2

A Right.

Q The number 1940, what kind of a marking device was used to put that on there?

A A pen.

Q Who put it on there?

A I do not know.

Q Do you know when it was put on?

A I do not know.

Q Do you know whether or not the date of this instrument 426 in fact is February 16, 1940 or February 17, 1940?

A I do not as a matter of fact know.

Q Can you determine now by examining Exhibit 426 whether it is the first page which is continued on 425?

A It would seem that this is true.

Q To what does 426 relate?

A 426, I can read the words thereon.

Q Well, don't read it, if you can by referring to it, tell us to what it relates?

A It relates to elements of the design of the computing machine.

Q Which one, the prototype or the main machine, so-called?

A Main machine.

Q Now, Dr. Atanasoff, according to your best recollection, when were 425 and 4256 written?

3

A There is no doubt in my mind the date was intended to be February 16, 1940.

MR. DODDS: Excuse me. May I see the original of that?

THE WITNESS: Yes.

MR. DODDS: Thank you.

BY MR. HALLADAY:

Q Will you turn now to Exhibit 427, please?

A I have it before me.

Q Can you tell me what numbers presently are physically clipped to 427 in your file as it is before you?

A 427 to 437 inclusive.

Q Would you be good enough to tell me from inspection of those numbers whether there is an appearance of a rusty paper clip on 427?

A There is such an appearance.

Q And going through them further, do you find any succeeding page which has a rusty paper clip mark on it?

A The only -- there is a slight appearance of a rusty paper clip on the back of 427. It, however, clearly has arisen by penetration of the rust marks through the paper from the front of page 427. There are no other rusty marks until you have arrived at the page 437 which contains a rust mark on the back which is evidence that this group are in their original or are assembled in their original condition.

Q And then can you tell from Exhibit 427 what the purport of it is?

A The purport of it is something to do with the logic circuit.

Q And can you fix by reference to that document alone its approximate date?

A It's right in the same time, '39 or '40.

Q Referring to No. 428, does that have a date on it?

A It does have a date.

Q In whose hand?

A In my hand.

Q When was that date put on this document?

A Well, the date says June 8, 1939, and I read it and this looks logical.

Q Is your answer that you put it on on or about that date or some later date?

A I am -- I never date things later. I always date them on the instance of the use. I might date them the next day but never later than that. I just don't do things that way.

Q Is Exhibit 427 in your hand, all of it?

A It is.

Q 428?

A Yes.

Q What does 428 relate to?

5

A Also relates to elements of the logic circuit.

Q Is 429 in your hand?

A It is.

Q Can you fix the date of that?

A Only by its being adjacent and on the same paper with the previous document, it looks as though, if I had to fix it independently of that contiguity, I would fix it during '39.

Q How about No. 430, in whose hand is that?

A That is in my hand.

Q Can you fix the date of that, approximately?

A The same, 1939.

Q How about 431, in whose hand is that?

A That is in my hand.

Q Can you fix the approximate date of that writing?

A Late 1939 or 1940, perhaps.

Q How about 432, in whose hand is that?

A That is in my hand.

Q Can you fix the date of that writing?

A The same answer as the preceding question -- page.

Q 433, is that in your hand or somebody else's?

A That is entirely in my hand, and I fix the same date, that is the second half of 1939 or first month or two of 1940.

Q What does Exhibit 431, I am going back, 431 relate to?

A Exhibit 431, I am visualizing the connection between

contacts and condensers, but this is all I can tell you about that exhibit.

Q To what does 432 relate?

A To the same subject.

Q Up at the top of Exhibit 432 there are some symbols?

A There are.

Q Can you interpret those symbols?

A It says the double La Placean of W equals -- he doesn't want me to say that.

Q Say it that way and we will see if it is something comprehensible to a lay person.

A It says the double --

Q You have your hands up to your mouth and the reporter can't hear you.

A The double LaPlacean of W equals KW.

Q We will have to furnish spellings of LaPlacean. What is that?

A It's a fourth order differential operator which relates to flexible plates, and you see I find a little disparity between that and the whole upper half of the page with the lower half and it looks as if it's a species of doodling, I don't mean doodling, I am thinking, and perhaps I am accomplishing something as I write that kind of stuff but I don't -- but I don't fancy that I can -- I know that the double LaPlacean of W equals KW is an equasion that relates

7

to plates. You remember that I had work going on in these directions.

And W equals, you know I hate this, to testify to this, W equals U of X and Y times an explanation there probably represents a special solution of this equasion. I can't verify that instantly in my mind and I hate to testify this is true, but this relates to some formative process in which I am seeking solutions of this partial differential equasion which resides at the upper end of the page.

Q Does that thinking on your part have any relationship or did it at that time to your reference in connection with the computing machine?

A It did not. I mean not direct. Of course, indirectly there were connections but not directly.

E-7-2

Q On Exhibit 432 is the word written ab initio, if I am reading it correctly?

A Ab initio, yes.

Q Is that in your hand?

A It is.

Q Can yougive us any idea why that is written on this page?

A No. But I can tell you what it means.

Q I think we will let the judge figure that out.

A He knows that kind of thing, doesn't he?

8

Q Exhibit 433, is that in your hand?

A That is entirely in my hand, sir.

Q To what does that relate?

A That relates, you see, neither -- either up there? That is logic circuits, isn't it, clearly?

Q What do you mean by that?

A Well, you know, we now say either or, but you see, this was done long before either or were ever used in connection with computing logic circuits. This is written far before that, and this represents my own efforts in the logic circuit area.

Q Approximately what date would you put for Exhibit 433?

A There is no question that this is all material from the years 1939 and 1940.

Q Look at Exhibit 434.

A Right.

Q Whose hand is that in?

A That is in my hand.

Q Now, there are some representations there in circles?

A There are.

Q What are those?

A You know, maybe, you know, I know I thought about it, and I would say that this page represents an effort to develop a diode logic on my part.

9

Q What is a diode?

A A diode is a vacuum tube with two elements.

Q What is the vintage or approximate date on which you put down 434?

A 1939 or early 1940.

Q With respect to the zero's and one's that appear on Exhibit 434, to what do they relate?

A They relate to the digits of a base two number system.

Q Turning to Exhibit 435, in whose hand is that?

A That is in my hand.

Q To what does that purport to refer us?

A You see, you know this gives me some strange feeling also because I see there an effort to concatinate vacuum tubes in a way that it's much easier with transistors, concatinate, that is, put them in series, another effort at logic circuits.

I am looking for easier ways of putting together logic circuits at this stage.

Q Can you fix the approximate date of Exhibit 435?

A 1939 or early 1940.

Q Referring now to Exhibit 436, and just for physical reference purposes, is thatall in your hand?

A The main drawing is in my hand.

Q Is there some red marking on Exhibit 436?

A Yes, sir. And that is also in my hand.

Q To what does Exhibit 436 relate?

A Well, the red markings refer to certain functional, functionale, and there is a difference in those two words, functionale processes which are related to the work of Gross and his predecessors. The drawing which resides on that page I have less hints, it is elements of the logic circuit, however, You see 120 across there represents our conventional 120 volts for the plates of these tubes which were used in those days.

Q Just for convenience in reference, Dr. Atanasoff, does it appear that the number 436 in effect is upside down on the page the way one would ordinarily read it?

A Yes, it does. It is clear that that is true.

Q Then can you determine from inspecting the document in front of you whether the red was written on top of the pencil drawing or the pencil drawing written on top of the red?

A I would prefer a magnifying glass or a microscopic examination to determine that. I cannot be sure with my eye.

Q In any event, is it clear that one is over the other?

A I believe that the pencil is over the red, but I am just not 100 percent sure.

11

Q What kind of vacuum tubes are reflected by Exhibit 438?

A As far as --

Q Excuse me, Exhibit 436?

A Sometimes a person is careless about that, but as far as I can determine these are triodes.

Q Will you look at Exhibit 437?

A I am.

Q Whose authorship is that?

A That is my authorship.

Q Can you tell us what that refers to?

A That refers to elements of circuit logic.

Q Employing what kind of devices?

A Triodes, as far as it is clear, and an effort -- it mentions diodes there and triodes in the writing thereon, and it is evidently an effort to combine diode and triode logic.

Q Can you fix the approximate date of this document?

A I would fix the approximate date as during 1939 or early 1940.

Q Does this represent and reflect some recordation of what you were thinking about at that time or what?

A It certainly does. Yes, it does. It represents exactly that, my efforts, and I have memory of those efforts.

Q Dr. Atanasoff, in connection with your preparation to

12

testify here, have you participated in the preparation of some drawings, and I used the word drawings in a loose sense?

A I did.

Q And specifically have you participated in efforts to prepare drawings which would exhibit visually the appearance of the so-called prototype?

A I have.

Q I have had marked as Atanasoff Deposition Exhibit T, a drawing which I have asked Mr. Allegretti to put on the board up here so that we all can see it.

MR. DODDS: Excuse me. Would you leave that, I want to refer to it later.

MR. ALLEGRETTI: I would like to put it on the floor so it doesn't obscure the appearance of the chart.

MR. DODDS: That's all right.

BY MR. HALLADAY:

Q I have put Atanasoff Deposition Exhibit T, with the kind assistance of Mr. Allegretti, on the board so that we can all see it, and I assume, Dr. Atanasoff, that this drawing was not physically done by you?

A It was not physically done by me. No.

Q Have you, however, been over it and checked it out, had corrections, alterations, changes and other things done to it so as to reflect your best memory of what such a drawing

would have looked like as you made one of this sort when you had completed your prototype by December 15, 1939?

MR. DODDS: Object to the question as leading.

THE WITNESS: I can state in my own words that -- what happened in the construction of this drawing. I made certain sketches, and these sketches were incorporated by a draftsman into a machine and then later I worked over it and I found errors and those errors have been successfully corrected on three occasions, at least, so that now this machine represents my memory of the general appearance and the effective inter-relation of the parts of the machine as it was in late 1939.

Q Now, I think that in giving the answer which you did, you had one verbal inadvertence. Will you state for the record again, please, the process by which this drawing that has now been marked Exhibit T was prepared?

A I first made some pencil sketches illustrating my memory. These were taken by the drawing -- by the draftsman, a patent draftsman and he prepared the original of this drawing. Subsequently I have examined it on a number of occasions and on at least three occasions corrections have been made at my suggestion as to parts which were incorrect and so that now I have, in my last examination, I found nothing wrong with this drawing as compared with my memory

of the structure as of that date, as of the date late 1939.

Q And for the purposes of the record, Dr. Atanasoff, can you give us a verbal description of an interpretation of what we see when we look at this drawing, Exhibit T? First let me ask you this question. Are the labels on Exhibit T with the arrows connected to the labels, to your recollection, accurate?

A They are accurate.

Q And can you by reference to this exhibit T take your mind back to late 1939, describe the physical appearance of the prototype and tell the Court how the prototype operated?

A I can.

Q Will you do so, please?

A May I use a pointer, if I also read the label in each case?

Q If that would be helpful to you it would be quite all right, and there is a pointer on the board in front of you.

A We have before us --

Q Now you are turning away from the reporter so please keep your voice up.

A We have before us first a circle of bakelite. On it are mounted condensers. The condensers, there are two

rings of condensers as are indicated there, one ring on the near side and one ring on the far side. This was just for economy of structure. The ring on this side and the ring on the other side were related as the cylinders in the large machine called KA is related to the cylinder called CA.

KL=32
8/1/1/32
WS

One finds the slow shaft in this position, horizontal position, the slow shaft is the horizontal shaft on which the circle of bakelite is mounted. The slow shaft is geared to the fast shaft with a worm and wheel. In the rear, the fast shaft marked there occupies this position. On the fast shaft are two devices, the commentator which is used for boost purposes and the commentator which is used for carry-over.

Q I observe, Dr. Atanasoff, on Exhibit T the term condenser and also the term capacitor. Do you see, for example, carry-over capacitor to which I am pointing?

A I do, yes.

Q And up above, condensers?

A Yes, sir.

Q What if any relationship is there between those two terms as shown on Exhibit T?

