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ANTICIPATED EFFECTS OF ATOMIC ATTACKS

19 September 1947

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Supplement to Lecture by Lt. Colonel B. W. Beers Carrying Discussion Following Main Talk.

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COLONEL GALLAGHER: During the past two weeks we have heard several lectures dealing with the atomic bomb. While these lectures have been both instructive and informative, they have dealt with the problem primarily from the aspect of its use as an offensive weapon. They have neglected one of the very important problems facing the world as a result of the development of the bomb. This problem, of course, is the problem of protecting the people against atomic attacks.

During World War II, those of us who worked on the problem of civilian defense thought that our problems were complex and difficult. Their complexity pales into insignificance when we consider the problems that will be faced in any future emergency, for to the problems of incendiary and demolition attacks will be added the very pressing problems of atomic attacks.

Many of the scientific minds in the Department of the Army have been carefully considering these problems. We are fortunate this morning in having with us one of those minds. He is a man who has had a very extensive experience in the field of civilian defense, particularly in foreign countries.

He commanded one of the teams that investigated civilian defense and internal security in Great Britain and in Germany, as well as in Japan. He conducted an extensive investigation of the bombings of Hiroshima and Nagasaki. His investigations concerned themselves with the aspects of the problem from the standpoint of civilian defense. He has served until recently as recorder for the Bull Board which completed its studies of civilian defense just a month or two ago.

It is a privilege and a pleasure to introduce Colonel B. W. Beers of the General Staff whose subject is "Anticipated Effects of Atomic Attacks." Gentlemen, Colonel Beers.

NOTE: The prepared statement was reporduced 19 September 1947.

DISCUSSION

COLONEL GALLAGHER: Colonel Beers has graciously volunteered to answer any questions that are asked. Are there any questions?

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QUESTION: With reference to this diagram showing the first atomic bomb dropped in the vicinity of the District of Columbia, do you know, sir, if the post commander at the Army War College post has some sort of plan for evacuating members of the Industrial College south across the river into safer territory?

COLONEL BEERS: I can't answer that but you had better find out.

QUESTION: I am very much interested in that since I live on the post. I put that forward not so much in a spirit of levity but as an illustration that there are a certain number of things that should not only be done in the foreseeable future but which probably should have been done yesterday.

COLONEL BEERS: I take your question seriously. I agree with you that local plans at the lowest level and from there upward should be made now instead of waiting any longer. Such plans are on the credit side, and if they are never used, they do no harm.

In my opinion, the reason that more of such local plans are not in existence is because the local planners have not had the necessary guidance to effect such specific planning. There has been considerable confusion as to what to expect and what means could be taken that would be effective. That, in my opinion, is no criticism of anybody at all. It is just that we have something that is brand new and its solutions depend on a great deal of research. I have "rushed in where angels fear to tread" to tell the truth, and presented my version of some of those answers. The elements of this are not just my own imagination. I have checked them very carefully with the most competent help I could get. I believe something such as this would furnish a basis for the defense of an installation of the type of this post right here.

This will be distributed, incidentally, sometime in the near future. I might say this, that it has been cleared by the Atomic Energy Commission and by the Special Weapons Project, and by G-2 as to its contents of classified material. It is in a form that can be released eventually to the civilian public. It is being withheld more for policy reasons--to dovetail it in with other things--but it is available in printed form to anyone under a restricted form of classification.

COLONEL GREER: Would you care to discuss the problem from the standpoint of multiple areas being bombed at one time?

COLONEL BEERS: I admit that I have confined myself to one community here and to my mind, compared to a great many ideas set forth, I have presented a comparatively optimistic picture.

There has been so much talk that in five hours or five days, or what not, they can absolutely obliterate the hemisphere. If they can, why, I am not going to worry too much because I won't be knowing much about it. But I don't believe that sort of thing is practical reasoning.

I am presenting my personal opinions now. Here is one thing that is significant in the two Japanese bombings. Those two cities had a population of about 250,000 at the time of the bombing. The average population density in those two cities was 50,000 per square mile. The average population density in the United States in cities above 250,000 is 10,000 per square mile. There is a direct relationship between damage that can be done, or the casualities, and the density of the population, an almost mathematical relationship. So that for the 50,000 per bomb that were destroyed in those cities, you could assume only 10,000 per bomb in the United States cities. By stepping it up, on my assumption of a 40,000 equivalent, you would increase that somewhat.

