

## EITEL AND ARMSTRONG WORK TOGETHER

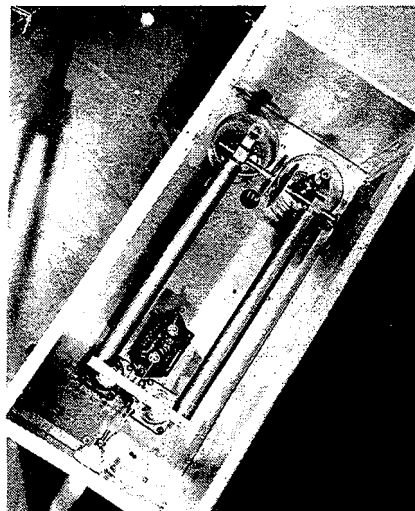
The recently published Special Publication 14 argues that Major Edwin Armstrong had a healthy and long-running connection with Eitel-McCullough. Here's some evidence along this line: the transcript of a wartime telephone between him and Bill Eitel. "The Major" was apparently doing development on a transmitter, possibly radar, for the Signal Corps. He was working with "1000" tubes, presumably the 1000T (the former 1000UHF). He was also using "117" tubes, probably the Eimac X117, one of the prototypes of the 4-250. The X117 code had been assigned four months before.

Note the relaxed tone of the conversation. There is no problem of a distinguished professor talking to a much younger man who hadn't finished high school. It's just two engineers working on a shared problem.

The transcript has some slightly non-sequitur answers to questions. The secretary who reduced the recording was probably not a tube expert. More critically, during the war essentially all telephone facilities in the U. S. of 1000 miles' length or more were equipped with channel splitters (the EB or "emergency bank" channel bank). So this conversation took place through a bandwidth of about 1500 Hz.

The high serial number of this transcript (817) suggests that recording of phone calls was common practice at Eimac headquarters at the time.

The photograph is of a VHF power amplifier that may have been the Eimac prototype of the unit that Armstrong was using. At least it appears in the same file as the transcript. - Ed.



Tuned-line amplifier probably using X117s at upper right. Note bypass capacitor on the midpoint of the shorting bar at lower left, probably the one mentioned by Armstrong

### TELEPHONE CONVERSATION

Dated: 5/25/44

Time: 2:13 P.M.

BILL EITEL vs  
Major Armstrong  
SERIAL #817

E: Hello.

OP: Is this Mr. Eitel?

E: Yes.

OP: Go ahead, etc.

A: Hello, this is .. mumble .. Armstrong.

E: How are you?

A: Well, I'm very good.

E: That's good. What's new?

A: Well, we haven't got-

ten your tubes yet.

E: Which ones?

A: The new 117s.

E: Oh! You got the telegram that they're on the way?

A: Yes, I know. I wasn't calling you about that!

E: Well.. Okay!

A: Although, while we're on that subject, you intend

to make those filaments 5 volts eventually?

E: That's right. These are supposed to be, these are what should be 5-volt filaments but for some reason we've had difficulty with that new filament design in there and it requires a little more voltage on it to get the emission out of it.

A: I see.

E: Yeah. We thought sooner than to hold you up we'd send you these tubes and we're working on the problem but we haven't been able to lick it yet and I hope in the next few days to have an answer on it.

A: Well, there isn't any objection to making them the same voltage as the 1000s, is there?

E: Well, we can't.

A: Huh?

E: We can't. We don't have enough length in there.

A: I see.

E: We're stuck to pretty close to 5 volts for the rest of the design.

A: Yeah.

E: And these were just running a little bit low in temperature so we boosted the voltage up to get the emission out of them.

A: Yeah?

E: But normally they will run at 5 volts.

A: Alright. Well, we'll figure on that.

E: Did you get the 1000s yet?

A: Not yet.

E: They haven't arrived either, huh?

A: Nope.

E: They should be there by this time.

A: Well, they'll probably come in tomorrow, I imagine, I just talked to the station and they hadn't come in.

E: I see. Okay.

A: Now, I wanted to tell you about something that

we had done in changing the design of your circuit which I thought might be of interest.

E: It sure will be.

A: We followed religiously the dimensions of the box you sent us.

E: Uh, huh.

A: And the spacing of the lines and so on.

E: Yeah.

A: And we found that there was a certain amount of reaction through the tubes and the grid circuit and we also found that the coupling didn't seem to act just right.

E: Uh, huh.

A: So we changed the spacing of the lines at 2-1/2 inches between center[s].

E: ... on the plate lines.

A: Plate lines, yes.

E: Yeah?

A: And took [off?] the mid-point ground.

E: Uh, huh.

A: Ran the mid point on the shorting bar floating.

E: Uh, huh.

A: And it makes a lot of difference.

E: Well, that's swell!

A: The grid current comes up now and it tunes quite true without any reaction and the plate loads up by the way an ordinary triode would.

E: Gee, that's fine! You still get the same diameter plate line. You just move them closer together?

A: We just move them closer together. That's all.

E: I see. Alright.

A: At that spacing there was just about as much difference distance between the centers as there was between the line and coil.

E: Uh, huh.

A: And you had a mid point ground on there so that there probably was some push-push current.

E: Uh, huh.

A: No ionization [neutralization?]

E: I see.