A These terms are employed synonymously. They are each so common that it is very easy by inadvertence even when great determination is used to avoid each of them entering a form, any form of discourse. Now, you see the fast shaft has on it a pulley and the pulley is driven by a motor which is probably a washing machine motor. It was a core horsepower non-synchronous motor, just an ordinary induction motor, probably split phase in character.

Now, we see, to summarize additional

8/1/2/33

apparatus, a small metal box here on which are two vacuum tubes.

Q The small metal box to which you are pointing being labeled on the drawing what?

A It's labeled metal regenerating circuit -- memory regenerating circuit. These three -- this box was -- this circuit, this portion of the circuit here was used to regenerate the portion of the memory which was associated with the condensers. Well, let us say -- It doesn't make any difference -- let us say on the near side of the shaft. We have gotten things hidden there so you can't tell which is which. On the other hand, there is another box which is called 8-tube add-subtract mechanism, and you will remember the 8-tube circuit previously demonstrated in -- the reference I cannot give you, but previously shown here. This circuit employs triodes and these are double triodes, the ones with the grid caps there.

Q The objects to which you are now pointing, five dual triodes --

A They are dual triodes of the variety 6F8G in this circuit.

Q Dr. Atanasoff, the object to which I am attempting to point now with the light pointer on the 8-Tube add-subtract mechanism box, is that what you have elsewhere called an

8/1/3/34

envelope or envelope?

A Yes.

Q All right. I am sorry to interrupt you like this.

A Sure.

Q But in an effort to keep this record --

A Sure, you have to keep it straight.

Q I hope clear. Continue with your description, please.

A Well, there are, you see inside one, two, three, four, five double triodes, dual triodes is another name for it, and then you see three tubes without the grid caps and these are pentodes, and we have had the designation of those pentodes before us. I know -- I remember these are 6F8G's and I will verify that sometime. This is also a pentode here in that other circuit.

Q In the memory regenerating circuit?

A There is also one pentode in the memory regenerating circuit.

Let me do this right. Over here to the right marked power supply is another box with electronic circuits in it and this device, probably that is a double diode for rectification purposes, this is probably a 180 type tube, 180 because those were, I believe, current in that day. This unit supplies through the leads which are demonstrated here

8/1/4/35

into the rest of the apparatus, the voltages for operating the rest of the circuit. It supplies filament voltage for these other electronic chassis and plate voltages for the other electronic chassis, and in these circuits we have always employed to a positive and negative voltage. These positive and negative voltages being approximately equal for the purposes of the way that the logic circuits co-act.

Now, on this power supply chassis there is also an on and off switch, and at the other end a wire connected to a plug which is used to drive power from a common AC main. And attached to the motor there is also a plug so you can operate the motor without operating the rest of the apparatus, or the reverse.

Now, we find below here some things called clearing switches -- correction, omit -- I will explain something else first because it will be easier.

You notice that the condensers are connected, they are connected at the outer ends to buttons, and these buttons, as a matter of fact, we know today are nothing but contact points for switches of the day which can be procured very easily. They are supplied with the contact at this end, turned, and a little stem that goes through and is attached to the bakelite by a nut at the other end.

Now, there are contacts on the other side, but one only sees the nut end of that other contact on

8/1/5/36

the opposite side. The two sets of condensers are offset by half the spacing of each so that they all go on the board. They all do not -- they do not connect electrically.

All right. You will notice that the condensers are connected to a contact point at that terminal and connected to a common slip ring at the inner terminal. It doesn't seem to have a designation. Yes, it does, it does say slip ring and brush. This is a slip ring right there and the brush bears thereon and comes off like this. This occurs not only on the near side of the disc but on the far side of the disc, exactly a similar structure.

W-8-2

Now, you notice the lead leading from the brush bearing on the slip ring down through here and going through a clearing switch to a terminal to the brush bearing upon the boost commentator on the fast shaft. Now, that means -- that is an important logical part of the way this machine works. When signals are being read back into the condensers, the condensers are always boosted in voltage. This is so when they are unboosted and the external ends are being read into the logic circuits or into the memory regenerating circuit, as the case may be, that these voltages will turn out to be positive and negative. You know vacuum tubes don't put out positive and negative voltages, they put out voltages which vary, but they are always positive voltages above the ground to avoid, to bring these voltages down to the level of the input requirements of the vacuum tubes employed in the memory regenerating circuit, and in the logic circuit inputs we boosted them durimg the time these voltages are read back into the condensers and then drop them to zero, drop the slip ring, that slip ring, by means of this device, the device being the boost commentator will be dropped to zero point.

Now, to wipe out the signals on the condensers, it is only necessary to not boost during a revolution, and a little consideration will show that this

will result in all of the signals being cleared from this ring of condensers if one of those buttons is pushed.

I am looking now at the clearing switch, at the item called clearing switch, which has a ground attached to it, but all we do is ground this lead per revolution, and then the near side, condensers on the near side will vanish, the charges on the condenser on the near side will vanish or they will pass into that state which corresponds to zero, and when you push the other button, the condensers, the chargers on the condensers on the far side of the disc will vanish or pass, more precisely, pass into that state which corresponds to the signal zero. The signal zero means the signal zero in the base two number system.

We have a coding that I might mention for the sake of clarity. The voltage minus five, any voltage between minus five and minus 100 or on up will be called a one, according to this coding system, and any voltage of zero or plus will be called a zero according to this coding system. This is a coding system used both in the prototype and in the main machine.

Now, if one wishes to add two numbers -- I might say this, in this machine numbers were placed on these condenser circles by the simple expedience of stopping the machine and taking in your hand a lead which is connected to a

3

battery of the proper -- as a matter of fact, if these had been previously cleared, the voltages will correspond to zero, so it's only necessary to put the one's on the ring of condensers, and you will find us doing this all the time and it looks like a common earthy method of doing this, of accomplishing this purpose.

What we do, if we want a one there, we just have a lead with a negative voltage and we just reach up and touch that point, and if you want to put in three one's in succession, touch that one, touch that one, touch that one or any other combination you wish. You have plenty of time to do it because the time of charge of these condensers, we got real good condensers, as good as we could get in that day, we can get much better ones today, and you can put any number you want to all the way around. And then you start the machine, and you can see -- we had a method of verification that the number on there is correct. Now, likewise, you could put any number you wished upon there, any base two number that you wished upon the rear of this condenser circle. Then, when you -- if you wished to add these two numbers, why, you proceed as follows. You have the numbers rotating, being maintained by the memory regenerating circle, as far as the near ring of condensers go, and a simple consideration will show that the logic circuits are also regenerating the condensers on the far side of the

4

circle.

And then we push a switch here. We push upon that member, the one-cycle switch. We push upon the one-cycle switch right at that point, and this is exactly the way it was made in that prototype. You are pushing, and you notice it can't go forward because of this circle on the slow rotating shaft. And then the notch comes up and it slips in. Then you take your hand away and it's locked in there, and it goes through a cycle, and when it has finished the cycle it snaps back out, and in this way by a very simple mechanical device, we get a one-cycle operation. Doing it differently, of course -- in the later machine we did it differently, but in this machine we get in this way a one-cycle of operation.

During that cycle, the following series of events will be occurring. The charges on the near side, this will be maintained by the memory regenerating circuit, but also, the signals hereon, as a result of agency of this switch, will be being presented to one of the terminals of the logic circuit. Also being presented to one of the terminals of the logic circuit will be the signals from the back, from the condensers on the back of this device. Also being presented to this box --

XL=37
8/3/1/37
IS

Q This box --

A This box being the logic -- the box representing the logic circuit or the add-subtract mechanism -- which is it called -- add-subtract mechanism. All right. Three signals are coming into this box, the signal from the near group of condensers called KA, the signal from the far group of condensers called CA and the signals being carried from the previous step in the operation by the carry-over capacity and the carry-over commentator. This box does in successive the operation involved in each of these steps and it replaces the signal in CA by the signal which corresponds to the sum, if an addition is being performed. The logic circuits will be demonstrated to perform either alternately sums or differences and we have seen some evidence of that in testimony that has already been presented.

Q In December of 1939 when the prototype was in its then condition, you have earlier said you had performed some tests on it. Will you describe those tests?

A I will attempt to describe the tests on the prototype and the associated apparatus logically so that there is a group of tests here depicted. Is that satisfactory?

Q Quite, all right with me, Doctor.

A Now, you see we had this box called -- we had a number of tests that we did to demonstrate the operations of the machine and the satisfactory condition of the components

8/3/2/38

thereof, and I will enumerate these tests. We had a test, a kind of a test to show that as a matter of fact, this memory regenerating circuit was regenerating the memory of the near circle of condensers.

Let's list these tests. One test, the method of doing this fairly obvious. You put any signal you desired on the near ring of condensers. You used an oscilloscope to read the signals thereon, and you noted as the machine was operated where the signal changed with time, and if the signal persisted, if you put it on a certain way and it remained in that way as time passed, you knew the memory regenerating circuit was in operation. Two, the first tests on the add-subtract mechanism were not done in connection with this machine but in connection with separate circuits. There were external circuits provided called a test set, which is not here drawn. The purpose of this test set is to apply signals to the add-subtract mechanism like the signals applied from the condensers and from the carrying mechanism and verify if the two outputs of the logic circuits were correct. Two outputs? Why, of course there were two outputs, because one of those outputs that the add-subtract mechanism went in to replace the charge previously upon the condenser circle in the far end of the disc, and the other one went past, back up here into the carry-over capacitor to replace the carry-over capacitor if a carry-over was required into the next place.

8/3/3/39

Those were the two outputs.

So we have the second group of tests in which we placed the add-subtract mechanism in a test rack, supplied to it voltages corresponding to the code for numbers which I have at this time described, and observed whether the outputs of that box were proper.

Now, we had to be sure that they were proper, not only under exact conditions because this isn't appropo to practical operating conditions. We had to make sure that this device would operate satisfactorily throughout the range of operating voltages and normal to the circuits being employed.

On this set we didn't have one bit of voltage regulation and I remember no difficulty with the operation of the set except those usually attendant to getting the darn thing.

Q When you say this set, you are talking about --

A The whole thing, if you wish, or more precisely, with the add-subtract mechanism, which I was emphasizing at that point.

Q Again, just the term this set, meant what?

A That is no good. It means this entire device, the prototype on the one hand, and it more specifically means the add-subtract mechanism, the add-subtract mechanism resting in a test set.

8/3/4/40

Then the next step would be actual computations with the device, in which arbitrary numbers were placed on the near set of condensers and the far set of condensers. The one cycle switch was operated. You will notice there is a control here on the add-subtract mechanism which says add and subtract. If that control is toward the top this add-subtract mechanism will add, and if it's towards the bottom, it would subtract, and we, of course, tested that in both positions. Arbitrary numbers were placed upon the two circles of condensers.

E-9-1

The one-cycle switch was depressed and, of course, the signal on the near set of condensers being like the signal on the keyboard of any computing machine would remain unchanged, but we would verify whether the signal on the far set of condensers, ones on the opposite side to us as observers then became charged in the way which depicted a number which correponded to the logical and mathematical sum of the two numbers which were on the circles to begin with. Equally the tests were made for subtraction.

Q By what method did you verify that subtraction or addition had been accomplished?

A Well, the only method we had at this time for reading numbers out of the ring of condensers was by a cathode-ray oscilloscope. Was this the general line of thought?

Q I don't have a general line of thought, Doctor. I am asking you to tell us what happened?

A Well, I wonder if I properly understood your question? But I will go on this tack. I suppose this must be what you meant. I understand the logical difficulties of a deposition and the law slightly. I will proceed.

Q You had used the term that you had a method to verify.

A Thank you.

Q I am asking for a verbal description of that verification method?

A That confirms my suspicions. Now, even oscilloscopes were short in those days, and we had an oscilloscope in which the plates were brought outside and it was operated in connection with the tests on this and succeeding machine in the following way. A voltage was supplied, and this voltage, linked through a high resistor charging the plates of the condenser, charging the horizontal plates of the cathode-ray oscilloscope causing the point to move in towards the right. I could employ, I mean a blackboard, if it were possible.