Again, it could be reduced by considering the fact that our construction here is superior to that in those Japanese cities. I will admit that they had some of the earthquake-proof buildings that stood out like sore thumbs here and there after the bombing, but generally speaking our construction is so much better--our engineers tell me it would protect a great deal more than that in the Japanese cities and save a lot of casualties. So on the assumption that each bomb of our type could take off 15,000 per bomb, that seems like an awful lot of people. But apply that against the fact that in all of the United States --according to the 1940 census there were some 30,600,000 of population in those cities of 250,000 or above--there were only 37 of them. Assume an enemy could drop--against all the other handicaps that he would be up against in carrying out this program--one 40,000-ton equivalent bomb on every one of our cities with a population of over 250,000 at once, into 30,600,000 inhabitants--there would be over 30,000,000 scot-free survivors, a pretty high percentage. For each additional bomb that was applied as multiple bombing, that percentage would only be reduced by one-half of one percent. I don't know whether that answers your question or not. You can make your hypothesis a little more optimistic by that sort of reasoning than from the other things presented to you, I think.

QUESTION: Last year after the first dropping of bombs at Bikini, Dr. Condon, Director of the Bureau of Standards, published a statement to the effect that men alive today could make a bomb a thousand times more powerful than the Hiroshima and Nagasaki bomb. He later qualified his statement by saying that he meant to imply a thousand times more efficient.

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Assuming the time comes when we have a bomb 1,000 times more efficient than the Nagasaki bomb, has any estimate been made with regard to the areas destroyed, using such a bomb? Obviously, the damage won't be 1,000 times as great, but has any study been made of that possibility?

COLONEL BEERS: I have, but I got myself into dizzy clouds and stopped, and went back to see whether they would use such a bomb if they did make it. What is the use in doing a great deal of planning for it if they don't use it? I am not a scientist. I could not dispute the fact. In fact, I will accept it right now. I always have. Right now they can develop a bomb 1,000 times more efficient than the Nagasaki bomb, but is it logical that they would use it?

Everybody tells me that the critical materials necessary to manufacture this bomb are now and will be in the foreseeable future a matter with which they practice the most extreme economy. If you would take a bomb 1,000 times more potent than the Nagasaki one and take our biggest city, what would it do? I figured it out a long time ago, and then I abandoned it by this sort of reasoning.

I figured out that the waste energy of such a bomb, even on the metropolitan area of New York, would be so tremendous that they would never think of using it. There is no argument that those things are possible, but are they practical? That is what we must reason from. There is no limit to the scientific possibilities, or actualities--not only in theory--but there is a limitation to how it will be used and whether those possibilities will be used to the utmost. They are going to attempt to be practical, aren't they? I am sure they are.

COLONEL McCARTHY: Colonel Beers, what progress is being made on fashioning garments that will give some protection to rescue workers?

COLONEL BEERS: I am not in a position to answer that authoritatively. I have asked the same question. I am very much interested in it. I can only say that I have asked questions of people who should know and I have received incomplete answers. I can just pass that on. That is all I can say about it. I really don't know, but it is my opinion that progress is being made along that line.

QUESTION: In your chart No. 4, you show the effect of a bomb dropped in an area surrounded by hills. Projecting that area out a little bit farther, if you had a hill the summit of which is higher than the point at which the bomb is dropped, what is the distance at which the effect of the gamma ray is felt in the horizontal direction?

COLONEL BEERS: You mean the effect on the shadow side of the hill?

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QUESTION: No, on the face side, projecting that out ten miles, 15 miles or some greater distance?

COLONEL BEERS: Well, if that hill were beyond this outer zone, I wouldn't take it into consideration at all as affecting it in any degree.

QUESTION: That answers my question.

QUESTION: You have given us some very concrete thoughts on a very short-range plan. We have heard from other speakers on some very long-range solutions and the things that prevent us from seeking a solution, such as mass movement of populations, and so forth. Of course, in this country, inasmuch as this looks like it would have to be a governmental undertaking and everything the Government does is immediately measured with the yardstick of the dollar, I would like to ask a purely hypothetical question, and it is this: If one bomb, such as you show here, were dropped over Washington, has anyone calculated what the cost would be in dollars so that such an argument as that might be held up under public opinion in the interest of really getting in and getting a solution of this thing?

COLONEL BEERS: I know of no such estimate having been made. I think such an estimate would furnish some excellent ammunition with which to bombard the opponents of passive preparedness, and I hope that the record of this question and answer will eventually reach the responsible people who would be inspired to make such an estimate on this subject. I don't think any has been made.

QUESTION: Would you care to make a guess, at least on what you have seen, sir?

