the field trickles into the board of the using arm, for example, Field Artillery, Anti-Aircraft, etc., and they channel the thing down through Washington and Washington sends it up to us, sends it to the Agency for development. I develop it. It goes back to the board. They approve it. Then it goes over to R&D to buy it. R&D then come to me to find out what it is. What has happened there? The chain has been from the board of the using arm to Washington, to the Agency and then back to the board for approval and through Washington to R&D and then here to report. I take minor changes as a result of laboratory reports without telling anybody. That will channel messages between just the Agency and R&D. Occasionally, on a very important minor change I will send it to the board and it will go around the whole rigidistic again. Of course it is one of the minor changes, Colonel Philip and I agree on when to report but it is in production, without saying anything to anybody. He just tell the manufacturer, "When can you change it," and he says, "I can change



ORGANIZATION CHART
 SIGNAL CORPS GROUND SIGNAL AGENCY

30 September 1943