Q Let's try it just verbally, please.

A All right.

Q I know it makes it more difficult for you but let's try it that way.

A It's easy enough for me but I only have concern for the listener. You see there was a source of voltage of such polarity available and this source of voltage, to this source of voltage, to one side of this source of voltage was attached a higher resistor, and to the other, to the other side was attached nothing except that it was attached to one plate of the condenser, and the other terminal of the resistor was attached to the other plate of the condenser and slowly charge would leak on to the plates of the cathode-ray

3

oscilloscope and to the condenser connected across them so that the point would slowly move to the right. There was affixed to the slow shaft a little contact, I remember it was a set screw and opposite the set screw was a brush and these two connections are not shown in the diagram here. When the slow shaft came to a certain portion of the circle, the set screw contacted the little spring and the spring discharged the condenser across the plates of the oscilloscope causing the oscilloscope spot to move to the left again to the zero position. The net result was as follows: If you had no vertical charges being applied to the oscilloscope, if you had no vertical, no charges being applied to the vertical plates of the oscilloscope, the spot of the oscilloscope would move slowly to the right during the active portion of the cycle of the machine and would return to zero during the inactive portion of the machine during, that is, during, while there were no condensers contacting the brushes of the machine. That was the inactive portion of the cycle. So far for the horizontal plates.

This represents what would be called today a method of syncing the oscilloscope into the apparatus, but the sync which was originally on this oscilloscope was unsatisfactory for the purpose so we built this external syncing circuit of very simple character which was used in testing this prototype and the main machine.

Q What is the word syncing short for?

A Synchronizing. It's short for synchronizing.

Q Continue, please.

A Now, as far as vertical motions of the oscilloscope go, we could take voltages from a point inside of the memory generating circuit or from a point inside of the logic circuit and these voltages could be used directly or through amplification, and we did both, mostly directly, to move the spot up and down. The net result of all of this is that when the oscilloscope was connected to the machine in the ways which have been described, there appeared on the screen of the oscilloscope a jagged line, and from the shape of this line, one could determine what base two number was on either the near set of condensers of the vertical plates were connected to the memory regenerating circuit, or the far set of condensers if the vertical plates of the oscilloscope were connected to some point, and I could describe that point with diagrams but I can't describe it very well without diagrams, to the add-subtract mechanism. This is a method of verifying numbers upon this oscilloscope, a very homely method, and one that has no significance here particularly. It would be instantly recognized by persons skilled in the electronic art as a valid method for understanding this awkward- this device. Itwas an awkward method, but it was the only method we had until the completion of our data-in, data-out

apparatus.

Q After that time, Dr. Atanasoff, did you continue to have the prototype on hand for any period of time?

A The prototype actually existed in the laboratory from its date of completion which was, I don't know when, November or December of 1939, late in the year 1939. Now, you remember Clifford Berry didn't go to work on this prototype until September of 1939, and this prototype was working satisfactorily in the laboratory by the end of the year and from that point onward into the next year the prototype was in existence; however, after two or three months of 1940 had passed. We had managed to get the main machine, the one whose pictures you have seen, into existence, and so it could be used for the demonstration. At that time the prototype was destroyed.

Q Now, referring to Atanasoff Deposition Exhibit U which I have had Mr. Allegretti put on the board before us, is that merely an enlarged portion of Exhibit T to show further detail?

A It is. I never saw it before, but it certainly is. Yes.

Q All right. After the prototype had been completed, will you describe for us the work that went forward in connection with the main machine?

A Well, during the late months of 1939 and the early

months of 1940, design work was going on on the main machine, the various appurtenances thereof were being conceived, sketched, organized, interrelated and in general those steps were taken which were necessary for selecting the structure of the main machine and for carrying forth the construction of that main machine. This doesn't coincide too exactly to the method, to the present methods of invention, if you allow me to use that term provisionally, conception, design and so forth, because the whole work was being rapidly pressed and phases overlapped. They were not, all the phases, for instance, of the prototype were not the only activities taking place at one time, but the prototype, the prototype, at the same time a great deal of time was spent working on elements of design of the main machine.

Q Will you turn to Exhibit F-1-D, please?

A I have F-1-D.

Q Photograph No. 1402?

A I have 1402.

MR. HALLADAY: We have a problem of assembling some papers here to get them in order to correspond to the order of the questions I have in mind. Would it be all right with you if we quit now and come back 15 minutes early?

THE WITNESS: Fine.

MR. HALLADAY: Can we come back at

a quarter of 2:00 in place of 2:00, is that agreeable?

MR. DODDS: Agreeable.

(Whereupon a recess was taken until 1:45 o'clock P.M., November 15, 1968.)

9/2/1/41
EA - KL

November 15, 1968
2:00 o'clock p.m.

Whereupon,

JOHN V. ATANASOFF,

a witness having been previously sworn, was examined and testified further as follows:

DIRECT EXAMINATION (Cont'd.)

MR. HALLADAY: May it be understood that we will recess today and, incidentally, in order to permit Dr. Atanasoff to catch a plane, we would like to quit at 4:30.

MR. DODDS: All right.

MR. HALLADAY: Unless there is a logical stopping point prior to that time, and I will try to keep track of the time and not make you run too hard.

THE WITNESS: Four o'clock, Henry. I tell you I will be running hard if I make it by 4:00 o'clock. Will you have Mr. Halvorson available to help me do various errands?

MR. HALLADAY: I will. Then we will reconvene at 10:00 o'clock a.m. on Tuesday, December 3, 1968 in these same quarters. I hope it will be this identical room, and I will do everything I can to make it available. Otherwise if there is some change I will

12/2/42

let everybody know, and we will then run through Friday, December 6, and if it appears that the deposition can be completed in its entirety by working on Saturday the 7th, this is agreeable. Otherwise we will at that time consider a date for completion, and I am suggesting we tentatively reserve for that purpose reconvening again on Wednesday the 11th. However, I am asking that this be reserved to block out any other intervening interference with the assumption that if we don't conclude on the 6th or 7th we will make every effort to do so on the 11th, 12th or 13th, and at that point we can consider more definitively how much, if any more time may be required.

MR. DODDS: I assume that the Bell Telephone Laboratories depositions which were originally scheduled for the 18th are put over?

MR. HALLADAY: We will have to be working around that and will be in further touch with you.

Also, to clarify the state of the record, I believe I now can say, Mr. Dodds, and I wish you and your associates would check to be sure, we have now given you an additional set of Atanasoff Deposition Exhibit H-1 including documents numbered 1,000 through 1224 which so far as I presently am informed is complete.

MR. SHIMER: Well, we have them but I

9/2/3/43

haven't checked the numbering of it.

MR. HALLADAY: I understand. My purpose is to say as far as we are concerned we have delivered to you an additional set and I believe these are more legible than the earlier set, and in any event, I am reasonably certain that portions which had been clipped off of the earlier set are contained on this one.

We also have delivered Atanasoff Deposition Exhibit C-1, including documents 0168 through 0196 which we believe now to be complete. We have also furnished you Dr. Atanasoff Deposition Exhibit B-1, document 012, and from Atanasoff Deposition Exhibit I, document number 01544 through 01551 inclusive, so that either with the first or second sets or by combination thereof we have done what we believe was suitable to give you copies of everything to which reference has been made in the course of the deposition.

MR. DODDS: I would like also to say that I assume that we will receive copies, reproductions of these various charts to which reference is drawn or to which he has referred in time to give us time to study them before we resume.

MR. HALLADAY: We have made preparations to take Polaroid copies of them in the belief they will be sufficiently legible for you to study them, and I will

9/2/4/44

forward them as soon as I get them completed. Then if larger copies for some other purposes are wanted at a later time, arrangements can be made with respect to that. I may also take photographs of the large exhibits on a process which will permit them to be put on a slide for easier portability in which event, if I do so, I will so advise you.

MR. DORITY: May I use a phone to make a call for a change in quitting time. We have a man coming here to help us with the exhibits.

MR. HALLADAY: Would you mind using the phone next door?

MR. DORITY: All right.

W-10

BY MR. HALLADAY:

Q One point of clarification in my own understanding, Dr. Atanasoff, at a given moment when you were testifying, you made reference to the circles of condensers on the prototype as being, according to the notes I put down at that time, incomplete, and I was not clear from the context of your statement whether you meant by that that the circles were unfinished or were less than 360 degrees or what you meant. I direct your attention to Atanasoff Deposition Exhibit U which we have on the board, and can you tell us for a more perfect understanding if the circle of condensers that is reflected on that exhibit is incomplete within the meaning of the word as you employed it in saying the circles were incomplete?

A You will note that the condensers are uniformly spaced around the circumference of the desk. As a matter of fact, the condensers connect to terminals and the terminals are uniformly spaced. But this series of condensers and terminals only occupies a part of the circumference. There is an open portion which may amount to a sixth of the whole circle. It's not a critical matter, a sixth, though maybe more or less. But that gives us, that allows the machine to run continuously but gives us a vacant period during the operation of the machine when various switching operations can occur.

2

Q Was that condition of being incomplete, as you have just now described it, something due to the unfinished condition of the discs or was it a deliberate proposition?

A It was a deliberate proposition because we required time to do switching.

Q You required what?

A Time to do switching.

Q By that, what do you mean?

A Well, for instance, that one cycle switch, that one cycle switch has to be closed and opened during that period. Otherwise, it might come in in the middle of a signal and you wouldn't know what you had. And you will note that there is another meaning to this vacant period, since a number -- you will notice that the large disc turns in the direction indicated with the arrow here, so it is moving downward and if this is encountering any brushes, this is the first place, this is the second place, this is the third place, and so forth, in the order of the digits of the base two number system, and this is the last place. Yes, sir, that statement is correct. The contact at the bottom and the condenser there connected to constitutes the last place of the series of the base two digits.

Q All right. Do you have your photographs in the sequence 1402 and following before you?

A I do.

Q Would you look at 1402, please?

A 1402 is before me.

Q And can you tell us approximately when that view was taken?

A Well, there is a date on the negative as to when this was taken.

Q Well, was the information from the negative reflected on the back of 1402, the enlargement?

A Yes. It says there 4-22-40.

Q Do you recall now that we went through this negative process yesterday?

A Yes. This is the same date as on the negative, I can promise that.

Q Will you look at a document that has been marked Mauchly Deposition Exhibit Z and tell me whether or not that by inspection appears to be a duplicate of 1402?

A It is the same picture.

Q Will you turn to 1403?

A They are not in order. I will have to straighten them out.

Q Do you have 1403 before you now?

A I have 1403.

Q And what is the date on which that photograph was taken?

A That photograph was taken on 4-22-40.

Q Will you look at Mauchly's Deposition Exhibit Y and tell me if that is a duplicate of 1403?

A That is a duplicate.

Q Will you now locate No. 1407, please?

A 1407.

Q What date was that taken on?

A That was taken on 8-7-40.

Q Will you look at Mauchly Deposition Exhibit AA, please, and state whether or not that is a duplicate?

A That is a duplicate.

MR. DODDS: What was that date?

THE WITNESS: The date is 8-7-40.

I imagine it is the seventh day of August, 1940.

BY MR. HALLADAY:

Q Will you now find Mauchly -- excuse me -- your No. 1408.

A I have it.

Q What date was that picture taken on?

A It says on the face of it it was taken 8-7-40.

Q Will you look at Mauchly Deposition Exhibit BB and tell me if that is a duplicate of 1408 -- excuse me, Mauchly Deposition Exhibit BB.

A This is a duplicate of my No. 1408.

Q Will you find it now 1405?

A 1405 is before me.

Q What is the date of 1405?

A 8-7-40.

Q Is that or not a duplicate of Mauchly Deposition Exhibit CC?

A It is a duplicate.

Q Will you find Atanasoff Deposition Exhibit 1406, please?

A 1406.

Q What date was that picture taken on?

A That was taken on 8-7-40.