COLONEL BEERS: That would be a pretty wild one. I could make a guess but it might be 5,000 percent off. I don't think it would be worth anything in the record. I might say this: I have placed my ground zero at the Capitol for one reason or another, mainly because that was the first spot I saw, and everything comes into the wheel there. My zone of special destruction--which I would consider as necessarily an abandoned area that we would forget about--as I said, comes somewhere between 3,000 feet and a mile. With the construction that appears in the city of Washington, which is very outstanding--I would say that it would be pretty well limited in here and would just barely take in the Union Station on one side, and would go down to about Virginia Avenue on the south, and wouldn't go over to Lincoln Square. It is surprising when you put this template on there, looking at the picture it looks like a vast area but it might be a pretty small area in Washington which would be very heavily damaged, but partially salvagable,

with this area (indicating a single zone from outside) which is the question the gentleman asked, you are pretty well taken in there in this area of heavy damage. We are a little better off at the Pentagon. But that central zone is an awful big area, and it looks pretty terrible. But it gives something that is true, that even though a certain area is completely destroyed, we must not forget that there is a lot of salvage to be accomplished.

QUESTION: Is there any effort made to disperse key personnel? I take it the entire personnel of Zone 3 would be considerably shaken and would not be up to their job straight-away. In a town of 400,000 inhabitants would there be enough key personnel outside of Zone 3 to handle the situation?

COLONEL BEERS: Well, a city of 400,000 in the United States is a pretty big city so far as area is concerned. I believe there is no city in the United States that could have enough survivors psychologically strong enough to resist the shock--whether physically injured or not--to handle with complete efficiency their own situation. I don't believe that that is possible, short of years of training and drilling, many more years of intensive training and drilling than is possible in this country in peacetime. That is one reason, among others, that I am a firm believer that mutual aid must be organized to a high degree. Whatever program of civil defense is organized in this country, it must be organized throughout the United States as thoroughly in those considered non-target areas as in the areas that we consider critical, for the obvious reason that if we are going to have to rush in mobile supporting units through a mutual aid system, we will probably have to draw them from the cities that aren't hit at all and that probably never will be hit. That is one reason I stress the importance of nationwide organization so that such cities as are unable to handle their own situation can be quickly supported by outside help.

QUESTION: If a bomb were to land on Washington as is shown there, do you think there would be any value in what was left of the city at all? In other words, could the city survive with so important a portion obliterated? What would the inhabitants outside do? Their means of receiving foods, their main essentials would be destroyed.

COLONEL BEERS: Yes, I think that the city of Washington with that important area destroyed could survive because it would have to survive. Certainly in normal times, if we took a natural disaster it might even take longer to accomplish any recovery of the undestroyed or incompletely destroyed areas. In times of stress and emergency and necessity, with the proper feeling that it has to be accomplished, when people are unified in a fight for their lives, I believe that, since geographically the majority of that area is very little damaged, they could meet the situation and would do so.

QUESTION: Has any thought been given to the staggering of working hours to prevent the large concentration of workers in that vicinity during the daylight hours?

COLONEL BEERS: Yes, sir, that has been considered in several studies that I have seen. It was tried out in some of the countries for a while. Germany tried that in some isolated instances. There are drawbacks to it, depending on the individual situation, but it is being studied and considered.

QUESTION: Any plans to be really effective must come right down to details as to who does what, where, and when, and very broad planning must be done to have value. Did you draw up such a plan when you laid the overlay on that map, specifying the point of attack? You can have a multiplicity of plans by moving that central point over the cities. However, when you start talking about the possibility of two bombs or three bombs, which is not beyond the realm of possibility, you no longer can draw any specific plan because you have no idea what the relationship between the points of impact is going to be. It seems to me the answer to the possible defense is a solar system type of defense where within this cell it is complete. Here our first thought should be the continuation of orderly existence within that cell with secondary thought being the rescue or salvage of any other affected cell.

COLONEL BEERS: What size cells are you referring to?

QUESTION: Probably the best type of cell is the telephone exchange branch system where the cell is as large or small as the population density requires.

COLONEL BEERS: I quite agree with that theory, and that is the basis that sound planning will have to adopt in the anticipation of multiplicity bombing. I have presented this on this theory, and with this in mind, that if an organized community and city bases its plans on one type of bomb, the type that can be reasonably expected, without too much concern for the possibility of multiplicity of bombing, the preparations that will be made in that instance are the maximum perhaps that any city could make. If by multiple bombing the entire city is completely obliterated, that is that. If a single or one or two bombs would fall, then their surviving machinery is trained in what to do to save the rest of it. This is just some of my own personal thinking. I believe that the cell idea is important, the team idea, so that units in surviving areas will be so trained as to know automatically what their mission is. I believe also that because of the danger presented by any type of warfare, radiology, and so forth, a long-range training program must be started practically at once so that the intelligent, dependable, thoroughly trained leaders are scattered physically throughout all populous areas.

I don't know what the avenue of training for those people will be. I personally consider that UMT would furnish the most excellent method for training a large number of people along that line. Certainly, all of the Armed Forces will have to have it and all of the key civilian people. Firemen and that type of people in the organized protective services should be thoroughly trained in it, and that training should include not only the technical knowledge necessary, but the whole scheme of what those people with that knowledge should do the minute there is an emergency. I must add, however, that I haven't presented the solution. I have only drawn a work sheet on which people can try to arrive at the solution.