A: Now, for the particular frequency you use that might have been better. We were on something a little different from what you use.

E: No, I don't think it was any better. We weren't satisfied with what we had. It was just something that we had put together and obtained a result from and we thought we'd pass that on. We're building a complete new outfit here and it's taking some time to get the thing together and we hope to run down some of those things so I'm glad to get this information from you because at least we won't have to start out in the wrong direction the first time.

A: Well, push the point [plate?] line as far away from the top of the box as you can. We find that's advantageous.

E: Oh, that's fine!

A: Now, we did one other thing. We increased the driving power required by loading the grid circuit with

40,000 ohms grid-to-grid.

E: Uh, huh.

A: And that's setting (?) [settling?] down every-thing by night [?].

E: I see.

A: I'm not sure that we know, this much loading as we have. We'll find that out in a day or so.

E: I see.

A: But, anyway the tube we were using to drive 'em, ah, the 829, had more power than was necessary so we thought we might as well use it in stabilizing the grid circuit.

E: Yeah. That's very simple alright. You're driving them with an 829, huh?

A: Yeah, we're using an 829 with 600 volts on it.

E: Gee! Well, that's very encouraging. How much are you getting out of the things now, any idea? ... ah, the 117s?

A: Yeah. We're not running very much. We're running about a kilowatt and a half [on the ?] tubes and we're using it currently.

E: I see.

A: So that's probably about 750 watts, average.

E: Uh, huh. I see.

A: It isn't working at all. The plates are almost black.

E: I see. (Laughs) Oh, that's fine. How much plate voltage?

A: 3500.

E: 3500.

A: The only reason for that is we didn't have any more

available on this particular supply. Tomorrow we're going up to 4500.

E: That's swell. That ought to give you a lot more right there.

A: Yeah.

E: What screen voltage are you running?

A: About 500.

E: About 500.

A: It don't seem to be too critical.

E: Uh, huh. Well, that's fine. I'm glad to get that information, particularly on the output circuit, because we weren't entirely happy with the thing the way it was working.

A: Well, this thing is wonderful now. The transmitter boys just can't keep their hands off it.

E: (Laughs)

A: Oh, yeah, really it ... for that matter it's just going to be beautiful.

E: It is, huh?

A: Oh, absolutely.

E: Well, that's swell!

A: More important, it's beautiful for what we want to do.

E: Uh, huh. Well, that's good. How's progress coming in general?

A: Very, very good.

E: That's swell!

A: We had General Colton up yesterday.

E: Oh, you did, huh?

A: Yep.

E: Well, that's swell!

A: The delegation.

E: Uh, huh. Well, that's fine!

A: He didn't believe the efficiency.

E: Laughs

A: Says, "You must have been talking to some salesman!" I says, "Oh, no, we didn't. We measured it in our little calorimeter."

E: Well, that's fine! Does it look like there's going to be any procurement on that type of stuff?

A: Yeah.

E: Well, that's good. Who's going to build it? Any idea?

A: No, I don't know yet.

E: I see. Oh, that's fine, because we just wondered how far to go with these things, whether tool up further on 'em or what, because we're kinda out in mid-air right now on the tubes as to ...

A: Well, I'll keep you advised just as fast as it comes along.

E: Okay, that'll be fine.

A: Now, tell me one thing about this 118, I suppose you'd call it, the one with the 1000T plate.

E: Yeah. I don't remember what the number is but I know which one you refer to.

A: You were talking about getting some sockets made for those.

E: Yeah.

A: When do you expect to have them available?

E: Oh, we're not making very much progress on it.

Say, probably in 30 days, the way it looks.

A: Well, send us along a few when you get 'em.

E: Yeah. Well, probably what we're going to do is make two types, a socket for a single tube and for the push-pull range with as high frequency as we want to make . . . a double socket with the by-pass condensers built right in it.

A: Yeah.

E: And that's what's kinda holding us up now. We just haven't been able to arrive at a satisfactory design that's compact and simple enough to do the job.

A: Well, we use the double type.

E: Uh, huh! Two separate sockets.

A: Beg pardon?

E: Two separate sockets, you mean.

A: Well, no, I don't care, whichever you get first.

E: Oh, I see. Okay, fine! I'll let you know just as soon as we get some progress on that thing. But it hasn't been very encouraging to date. We've been kind of fumbling around here with it so to speak.

A: Yeah. Have you gotten any power runs on these 1000s?

E: No, we haven't. We probably won't for several weeks. The way it looks now, it'll be at least several weeks, probably 30 days even because we have quite a job of building a complete setup for the 1000s and the 117s and the ah, a couple of others that we have here. And it's a kind of an overall program so we haven't been able to just sit down and really get much done on it. We

don't want to go into, ah ... haywire like we did on the first setup on the data that we sent you.

A: Well, we'll fill [fire?] one up just as fast as we get 'em.

E: Okay.

A: In fact we'll start, probably be starting the beginning of the week and we'll let you know what we think ... what we find is the best setup for 'em.

E: Okay, fine. I'd sure appreciate that. Might save you a little trouble.

E: It will. It will. Anything you can do will save us some time.

A: Uh ... tell me ... (RECORD CHANGE)

A: Okay.

E: Alright. B'by.

Material from the Perham-Eimac archive, a holding of History San Jose.