Q Will you look at Mauchly Deposition Exhibit DD and tell me if that is a duplicate of your Exhibit 1406?

A It is a duplicate.

Q Will you please find your Exhibit No. 1413?

A 1413 is before me.

Q Excuse me. Would you turn back to 1406?

A I have 1406.

Q The same as Mauchly Deposition Exhibit DD, is that?

A It is the same as Mauchly Deposition Exhibit DD.

Q What is the date of Exhibit 1406?

A 1406 has the date 8-7-40.

Q Then do you have 1413 before you?

A 1413 is before me.

Q What is the date of that photograph?

A I do not have a date for this photograph.

Q Is it a duplicate of Mauchly Deposition Exhibit EE?

A It is a duplicate of EE.

Q Will you now locate your Deposition Exhibit 1410, please?

A 1410 is before me.

Q Do you have a date for that?

A I do not have a date for this.

Q Do you observe whether or not Mauchly Deposition FF is a duplicate of your exhibit No. 1410?

A It is a duplicate.

Q I have also in my possession here a photograph marked Mauchly Deposition Exhibit GG for which I believe there is no corresponding number in your file. Will you look at that exhibit, please?

A I am looking at it.

Q Of whom is that a photograph?

A That is a photograph of Clifford Berry.

Q What does he hold in his hands?

A He holds in his hands a chassis with terminal block, and located on there are 45 twin triodes of the type 6C8G with grid caps. This circuit is used for regenerating the bank of condensers called KA.

Q Do you recall whether or not that photograph, Mauchly Deposition Exhibit GG, is the same or different than a photograph of Clifford Berry that appeared in the Morning Tribune on or about January 15, 1941?

A It is the same picture.

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Q Will you find Atanasoff Deposition Exhibit No. 1417, please?

A I have before me 1417.

Q Can you fix the date of that photograph?

A I cannot exactly.

Q Can you fix it approximately?

A This came from Mr. Clifford Berry's thesis and Mr. Berry's thesis was finished in the middle of 1941. That means at the end of the first summer session and second summer session, so the date of this photograph is early in the summer of 1941.

Q And is your Exhibit 1417 the same as or different than Mauchly Deposition Exhibit HH?

A It is the same as Mauchly Deposition Exhibit 8H.

Q HH?

A HH.

Q Will you please find Atanasoff Deposition Exhibit No. 1418?

A I have before me Atanasoff Exhibit 1418.

Q Can you identify the date or approximate date of that photograph?

A Well, that would be early in the summer of 1941.

Q By what method do you arrive at that?

A I am using this because this was included in Clifford Berry's thesis, and his thesis terminated, oh, in

11/1/2/46

July or something of the kind. So it is necessary that this object be prepared for publication and it would be, oh, certainly we have a date for the date filed of, and I am sorry I don't have the exact date filed in my mind, I just don't have it in my mind. Somewheres I have it in my records the exact date which Clifford Berry's thesis was filed with the library.

Q That can be established by other methods.

A Yes. You can be sure this occurred, this photograph was taken at least two weeks prior to that date.

Q And is your Exhibit numbered 1418 the same as or different than Mauchly Deposition Exhibit II?

A It is the same.

Q Will you find Atanasoff Deposition Exhibit 1416, please?

A I have in my hand.

Q Can you fix the date as of that photograph?

A This photograph is also from Clifford Berry's thesis, same explanation as before.

Q Is it the same or different than Mauchly Deposition Exhibit JJ?

A It is exactly the same as Mauchly Deposition JJ.

Q Do you have before you No. 1409?

A I have before me 1409.

Q Can you fix the date of that photograph?

11/1/3/47

A I cannot fix the date of this photograph.

Q Can you identify its source?

A Its source is from the private files of Clifford Berry.

Q Would you look at Mauchly Deposition Exhibit KK and state whether or not that is a duplicate of your Exhibit 1409?

A It is a duplicate.

Q Have you 1414, the photograph before you?

A 1414 I have.

Q Can you fix the date of that photograph?

A Again I do not have a direct fix on the date of this photograph.

Q Do you have a reference to its source that could lead to fixing the date?

A It was obtained from a picture found in a photographic album by Clifford Berry.

Q Found there by whom?

A By me.

Q Is Exhibit 1414 a duplicate of Mauchly Deposition Exhibit LL?

A It is a duplicate.

Q Will you find Exhibit 1415, please?

A 1415. I have 1415.

Q Can you identify the date of that photograph?

11/1/4/48

A I do not know the exact date of this photograph.

Q What is the source of the enlargement that you have before you No. 1415?

A It came from the original photograph -- it came -- it is a reproduction of a print supplied by Mr. Norman Fulmer of General Electric.

Q Who is the person who appears in the Exhibit 1414?

A Mr. Clifford Berry is standing there.

Q Is your Exhibit 1415 a duplicate of Mauchly Deposition Exhibit MM?

A No -- well, it is substantially the same photograph. I believe that -- let me see. I must have something that is closer than that. I have it somewheres. It is the same picture, from the same instantaneous exposure, but the source is different. I am afraid that we don't have that exactly, that one here.

Q With reference to the appearance of the objects in the photograph Mauchly Deposition Exhibit MM, and in your deposition Exhibit 1415, is there a difference in the quality of the two reproduced reproductions?

A Yes, there is.

Q Which one is clearer to the eye?

A The one that is called Mauchly Deposition Exhibit MM.

Q Otherwise are the objects that are reflected in the photograph in each of the two photographs apparently identical

11/1/5/49

on inspection?

A They are. May I make a further explanation of this?

Q You may.

A You remember I told you that there was two sources of that exact photograph and the second one I got the original -- I borrowed the original print which Norman Fulmer had taken to this time, hired a high-grade photographer, and he did his best to reproduce it as well as possible, and I think this has resulted in additional clarity of one print over the other.

Q All right. Will you locate your Exhibit 1412?

A 1412 is before me.

Q Can you fix the approximate date of that photograph?

A I have no firm date for that photograph.

Q Do you have any point of reference for dating it?

A Well, we can, by the state of completion one can make an estimate that it is along into the beginning of 1942.

Q And is Mauchly Deposition Exhibit NN a duplicate of your Exhibit 1412?

A It is.

Q Would you find your Exhibit 1419, please?

A 1419.

Q Can you fix the date of that photograph?

A I can. The date of this photograph is 18 May, 1942.

Q And from what source do you obtain that date ?

11/ 1/6/50

A From my original records transferred to me by the photographers who took the picture.

Q And will you look at Mauchly Deposition Exhibit 00 and see if that's a duplicate of your Exhibit 1419?

A It is a duplicate.

Q Have you got 1411 there?

A Here is 1411.

Q Will you refer to the photograph marked Atanasoff Deposition Exhibit 1411, Dr. Atanasoff. Do you have it before you?

A I do.

Q And can you fix the date or approximate date of that photograph?

A I have no firm date, firm estimate of the date of that photograph.

Q Do you recall the source of the photograph?

A The photograph came from, again, it's from Clifford Berry's files, private files of Clifford Berry out in Altadena, California.

Q Who is the person in the picture?

A The person in the picture is Clifford Berry. I can give you an approximate date, estimated date for that photograph.

Q Will you do so?

A The estimated date of that photograph is

11/1/7/51

September of 1941.

Q Now, we have also in the course of another deposition had identified as Mauchly, referred to as Mauchly Deposition Exhibit X, which I think is not duplicated by anything in your personal file?

A I have a copy.

Q Would you look at that?

A It's extraneous.

Q What's that a picture of?

A That's a picture of the physics department. It overlooks the window of my office in the physics department as of those years.

Q What years?

A I don't know. Maybe even these years, but it looks too grown up for those years. I guess it is of late years, probably.

Q All right. You don't know the source of Mauchly Deposition Exhibit X?

A I do not know the source of that. I think it was taken recently.

MR. DODDS: Excuse me. 1411 did not correspond to a Mauchly Deposition exhibit I gather?

MR. HALLADAY: No.

THE WITNESS: Not exactly.

MR. HALLADAY: We didn't have that one with us at the time we were with Dr. Mauchly.

E-11-2

Q Dr. Atanasoff, did you put your photographic exhibits back in the numerical order or did you keep them separated in the order which I had been attempting to identify them?

A They are back in numerical order. I am sorry.

Q Well, therefore, I am going to place before you Mauchly Deposition Exhibits in the order that they were marked. Now, this is going to get too confused. Would you mind taking the photographs you had before you out and sorting them into this order, please: 1402,

A 1402. You want that at the top or the bottom?

Q I want it at the top as you look at it so start on the bottom.

A 1402.

Q 1403?

A 1403.

Q 1407?

A 1407.

Q 1408?

A 1408.

Q 1405?

A 1405.

Q 1406?

A 1406.

Q 1413?

A 1413.

Q 1410?

A 1410.

Q 1417?

A 1417.

Q 1418?

A 1418.

Q 1416?

A 1416.

Q 1409?

A 1409.

Q 1414?

A 1414.

Q 1415?

A I believe there is a mistake. Are you sure the next one is 1416?

Q 1415.

A 15?

Q 1415?

A I have it.

Q 1412?

A Right.

Q 1419?

A Right. Shall I hand them to you?

Q I will work with the duplicates if you will keep

them in this same order and it probably would help us at some point if we had the numbers on the front, but I don't want to interfere with yours.

MR. HALLADAY: May it be agreed on that the duplicates for the Court we can have the court reporter state numbers on the face of these photographs so they are easier to tell?

MR. DODDS: Okay.

BY MR. HALLADAY:

Q You have identified 1402, 1403, 1404 -- excuse me, -- 1402, 1403, 1407, 1408 --

A Right.

Q 1405?

A Right. The vacuum tube one is next.

Q And 1406?

A 1406.

Q As antedating the middle of August, 1940? I have used the term middle of August to get us a date later than 8-7-40, purely for reference. Is that a correct statement that I have just made?

A As antedating, meaning older than?

Q Yes, sir.

A Being older than.

Q Taken prior to?

A Prior to the 15th of August?

Q Yes.

A Yes. Are you asking me what, whether they are or not or whether that is a correct statement?

Q I am asking you whether that in effect summarizes what has been said before? I haven't gone on to 1413.

A I am sorry. Yes. It seems to be true, but are they supposed to be in numerical order in any sense?

Q They should be in the following order: 1402, 1403, 1407, 1408, 1405 and 1406?

A I have them in that order.

Q All right.

A I was asking a different question. Are these supposed to be in a chronological order? I was attempting to ask that or have you decided --

Q No. All I am asking --

A Are you asking me or --

Q Whether or not they were taken prior to August 15, 1940.

A And August is the --

Q 8th month.

A -- 8th month.

Q Of the year.

A All right. There is no question about it.

Q Now, having in mind the period of time prior to mid-August, 1940 --

A Yes?

Q -- can you now say whether or not the photographs that you presently have in your hand, Exhibits 1403 -- excuse me -- 1402, 1403, 1407, 1408 and 1405 show the condition of the machine and parts thereof as they would have appeared to the eye during a period of time prior to August 15, 1940?

MR. DODDS: Objected to as leading.

THE WITNESS: They do.

BY MR. HALLADAY:

Q And within the limits of black and white two-dimensional photography, are they fair and accurate photographic representations of what they purport to portray?

A They are.

MR. DODDS: Objected to as leading.

BY MR. HALLADAY:

Q In the summer of 1940, Dr. Atanasoff, tell us whether or not you pursued any efforts to obtain funds to finance the construction of the so-called main machine?

A I was working actively on seeking funds.

Q And you have heretofore referred to Exhibit 455 which I have separated now from the folder Atanasoff DepositionExhibit F-4 in order to place it before you. During the summer of 1945, did you have one copy or more

than one copy of a manuscript prepared similar to that which is now identified as 455?

A I had two typings of this manuscript done. I don't know how many copies were prepared for typing. Perhaps we had five or perhaps we were limited to four.

Q In the summer of 1940, did you forward a copy of the manuscript that we now have identified as Exhibit 455 to anyone?

MR. DODDS: Objected to as leading.