QUESTION: Colonel, do you feel that the erection of tiers of barriers would be effective at all in reducing blasts and minimizing fires?

COLONEL BEERS: I am positive that it would. Whether it is practicable or not is another problem, but I am sure that just mechanically speaking that would be very effective. It would sort of make physical cells of the community, break the community up into physical cells that would afford quite a degree of protection. I don't know whether there is enough concrete and steel in the United States to carry out an effective program along that line. I am not sure.

QUESTION: In the establishment of the control system that you refer to, not only would it be necessary to train the people but there would have to be some sort of physical plan. Would you envisage something that would have an effective covering, something, say, located in a concrete protective shelter or would you have some sort of mobile unit that could be protected initially and that would be able to have a greater flexibility and scope of operation?

COLONEL BEERS: For the control center?

QUESTION: The actual establishment of control.

COLONEL BEERS: Your last suggestion thrown in there is a good one. There are three possible solutions. The mobile idea which, in turn, would have to have a place of absolute protection before the explosion at all times. That involves the construction for it of a completely effective underground shelter or wheeling it out into the woods, mountains, or country someplace where you know it is not going to get hit. Those are two methods by which those control centers could be established before the explosion, either by establishing one of known bomb-proof proportions which couldn't be destroyed or at least not easily destroyed, or by establishing two or three alternate control

centers, and placing them out in an area which they think would be out of the danger zone. Any combination of those would be effective.

QUESTION: You spoke about mutual aid being necessary and about cities that weren't likely to be hit having to be prepared to help cities that might be hit. Would you care to comment on how those plans would be accomplished and implemented? Would it be done by the central Government, would it be done on a regional basis, or would it be done on a state basis?

COLONEL BEERS: In answering that at all, I will have to give it distinctly as my personal opinion. All of the levels of our Government must be concerned with this plan as a team. I am firmly convinced that it must be federally directed. I am sure that if the danger was apparent, the states would, as they did, go to any limit necessary in the expenditure of money and effort in the training and organization of their people. To meet this contingency they will have to do just that, as will the individual municipalities.

It will also need support and guidance if for no other reason than for the purpose of standardizing and effecting that over-all program of mutual aid. With the organization stopping at the level of the state, you depend on cooperation to get effective mutual aid. You remember the story about the general at Gettysburg. He was willing to take orders but when he was told to cooperate with General So and So, he said he would be willing to let the other general be in command, and he would obey him implicitly, and if he himself were placed in command, he would see that the other general obeyed implicitly, but he would be d----- if he would cooperate with anybody.

COLONEL GALLAGHER: May I add to your remarks there that during World War II we had a very extensive mutual aid system of fire fighting developed. It was suggested by the national office. It was executed and implemented at the state and local levels. Today throughout the country there are mutual aid understandings between fire-fighting forces whereby a stepup system is arranged so that you dilute the fire protection of the nonburning area, but you do increase materially the protection of the burning area. Those agreements are still a practical matter arranged at the local level.

COLONEL BEERS: There was a great deal accomplished by agreements on this thing in the past war.

COLONEL GALLAGHER: Of course our biggest problem in this country so far as mutual aid in fire fighting is concerned is the perfectly ghastly situation we have in regard to fire-fighting equipment, whereby virtually none of the equipment in any of our large metropolitan

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centers is satisfactory or practical in other metropolitan areas. Philadelphia, New York, Chicago, all have different fire-fighting equipment from the standpoint of thread sizes and outlets for hydrants. That is what Colonel Beers spoke of when he spoke of standardization. That to me is the one "must" that should exist from the standpoint of protection in a future emergency.

COLONEL BEERS: Another obstacle or legal problem concerns compensation, and so forth. If Chicago sends fire apparatus down to Gary and one of them gets destroyed, or a fireman gets killed, who pays the compensation? Those things have to be ironed out. That stops them a lot.

COLONEL GALLAGHER: Are there any other questions, gentlemen?

QUESTION: Has there been any investigation in regard to depth and the materials required for underground shelter in Zone 1 area?

COLONEL BEERS: Yes. The Office of the Chief of Engineers has done considerable research along those lines and there are policies on that matter laid down, I believe, by the War Department. I think I see an officer sitting about the center of this audience that might be able to tell you more about it than I, but I do know that those studies are being made by the Chief Engineer.

COLONEL GALLAGHER: Are there any other questions? If not, Colonel Beers, I know I voice the wishes of the group in extending our very sincere thanks for a very illuminating and thought-producing talk.

(1 October 1947--300)S/h

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