THE WITNESS: I furnished copies of this manuscript to Irving Stewart for the Scientific Aids for Learning; to the Research Corporation in the person of Mr. Poillon for his perusal; and another copy was sent to Dr. Warren Weaver, Director of the Natural Sciences, the Rockefeller Foundation.

Q Without inspecting any copies of such documents that were received by those persons yourself, can you say whether they were exact duplicates of that one which we now have marked as Exhibit 455 or would it be necessary to see the specimen itself?

A I don't know exactly what the word "exact" means, but I can reach into this file and produce another document of the same type. These two documents placed together and this document carries the number 456 in place of 455.

Q Yes?

A Those two documents are of different typings.

Q Yes?

A And they comprise, they comprise the two typings, by accident, I suppose, I don't know. I can see they are different typings. There are slight differences, slight minute differences which can be detected and they comprise the two typings that I know, by memory, were produced of this document.

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Q Do both exhibits 455 and 456 contain photographs which have dates on them 8-7-40?

A They have the same set of photographs within them and they have such dates as you described.

Q All right. Were any manuscripts of the character of either 455 or 456, to your knowledge, sent out that did not include the photographs with these dates on them, namely, 8/7/40, for the figures, I believe it was 8, 9, 10 and 11? Let me double check for sure.

A The answer is no.

Q To your knowledge, can you tell us whether or not duplicates of either 455 or 456 were sent to the persons whose names you have mentioned? Whether it's one or the other is what I am trying to find out, if you know.

A The answer is yes.

Q All right. Do you know which one?

A Was sent to which?

Q Yes.

A I do not.

Q Now, also in your Exhibit F-4 is a third bound volume number 457?

A Right.

Q Which appears to be some kind of a machinery reproduction of 456 or 455?

A Yes.

12/2/53

Q And I don't remember this, forgive me if it is a repeat, when was 457 machinery produced?

A I do not know.

Q Can you say approximately when?

A I can say, I can give an item or two of history of this document.

Q If that will help try to fix the vintage or lineage, I would appreciate you doing that.

A I received this copy in return for one which I gave, in return for a copy which I loaned Mr. Bradley of Chicago. I was very careless at this instant and he recited this was one of the original copies, and in this he was mistaken. I had given him -- now, I am not 100 per cent sure that I gave him an original copy, but he recited as he returned this copy to me that it was one of the original copies, and it is not, and I presume, therefore, it was made by a reproduction process by him.

Q All right.

A And I do not know what year it was made.

Q And with respect to Exhibits 455 and 456, has either of them been out of your files?

A They have at no time been out of my files.

Q Will you examine No. 1413, please, the photograph?

A I have 1413.

Q Does that photograph fairly portray the objects

12/3/54

shown thereon as they would have appeared to the eye as of the time of the photograph?

A It does.

Q And the time of the photograph, again, if you know, was what?

A I do not know the time of that photograph. I can make a statement for you.

Q Your best recollection or judgment, please.

A I must be very careful in these estimates because a person could easily get confused as these questions come without end from counsel and I suppose they will come without end from now on. I suggest that this photograph was taken about June of 1941; perhaps a month before or after that, I cannot be sure.

Q Do the succeeding photographs numbered 1410, 1417 -- you see, Dr. Atanasoff, I had assembled them in this prescribed order.

A I know they are assembled so, but they get scratched through and some pulled out and maybe they don't get back.

Q All right.

A 1410, 1417 --

Q 1418.

A 1418.

Q 1416.

12/4/55

A 1416.

Q 1409.

A 1409.

Q 1414.

A Read the next one.

Q 1415.

A All right.

Q 1412?

A All right.

Q And 1419.

A Okay, I have those in my hand.

Q Considered in that sequence, do they reflect the progress of work on the machine from time to time?

MR. DODDS: Objected to as leading.

BY MR. HALLADAY:

Q You may answer.

A I do not know.

Q Will you look at them, then, and see if you can answer the question?

A Well, the last photograph is in the right position. I don't have any doubt about that. I find myself unable to comply with counsel.

Q In other words, you cannot tell merely by an inspection of the photographs whether we have the sequencing correct?

A I could perhaps answer if you would allow me two days to think about this and to study them and to order them, then I would be able to testify and I might do some good. I have made some estimates now and I am doing my level best, but I think we had better, if counsel permits, withhold further examination in this form.

Q Without regard to the sequence, then, will you again take and have before you Exhibit 1413?

A I have it before me.

Q And the next one is 1410.

A The next one is 1410.

Q Does that fairly and accurately, subject to some deficiencies in photographic reproduction, exhibit what one would have seen with the eye on the date of the photograph?

MR. DODDS: Objected to as leading.

THE WITNESS: It does.

BY MR. HALLADAY:

Q What about No. 1417?

MR. DODDS: Objected to as leading.

THE WITNESS: It does.

BY MR. HALLADAY:

Q 1418?

MR. DODDS: Same objection.

THE WITNESS: It does.

12/6/57

BY MR. HALLADAY:

Q 1416?

MR. DODDS: Same objection.

THE WITNESS: It does.

BY MR. HALLADAY:

Q 1409?

MR. DODDS: Same objection.

THE WITNESS: It does.

BY MR. HALLADAY:

Q 1414?

MR. DODDS: Same objection.

THE WITNESS: It does.

BY MR. HALLADAY:

Q 1415?

MR. DODDS: Same objection.

THE WITNESS: It does.

BY MR. HALLADAY:

Q 1412?

MR. DODDS: Same objection.

THE WITNESS: It does.

BY MR. HALLADAY:

Q And 1419?

MR. DODDS: Same objection.

THE WITNESS: It does.

12/7/58

MR. DODDS: Again, counsel for defendants serve notice that if the deposition is offered in evidence, motion will be brought to strike from the deposition answers to leading questions.

THE WITNESS: I move you, sir, that a tea break be held.

MR. HALLADAY: That is agreeable with me.

(Recess taken.

E-13

BY MR. HALLADAY:

Q Dr. Atanasoff, did you have any --

A Thank you, sir.

Q -- role in the writing of Mr. Berry's thesis that was filed some time in the summer of 1941?

A I did.

Q Will you describe what that was?

A Well, I don't know how acquainted counsel is with thesis writing process in American universities, but usually the major professor has something to do with the thesis. In the first place, the conception of the method of recording which is depicted there was mine, the original conception of that was mine. Now, Clifford Berry was left on his own in presenting the material, and of course you know that a master's thesis are not,a great exhibit of originality is not required in a master's thesis. So Mr. Clifford Berry wrote a good thesis, and he did as much work as could be expected for a master's degree, but it certainly meant that I had a hand in writing the thesis.

Q What was the subject of the thesis?

A The subject of the thesis, I do not know the title, I do not remember the title, but the subject of the thesis was a method of recording data.

Q And will you look at Exhibit 1417, please?

A 1417. I have it before me.

Q I believe you have heretofore indicated that the source of that was Mr. Berry's thesis?

A Yes.

Q Now, what relationship does it, do the objects that are shown on Exhibit 1417 have to the subject of Mr. Berry's thesis?

A Well, of course, this is a data reading and recording apparatus which was used in the computing machine. By the time Mr. Berry wrote his thesis, we had designed and constructed this, these devices, and they were related to the recording of the data.

Q Can you describe that more fully, please?

A You mean the process of recording data?

Q The objects shown in the photograph 1417, the reading and recording of data and the subject matter of Mr. Berry's thesis?

A I presume what you want me to do is to outline the concept of the data recording which we used here and how it's related to Mr. Berry's thesis and how it's related to the machine. Does this comprise the area to which you are desirous of hearing about?

Q It may be so understood.

A Fine. Now, the concept which I had was the following: That we would use a sheet of dielectric, that the Dielectric would be punctured by electric spark at the

points where it was desired to record data or more precisely where it was desired to record a one. This would make the record. This spark source was reliable and the voltages were high enough to puncture the dielectric in question, so a record was constructed. Then the record would be read back in the following way:

As the record passed between contact points, there would be a voltage applied to the contact points which tested the dielectric at that point for a punching. If a punching is found it meant there was a one on the record. If a punching was not found it means that there would be no, no one, and no one means a zero in the base two number system.

Now, you know, we would test the efficacy of this recording process by the following method: We would measure the voltage which was necessary to punch the dielectric originally and the voltage which was necessary to read back the signals when it had previously been punched. We would take the ratio between those two voltages, and we wanted to secure that this ratio be as high as possible; that is, we were trying to select a material and a method and a shape of electrode, and what-not, so that the ratio of these two voltages would be as high as possible.

Now, we had no trouble getting

ratios of three. Of course, the material must have great uniformity because if the uniformity of the material varies more than the ratio we have in question, you are in trouble because you will be detecting signals where there are none or be failing to punch where you desire to punch. We found material -- we found material -- in the end, we found material which worked well but we never had this material under completely adequate quality control.

Now, let's talk about -- that is an outline of the method of recording base two numbers and punching them. In conception it is a very fine method because there is no question about having any rapidity of punching that you desire and any rapidity of reading that you desire, and you know this method of recording base two numbers is very efficacious and will be used, it just simply means either a punch or no punch that exactly corresponds, that alternative exactly corresponds to the zero and one of the base two number system so that the coding is the most effective and least amount of material is necessary for making a record. As a matter of fact, while I was trying to estimate how many punch -- you can see the size of that, of course, you can't tell the size too well here, the size of that card, but on that card there would be punched, a card that would lay on that thing there which is perhaps --

Q You got No. 1417 in your hand?

A I have 1417. The card that would lay on there would carry the data of ten base ten cards, carry the same data as ten base ten cards. So you can see it's an extremely excellent method of recording.

Now, the relationship of all of this to Clifford Berry's thesis. Clifford Berry's thesis took this process which we had along in this trough, you know, working on it. He had to have a thesis, and so he took this and for his thesis worked on various experimental approaches to the exact method of handling these processes and he succeeded in markedly improving them.

Q Then who actually wrote up the thesis?

A He did. He wrote his thesis.

Q Was it approved by you or by someone else?

A It was approved by me.

Q Was it --

A And by other people too, formally, but that is only in course, as we say. There wasn't any serious approval by anybody but me.

Q What was the relationship between these objects that are shown on Exhibit 1417 and the main machine?

A The objects which are shown on 1417 are objects which were used on the main machine.

Q What was the use thereof?

A The use thereof was for punching -- when we had a cylinder with 30, let's see, you see that cylinder had, in effect, 30 times 16 base 10 digits or 30 times 52, perhaps, base 2 digits, 30 times 52, 1500 -- say 1600 base 2 digits, a cylinder would carry at a single time 1600 base 2 digits, and at a single revolution all this material would be punched out on a base 2 card and retained there. Now, that is the function of it, and it enabled us, it furnished what is in effect a slow memory and one that could be easily retrieved and one that was entirely suitable for the purpose which we had in hand, that is, the process of solving linear system of equasions.

Now, as far as reading it back, we understand, really these things that appear in sight in figure 1417, the apparatus that appears there is really card handling objects. There is room back in the throat to put the punching and the reading mechanism in. I believe that I can assert these devices that in these photographs, the punching and reading apparatus is not in, it goes in the throat just before the card goes through the rollers, and it is not in position in either one of these devices here, but those were constructed and, of course, we used a high grade of materials, high grade materials, Tungsten spark points and the like so that that apparatus would be very durable and satisfactory and we never had any trouble with it as far as I am aware.

end.

L=59
14/1/1/59
WS

Q Referring to Exhibit 1417 and 1416?

A All right. It is right where it is supposed to be, I presume.

Q Will you describe the viewpoint that is displayed from one looking at the camera, at the objects in 1417 and compare it with 1416, please?

A Well, 14 -- I think that anyone looking at those two pictures would tell what the relationship was very easily. 1417 was taken from an angle of 45 degrees towards, from what I will call the pin end of the device. I am going to name the ends of the device the pin ends and the pin end of the device is toward the observer in 1417 and the pins of the two pins sticking up there. I have got to have some language if I am going to start describing such things as that. On the other hand, the rollers are in sight in 1416, the rollers are in sight and towards the observer. All right. 1417 is taken from the pin end at an oblique angle of perhaps 45 degrees. 1416 is taken from the roller end and not quite straight on, either, but nearly straight on, and shows the rollers. They are ground, hardened and ground steel rollers which carry the paper through very accurately and we found accurately within a thousandths of an inch, as far as that goes.

Q Where in relation to the object shown on H-1416 or 1417 would the positions have been for these tungsten points that you mentioned earlier?

4/1/2/60

A Now, look at 1417. Would you like to have me make sketches? You want words, don't you?

Q If you can do it in words, Dr. Atanasoff.

A I will do it in words. Heck, I will do it in words. Look at, take 1417. You can see the rollers in the background. Just towards the pin end from the rollers is what I call the throat. Into that throat will go the punching and reading electrode, and there's room in there. The room in there is just below the rectangular bar which you find above and slightly towards the pin end from the rollers.

Q And referring to No. 1418, the view from below that you have previously made reference to --

A Right, yes, sir.

Q Where with reference to any object that can be described in words on that Exhibit 1418, would these tungsten electrodes be inserted?

A They would be inserted -- now, on the pin end, you were looking upward from below, these devices, and the pin end is generally towards the right and top of the picture. The roller head is shown there clearly. The reading point would be located towards the pin end from a point, from the position of the rollers, but contrary to the appearance here, the center of the spark or the sparking points would be just at the top of the, not at the bottom as it would appear from this

14/1/3/61

photograph, but just at the top of that plate which exists there and up towards, which you are looking in this photograph.

Q Referring to Exhibit 1417, can you tell us which of the two plates that show in that photograph has the bottom that shows in 1418?

A I have to figure a moment, I am afraid.

Q All right.

A Well, I guess -- Yes, I know. You notice in 1418, you notice the bottom part of that aluminum plate shows scratches, but it also shows a reflection of the devices which were housed below. You can see them if you look there. That shows us that there are two aluminum plates in the picture divided by the angles and passing diagonally across the upper left-hand corner.

Q There are three objects that appear in the upper left-hand corner of Exhibit 1418 running along that diagonal line that you have just mentioned, I think?

A Yes.

Q What are those?

A Well, I notice that from the other pictures. Look at the picture, look at figure No. 1416. Do you see those angle irons, those ends that appear there? They traverse the length of the machine and support the parts, and they appear at the upper left-hand corner of figure 1418. They appear diagonally across the upper left-hand corner of 1418.

14/1/4/62

Q Then if we were to take Exhibit 1416 and count from left to right --

A Right.

Q One, two, three, four angle irons down below the rollers that are in the picture?

A Right.

Q Is it one or another of those angle irons, one, two, three or four, that shows up in the upper left-hand corner of 1418?

A It's a pair of them. It's number two and three, I believe.

Q Counting from left to right on Exhibit 1416?

A Yes. Now, look up there in that diagonal corner and you can see a pair of them there, I believe. Of course, I am not -- yes, I believe it's that way.

Q And then directing your attention to Exhibit 1418 and the solenoid that you have previously described or the cylindrical appearing object --

A Right.

Q -- where, with reference to Exhibit 1416, would that be located, again referring to these angle irons from left to right as one, two, three and four?

A It would be located towards number one angle iron at the left of 1416.

14/1/5/63

Q Would you gather up the photographs, please, and put them back in Exhibit F-1-D from which I believe they came, and turn your attention now, please -- Excuse me. Do you have the folder all right?

A Yes.

Q I turn your attention now to a different sequence and I am looking for Exhibit C-3.

A C-3?

Q Yes.

A C-3 is in hand.

14/2 starts

Q And I am also placing before you Exhibit F-6, so that you have before you C-3, F-6, F-1 and F-1-A, and will you turn in Exhibit C-3 to document number 217, please. Do you recognize that as a carbon copy of a letter of August 5, 1942, to Mr. Richard Trexler?

A It was a letter by me.

Q That is a letter that you have heretofore described in the course of a previous examination?

A Right.

Q The letter says, "You will find enclosed a description of our computing machine," in the first sentence, of which I have only read a part?

A Right.

Q Will you refer now to Exhibit F-6, please, document number 0489 through 0524 and tell me in whose hand 0489 through

14/1/6/64

0524 is written?

A In the hand of Clifford Berry.

Q Do you know when Mr. Berry wrote 0489 through 0524?

A During the first five or six months of 1942, perhaps seven months, I don't know.

Q Will you look through the sheets that are included in that No. 489 through 524 and tell me whether or not on the first sheet you are able to observe any writing that you can identify as yours?

A First sheet, no, I can't see any at first glance.

Q Do you have a recollection, apart from looking at this document sheet by sheet, of yourself having had written anything on the writing of Mr. Berry's?

A Oh, yes. You see, I corrected it. Now, may I say that this doubtless wasn't Clifford Berry's first draft of the thing. He probably had another handwritten draft before this, and I probably corrected that handwritten draft much more extensively. By this time, Clifford Berry was writing this at my instance. We had a number of discussions, one or two of them slightly unhappy, I remember. I hated to have him give him the word abacus for the condenser banks which carried the numbers and he was determined to do so, give it up, and this is a little minor thing, not of much consequence, but that instance is clear in my mind in discussion, and he also didn't call that device which adds and subtracts an

14/1/7/65

add-subtract mechanism, but I don't know, there is another name for it that you will find here, I think computing element, something of the kind, but I was following his work with great care and penciling it and correcting it from time to time. I believe maybe somewheres in here you will find some corrections in my hand. Now, here on page 494 you will find two words written by me.

Q What are they?

A "Do not overload the plate circuits." Instead of "affect" I put "overload." You see it is not a very brilliant correction, but it was by me. 495 -- but this was, our typing available, in spite of the presence of Mrs. Berry, wasn't too easily used for scientific purposes. You will find on page 500 some interlineations of numbers by my hand, but this was in good shape at that time.

Q Can you tell whether or not this handwritten document was prepared before August 5, 1942, the date of the letter to Mr. Trexler, or after?

A Oh, it was prepared before. Without any doubt, it was prepared before. You see, it would be prepared and then would have to be typed, and this is the material which was sent to Mr. Trexler, so there's no question about it being prepared before.

E15-1

Q Then would you turn to Exhibit 525?

A 525. Yes, I have it.

Q And in Exhibit F-6?

A I have it.

Q Is that a document that is stapled together presently?

A Right.

Q Had it been historically stapled together, can you tell by observing it or hadn't it?

A Well, no. Historically it was stapled together but it has been separated for reproduction and then restapled.

Q How can you tell that?

A Well, look --

Q I know. But the Court isn't looking at it now.

A You want some words to go into that machine?

Q That's right.

A There is an old rusty evidence of a staple on both sides of this document.

Q Is Exhibit -- excuse me one moment. Is Exhibit 525 multiple pages but only the first of which has been numbered with the numbering machine for identification purposes?

A That is true.

Q How many pages are there?

A There are 20 pages here.

Q And would you look at Exhibit 526 and tell me if that is -- tell me what is 526?

A 526 is a carbon copy of 525.

Q Again ,is that a 20-page document?

A It is a 20-page document, yes.

Q All identified for these purposes with a single number on 526?

A It is, yes.

Q And what about 527?

A It is another document.

Q Is that again a 20-page document only the first of which has been given and identification number?

A Right.

Q Then on 528, is that a 17-page document only the first of which has been given an identification number of 0528?

A It is.

Q Now, with reference to these documents 525, 526, 527, and you say now, or 528, which if any thereof were referred to in the letter to Mr. Trexler of August 5, 1942, as a description of, "Our computing machine"?

A I don't have any doubt that it is 525, 26 and 27, a common typing, I believe. I will have to examine this closely, but I believe it's a common typing that is referred to in the relation, so I have three copies here and

probably four copies were typed and one copy went to Mr. Trexler.

Q Now, at some time or another were some patent drawings or patent type drawings made up and sent to Mr. Trexler?

A They were.

Q Have you attempted to locate all of the drawings that ever were created in connection with a document such as 525 or those others in this exhibit F-6?

A I have.

Q Have you included in the files which you have brought here and which heretofore have been identified, all of such drawings in this respect that you have been able to locate?

A I have.

Q Do you now know that there are certain internal references to drawings in the write-up sent to Mr. Trexler?

A I do.

Q That you cannot locate corresponding drawings for?

A Yes. We are short drawings, and we, a party to sending -- besides Clifford Berry being a party sending this material to Trexler, Mr. Legvold became involved.

Q Referring to Exhibit F-1-A, can you tell us whether any of the documents contained therein represent documents that were sent to Mr. Trexler?

A They do.

Q And can you go into that folder now and give us an identification by number with any assurance that you are going to be correct or you are going to have to resort to make certain?

A It is my opinion that all of the drawings that are contained herein were sent to Mr. Trexler. Now, of course, you know the drawings before you are of two kinds, one were original patent drawings illustrated by this, which are drawn upon -- which are drawn in ink.

Q Illustrated by this, you say, referring to number what?

A 1441. And then there are reproductions of those by photographic process to a slightly reduced scale which are illustrated by items No. 1438 and others like them. The ones that were sent to Mr. Trexler were the, at first, were the photostat reproductions of these drawings. It is clear that I do not have in my files a complete set even of those, the original drawings, even of those which Mr. Trexler says he reproduced, I refer to 1446 on which a list of drawings is given.

vL=66
5/2/1/66
EA

Q And have you made a search for the drawings that are listed on Exhibit 1446?

A I have but it has been some time ago and I am not quite sure. I will have to do so again at leisure because my memory fails me about what happened when I made that search.

Q All right. Do the identifications that are on 1446 in letters and numerals correspond to similar identifications on drawings that existed at one time?

A Yes. The only point being that on some of these drawings you will find drawing numbers written in pencil even though the drawing is in ink. This is because -- I don't know whether this is a common practice among patent attorneys or not, but it apparently is because sometimes they wish to revise their list of drawings and it's easier to do so if the drawing numbers originally signed are in pencil. Now, let's see, we will take just those that I have in here. Now, here I have drawings which I have at hand are seven and eight--

Q Excuse me. If you would give the identification number assigned for identification in the course of this proceeding?

A All right. Good. I will. 1441, seven and eight, and I make notes to jog my memory.

Q You are saying 1441 includes?

A 1441 includes seven and eight.

Q Figures seven and eight?

15/2/2/67

A It does. Yes. 1444 contains twelve.

Q Again is that figure 12 you mean?

A Figure 12. 1445 contains figure 20. 1442 contains nine.

Q Again, figure 9?

A Figure 9. Thank you. Now, I suppose we will have to -- now, here is figure 11-A, B and C on other documents, 1431 is 11-A.

Q Did you say 1431, Dr. Atanasoff?

A 41, 1441 -- I am sorry, it is 31, 31 is 11-A. 1432 is 11-B and 1433 is 11-C. Now, this includes all the drawings which Mr. Trexler says he has had.

Q Will you look at the other --

A Form of drawings?

Q What I would call negative photostats because they are white on black?

A Yes. That's all right. They are negatives of the original. They are, yes.

Q And give us the current identification number and then the internal figures to which each respectively refers?

A Right.

Q Can I help you hold them?

A Yes. I expect you can. 1434 contains figures 1, 2, 3, 4, 5 and 6. Let go.

Q Also 7 and 8?

15/2/3/68

A I am sorry. Yes, of course, 7 and 8 at a reduced size, right. Thank you.

And figure 1440 contains figure 20 and figure 1435 contains figure 9 and figure 1439 contains figure 12.

Q If you are making a note you had better make your note.

A Now, 36 contains figure 11, again, and 11-B 1437 and 11-C 1436. I guess that's 11-C. Yes. Now, this is exactly the list that Trexler said he received. As far as I can see this is exactly the list Trexler said he received.

Q Now, do you know whether or not other drawings existed that are not contained in the documents you have brought with you to this deposition?

A I know --

Q Of this sort that we are presently discussing?

A Yes, I know. I know that, by my memory I know that other drawings were produced.

Q And if --

A But I am not sure, they were produced very late in the course of 1942, and it may well have been that they were not transmitted to Mr. Trexler. I do not state that all of the drawings here were produced. I do not think they were. I believe that a start was made on these drawings, and as drawings came to some end, which is outside of my files.

W-16

Q All right, sir. I think the time has come when you have indicated that you need to pack up and get ready to head back East and it's agreeable with me if we go off the record after I first put on the record my request that we reassemble these files and then when we are off the record, I will help you get them back in your suitcase for security and custodianship.

MR. DODDS: I would like to make a request that the chronological notes to which the witness referred at earlier sessions be available at the next session.

MR. HALLADAY: They will be.

THE WITNESS: Do you know what the chronological --

MR. HALLADAY: Yes, I think so.

(Whereupon the deposition was adjourned to December 3, 1968, at 10:00 o'clock A.M.).

* * *

VOLUME VI

UNITED STATES DISTRICT COURT

DISTRICT OF MINNESOTA

FOURTH DIVISION

- x

Honeywell, Inc.,

Plaintiff,

-vs- 4-67 Civ. 138

Sperry Rand Corporation and Illinois Scientific Developments, Inc.,

Defendants.

- x

Continued deposition of Dr. John V. Atanasoff taken by Plaintiff, before Earl G. Anderson and Ward L. Sutfin, Notaries Public, State of Minnesota, County of Hennepin, at 2515 First National Bank Building, Minneapolis, Minnesota, commencing at 10:30 o'clock A.M., December 3, 1968.

(APPEARANCES AS HERETOFORE NOTED)

Whereupon,

DR. JOHN V. ATANASOFF,

a witness having been previously sworn, was examined and testified further as follows:.

DIRECT EXAMINATION (CONTINUED)

MR. HALLADAY: On the record. I had said during one of the days of the prior sessions of taking Dr. Atanasoff's deposition that for convenience I would have some of the photographs marked on their face which had theretofore been marked on their back, and during the recess I also asked the court reporters to come up here and to put their official court reporter exhibit identification on the copies that had been made for inclusion with the original of the deposition, and I believe that the court reporters have now accomplished that task, and I believe that what now constitutes the original of the exhibits as duplicated are all present here in this room.

I am not certain, because I haven't yet asked the reporter, and I am about to do that, whether in the marking they discovered any missing folders, and if so, if they made a record of them and if there are certain missing ones we will arrange to supply them so that the file for the Court will be complete.

THE REPORTER: There are no missing

folders but there appear to be some missing documents in some of the folders.

MR. HALLADAY: Then make a record of my inquiry to you, if you will, or if you have placed a mark in the exhibits where the documents are missing and we will undertake to supply whatever seems to have been for one reason or another omitted.

THE REPORTER: Yes.

12/3/68
K=1
WS-2

MR. DODDS: May I ask, I believe the original of these photographs had some of Dr. Atanasoff's on the back. Have those been duplicated on the copies?

MR. HALLADAY: I can't answer that question of my own recollection. The set that I am working with does not have that information on the back of it, but we will undertake to supply that information with whatever the appropriate copies are.

MR. DODDS: Okay.

MR. HALLADAY: Now, for further record reference, I personally labeled an envelope from that part of the file which is intended to be the Court's with my own marking F-1-D. I would like to have the court reporter simply validate that and I will back refer to it again so that we are sure we are talking about something that has previously been referred to.

(Atanasoff Deposition Exhibit F-1-D marked for identification.)

MR. HALLADAY: I have had the court reporter mark this now as Atanasoff Deposition Exhibit F-1-D, 12-3-68, W.S., for Ward Sutfin, and inside are the following numbered photographs, the numbers appearing on both the front and the rear and in the following order, so that I can help you have them assembled in the order they are now in in Exhibit F-1-D: 1402, 1403, 1405,

1406, 1407, 1408, 1417, 1418, 1416, 1409, 1414, 1410, 1413, 1415, 1411, 1412 and 1419. There should be a total, I think, of 17 photographs. Does that check, Mr. Shimer, with the copies which you have?

MR. SHIMER: Seventeen photographs, yes, sir.

MR. HALLADAY: All right.

MR. DODDS: I think, as I indicated before, these photographs which you have just identified in folder F-1-D do not correspond to the ones which the witness inspected and testified about, in that they do not have the notes on the back at the present time.

MR. HALLADAY: The current copies that I have just referred to in the record do not appear to have those notes on the reverse. I believe the copies before Mr. Shimer have had those notes put on by you gentlemen.

MR. SHIMER: Yes, I believe so.

MR. DODDS: Yes.

MR. HALLADAY: So that what I am proposing to do is to copy the notations onto the Court's exhibits that are identical with the information on the back of the exhibits that you have in your file. Then you will know that they are one and the same. Is this all right?

MR. DODDS: That is satisfactory.

MR. HALLADAY: Very well.

BY MR. HALLADAY:

Q Now, Dr. Atanasoff, turning to you, and just one minor point that I would like to clarify. I noticed in observing the typewritten transcript of your deposition that on one or another occasion you were quoted as using the word "commentator" in connection with a description of the computing machine or a computing machine, and I simply want to understand whether or not that was, if you said it, it was intended to be said or if there was a different word that you intended to say?

A I do not remember using the word "commentator", although I may have. I wonder if the word is "commutator."

Q Is there any use of the term "commentator" in connection with the machine that you were describing?

A Not to the best of my memory and belief.

Q There is the word "commutator"?

A There is such a word.

Q All right. In the course of your deposition, I had asked you to make reference to photographs that were marked exhibits 1402 through 1419, and I now place before you Atanasoff Deposition Exhibit F-1-D containing photographs with those serial numbered identifications on them.

First, I would like you to observe this

with me. Are they assembled in the following order: 1402, 1403, 1405, 1406, 1407 --

A Wait a minute.

Q Excuse me.

A Go ahead.

Q 1408.

A Go ahead.

Q 1417, 1418, 1416, 1409?

A Right.

Q 1414, 1410, 1413, 1415, 1411, 1412 and 1419?

A They are.

Q And have you for convenience put those numbers on adhesive stickers on the face of each of the exhibits which you now have in your files?

A The ones I have now in my file have those numbers on the face on adhesive tape, not in my handwriting, however, but they do have these numbers.

Q That is the file that you have before you that I just handed you, F-1-D?

A Right.

Q Did you do likewise with your retained copies of these or have you --

A You know there is a slight difference in this list, I believe. I don't know whether there is or not, but we will have to verify this.

Q All right. What I would like you to do is --

A Can you get those in the same order? Could you get those in the same order? 1402, 1403, 1405, 6, 7, 8, 1417, 18, 16, 9, 14, 10, 13, 15, 11.

MR. FALLON: I don't have 11. We have 12 and 19.

THE WITNESS: And 12 and 19. All right. Eleven is missing from mine. I don't think it is missing from my file of negatives, it's just missing from this file of reproductions.

BY MR. HALLADAY:

Q All right. And included in the series in your original file there is no number 1404 in this grouping?

A 1404?

Q Right.

A There is not, as I have them here.

E-3-1

Q All right.

A You know that in my file there is in no sense an original file.

Q I understand. I am referring to the file as you brought it as an original file to distinguish it from the one that has been reproduced specifically for reference in the course of this deposition.

A Yes. Right.

Q Then I want to ask you this: Whether on your own retained copies of Exhibits 1403 and so forth, you had put on the face of them the numbers and if those numbers on your originals correspond to the numbers on the copies that you now have before you.

A All right.

Q Photograph by photograph.

A One, two, three, four, five, six, seven, eight, 17, 16, 9, 14, 10, 13, 15, 12 and 19. They do now except for the one.

Q Then in the file before you marked Atanasoff Deposition Exhibit F-1-D, 1411 appears not to duplicate a photograph in what I have been referred to as your original file, a similar collection?

A 1411 occurs in that group, doesn't it?

MR. FALLON: Not in what he referred to

here.

THE WITNESS: The answer is no.

BY MR. HALLADAY:

Q All right. Would you, however, reinsert it in F-1-D between 1416 and -- excuse me -- between 1415 and 1412?

A I have done so. Is this one -- all right. I have done so.

Q All right. Now, in the course of the previous testimony which you had given, I had presented to you these photographs in a certain order and asked you to reflect on the same and to describe whether or not you thought those reflected the progress of construction of the main machine from time to time or the sequence of same, and in a general way, at least, you answered that you couldn't do that without reflection. Now, that may not be exactly what you said,but that was the burden of what I understood you to say. Did you say essentially that or did you say something different than that?

A I believe I said essentially that.

Q All right. Would you now look at the photographs included in Exhibit F-1-D, 1402 and so forth, in the order that we have heretofore put on to the record this morning and tell whether or not the current order of the photographs does or does not reflect at leastin a general way the sequence or progress of the construction of the main machine from time to

time?

A They do.

(Atanasoff Deposition Exhibits V, W, X marked for identification.)

BY MR. HALLADAY:

Q I have put on the board here in the room, Dr. Atanasoff, Atanasoff Deposition Exhibit U which is an enlarged version of a portion of the prototype as I think we had called it which is shown in its entirety on Exhibit T which I am also putting on the board just for reference, and I don't believe I have asked you the specific question whether or not you yourself had a hand in the preparation of Exhibit U.

A I had a casual hand in it. I was aware it was going on and it represents an enlargement of a portion of Exhibit T and so indirectly I had a hand in its preparation.

Q You have already told us what part you had in the preparation of Exhibit T?

A Exactly.

MR. HALLADAY: Would you, please, Mr. Allegretti, put Exhibit V before the witness so that he can have it.

BY MR. HALLADAY:

Q Examining Exhibit V as it is before us here on the board, can you tell us what, if anything, you had to do with the preparation of that exhibit?

4

A This exhibit was prepared by draftsmen from photographs and from discussions with others, but I had played the following role in the preparation of that. At each stage of the development of this drawing by patent draftsmen, I have marked the structures presented there and have verified that they are the same or the substantial equivalent of structures which are contained in photographs or as have been known to me, known to me to be elements of the structure of the original machine.

Q And with respect to the add-subtract mechanism that appears on Exhibit V as if it were physically removed from the main frame and which is labeled in the lower right-hand corner, did you have a hand in deciding to have that display made in that fashion?

A I did.

Q And with respect to the figures that show up on that display of the add-subtract mechanism, I have heretofore been using the term tubes. You have used the term envelopes, and the label there says, "7 dual triodes."

A Yes.

Q What is the meaning of that reference?

A A dual triode is a vacuum tube which contains within a single envelope three thermionic -- two thermionic triodes and these tubes possess that property.

Q And directing your attention to the reproduction or

representation on the drawing Exhibit V of the dual triodes in their apparent removed condition in the lower right-hand corner of Exhibit V, can you tell from where you are sitting whether each of the seven dual triodes appear or does not appear to have a grid cap?

A As I view that drawing, they all have grid caps but one tube does not have a lead to the grid cap.

Q That is on the one that is exploded from the pictorial representation?

A Right. And it's a tube that is mounted somewhat centrally between two other rows of tubes.

Q Then directing your attention to the other tubes or envelopes, and if we count from top to bottom in the first column of them to the left, one, two , three, four, five, may I call them modules for a convenient reference?

A That word is acceptable to me.

Q In that first bank of five, the top one there appears visible only how many of these envelopes or tubes in it?

A Two are completely visible and one is partially visible.

Q And then below that in module No. 2, reading downward in the left-hand column, how many triodes are visible?

A You mean how many triodes or how many envelopes?

Q Well, if we use the term dual triodes, and I say triode, my intention is to speak of one envelope, or my

language one tube?

A Yes. But you shouldn't use, I do not mean to correct counsel, but you shouldn't use the word one triode as equivalent to one envelope.

Q I should not?

A You should not.

Q All right. Then I will try to be as precise so that we don't get confused.

A Because, you see, as a matter of fact, this will prove confusing because there are two triodes in a single envelope and that will be confusing.

Q All right. Referring to Module No. 2, according to the designation which I have been employing which is the second one down in the bank on the left?

A Right.

Q To which you are pointing, and I am also pointing, how many dual triodes are represented there in Exhibit V?

E-3-2 A Seven.

Q And in that pictorial representation do all of them have both grid caps and leads?

A They all have grid caps but the center tube, again, as far as I can discern from my view of that, of the drawing, does not have a grid lead.

Q With respect to module No. 3, again counting downward in the same fashion, does that appear to have a grid

cap and lead on the centrally located dual triode?

A It appears to have a grid cap and lead. Yes, sir.

Q Now, with respect to that, is that an inaccuracy in this reproduction?

A That is an inaccuracy in the drawing, in the original drawing, and therefore in the reproduction thereof.

Q Then with respect to these modules of the dual triodes, can we count 35 of them? How many can we count on Exhibit V?

A How many modules?

Q Yes.

A We can count 14 -- no, 15 in sight.

Q Fifteen in sight. And then on the machine proper how many modules were there altogether?

A There were three modules. Yes, modules.

Q Then immediately to the left of the first bank of modules to which I have been referring and pointing, there is an appearance of an upright member of some kind, am I correctly describing it?

A There is.

Q Then immediately to the left of that are some objects. What do those objects -- what are those objects?

A The objects to the left of that vertical member?

Q Yes, sir?

A Those are representations of the types of vacuum tubes

which are located on the other face of this structure.

Q Then in the main machine when there were all of the modules assembled in place, how many were there?

A There were a total of 30.

Q And as to each module, how many of the dual triodes had grid caps and grid leads?

A They all had grid caps because they all were identical dual triodes. On each module, one centrally located as shown in the picture to the lower right, does not contain a grid lead but all of the rest do.

Q So that if in examining Exhibit V there is an apparent representation of a grid cap and lead therefrom for the centrally located tube on each module, is this simply a matter of an error in the drawing itself?

A It is.

Q Can you give us your best memory, Dr. Atanasoff, as to the approximate time at which the main machine, as we have been referring to it, attained the condition that is reflected by Atanasoff Deposition Exhibit V?

A With two exceptions, this machine attained this form, essentially this form during the summer of 1941.

Q And the two exceptions are what?

A I notice that this machine seems to carry the complete array of the boost and carry drum and seems to carry the complete timing control contacts which were --

Q Both of which are so labeled on Exhibit V?

A Both of which are so labeled, and which were perfected and placed on the machine after the summer of 1941.

Q You have heretofore said something, Dr. Atanasoff, about the time at which the prototype generally reflected by the Exhibits T and U, one of which is on the board?

A Right.

Q Was dismantled or eliminated or someting of that sort. Can you tell me now what your memory is as to approximately when that event occurred?

A The prototype became operational late in '39 and was operational in the, a similar function could be performed by the main machine as indicated by Exhibit V, as indicated in general by Exhibit V, but not exactly because certain parts were missing, and then it was dismantled and the date on which it was dismantled, according to my best memory, may have been May of 1940.

4/1

Q After its dismantling, do you know what happened to the parts that were dismantled?

A Some of the parts were cannibalized and reused in building the main machine, and some of the parts were otherwise disposed of. I do not know how.

Q Do you know of the whereabouts of any of the remains of that prototype?

A I do not.

Q Have you made any effort to locate same?

A I've made a diligent search for same.

Q From the time of the dismantling or elimination of the prototype, did you conduct any tests from time to time during the construction of the main machine on its computing activity?

A We did.

Q Who participated in those tests?

A The principal participants were Mr. Clifford Berry and myself.

Q And you have heretofore described the tests as they were employed in connection with the prototype. Can you tell us how the tests were conducted in the process of the construction of the main machine?

A I can.

Q Will you do so?

A It's a rather surprising comment that even at this

stage of the development of this machine, I was aware that the data in data out devices were giving me more trouble than most other parts of the circuit. We only had available to us very crude methods for data in and data out and these methods have been described in the prototype, and the same methods of data in and data out were here employed in the original testing of this machine. The logic circuits had been worked out, and, of course, we had basic tests which we employed on the logic circuits, and for the sake of having a description of the process that adheres to some logical system, I will describe the testing of the add-subtract mechanisms first.

These mechanisms were tested statically on a test bench, aside from the machine itself, not as a part of the machine itself, but as a separate entity. This was done by a test set which exposed the add-subtract mechanism to the inputs which it would receive on the machine and recorded as outputs from the add-subtract mechanism the outputs which it would yield if it were operating in the main machine. I recognize the objections to such tests which will be made. It will be said that such tests are not dynamic. In this matter, even in those years, we were well aware that the difference between dynamic and static tests in a vacuum tube structure such as the one indicated in the lower left -- lower right-hand corner of Exhibit V, and static tests thereof at

the dynamic speeds to which the machine depicted in Exhibit V would expose these units, leaves little choice; in other words, the static tests have great validity for the dynamic situation. This might not be true if the speed were enormously increased as compared with the speed at which Exhibit V was designed to operate.

But on the other hand, these static tests had much to recommend them because they got the units one at a time out on the bench so you could have them upside down and do the tests with the inner workings of the device at your very fingertips, and so you could locate misperformance and correct it as the occasion demanded.

In this way, all of the 30, more than 30 units, part of which would be on the machine at one time, 30 of which would be on the machine at one time and two or three additional spares would be provided, were tested and adjusted so they would perform according to the logic which was required of the add and subtract mechanism.

Q You have said something, I think, in your discussion about a test set?

A I have.

Q Or something of that sort?

A I have.

Q Can you describe the test set --

A The test --

Q -- that was employed during that period of time?

A The test set was located in a little box, a little tin box such as is so common in the electronics of yesteryears, maybe two inches high, five by eight inches, or some such size, it makes little difference, and in this device and mounted thereon were provided, for instance, transformers to provide the correct filament voltage for the module under test. This box also had a power supply providing the power voltages which are necessary for the performance of the add-subtract mechanism in test.

It also had additional circuits which provided the input, the inputs which these logic circuits, the add-subtract mechanisms themselves would receive in the course of the actual operation on the machine.

And then in addition to this, means were provided for measuring the outputs which were obtained from add-subtract mechanisms. As of that date, the outputs of add-subtract mechanisms were measured by two moving needle meters which were attached to certain leads, certain leads of the add-subtract mechanism.

Q Were those -- Did you call them needle --

A Moving needle meters.

Q Were those needle meters physically incorporated into the test set or mounted on it, or how would we get a visual picture of what it was you were dealing with?

A The box was provided and it contained everything but the meters, but the meters were just fastened to the leads. The meters were provided with their own individual containers and they rested on the bench, so you would have to observe the motion of the needles in order to tell the output of the tests, of the test, the results of the test of the output of the add-subtract mechanism in the course of tests.

Q What means was provided in connection with that test set for supplying the voltages to the add-subtract mechanism?

A Well, they had a normal, a transformer which furnished an output voltage of, well, after filtering and rectifying of perhaps 120 volts plus and 120 volts minus. This -- when you say a power supply that would provide these filtered rectified DC voltages, why, you pretty sharply describe the situation.

Q How did you employ this test set in the actual testing? Can you describe what physical movements or manipulations you had to engage in to accomplish a test?

A Well, you -- the add-subtract mechanism itself was provided with a male multi-lead plug. The test set had a cable attached to it and on the end of the cable was a female multi-lead plug, so the two would articulate and join.

In testing a unit, you did join them. Thus, the unit received the voltages necessary for its

operations as soon as the AC plug attached to the test set was plugged in the mains, the source of AC current which was present in the room.

Then you connected the meters at the proper places. There were on the test set three buttons, and three buttons were provided. The add-subtract mechanism, it has been intimated, and it will be further described, I believe, contains three input leads. These input leads receive impulses from three different sources. There are three buttons. The three buttons correspond, imposing upon these input terminals voltages which correspond in the code employed at the time to the zero and the one of the base two number system. By manipulating the proper buttons, by pushing, if the buttons were not pushed, they gave zeroes, but if the buttons were pushed, the corresponding lead received an impulse which corresponded to a one in that particular code.

By manipulating the buttons, we could test the add-subtract mechanism under all conditions of input signals which were pertinent to the problem at hand and according to the codes of the day.

In addition, the add-subtract mechanism had two other terminals which were supplied with voltages which in code told the add-subtract mechanism to add or subtract. When the voltages were coded in one way, the machine would

add, and when they were coded in a different way, the machine would subtract.

A provision was made on the test set for a moving mechanical element which, when moved into one position, would provide that voltages would be supplied to the add-subtract mechanism which would induce addition by that unit, and which, when moved in the other direction, would adduce subtraction in that unit.

Q In connection with the test set, was the test so devised as to accomplish any regulation of the voltage?

A At that day, consideration of the problem of regulation had taken place and it was decided that the test set would work sufficiently well if monitored by a voltmeter, but not a supply -- but not -- but the test set -- it would be satisfactory if the test set did not itself contain any voltage regulating elements, and it did not, as of that day.

It may be said that the problem of voltage regulation was, rested heavily on the minds of the designers of this apparatus and the choice of the structure of add-subtract mechanisms as of the day was such as to provide the greatest range of voltages -- may I correct that -- a great range of voltages under which the machine would give exactly the right results. It was recognized that the structure of the -- the larger structure of the add-subtract mechanism could have been simplified if we had accepted

operation of this device under a lesser range of voltages, but this choice was not made. The contrary choice was made.

Q You have heretofore testified, Dr. Atanasoff, about applying for funds to support this project?

A I have.

Q Did you ultimately or did the University ultimately or a foundation connected with the University ultimately obtain such funds to support this project?

MR. DODDS: Objected to as leading.

THE WITNESS: The funds to support this project were secured at various times and dates from the University, and finally, funds were obtained from an outside organization to fund this project.

BY MR. HALLADAY:

Q What outside organization?

A The Research Corporation, a foundation founded by, oh boy, -- well, the name of the gentleman escapes me at the moment.

MR. DODDS: Cattrell?

THE WITNESS: Cattrell, by the Cattrell interests. Thank you, Mr. Dodds.

BY MR. HALLADAY:

Q Prior to the time that that grant was actually received from the Resource Corporation, did any representative

thereof come to Ames, Iowa, for any purpose?

A He did.

Q What was that person?

A To see what the nature of the apparatus --

Q My question was certainly a poor one. Who was the person?

A The person was, one such person was Mr. Sam Caldwell who at that time directed the operation of the differential analyzer at the Massachusetts Institute of Technology, and who was therefore considered a foremost figure in the computing art as of the day.

Q Do you recall approximately when it was that Mr. or Dr. Sam Caldwell visited you at Ames, Iowa?

A Oh, early in the year 1941.

Q Do you recall on that occasion whether he was alone or accompanied by somebody?

A I believe on that occasion he was alone, to the best of my memory and belief.

Q Do you recall how long he stayed there on that occasion?

A Overnight; a couple of days, perhaps.

Q And was Mr. Caldwell back there after that?

A He was.

Q On how many occasions, if you can recall?

A Oh, three or four or five.

Q Do you remember the next occasion when -- is it Dr. Caldwell or Mister?

A Dr. Caldwell.

Q When, if you can remember, was the next time Dr. Caldwell was back to Ames?

A I believe that he came again before the end of 1941, but the exact date thereof, I do not have in mind.

E-5-1

Q On any occasion while Dr. Caldwell was there in January of 1941, did you demonstrate in any way the main machine in its then condition to him?

MR. DODDS: Objection. The witness did not testify Dr. Caldwell was there in January of 1941.

BY MR. HALLADAY:

Q On the first occasion when Dr. Caldwell was there, whenever it was, did you demonstrate in any way the main machine to him in its then condition?

A I did.

Q Can you give us a verbal picture of that demonstration?

A Well, the demonstration was equivalent to the demonstration that I started to give awhile ago and generally equivalent to the demonstration which I have described as having been given on the prototype, but I have not completely described the demonstration which we gave on this machine and so I cannot refer to that, and I will have to go through details at this time if you wish.

Q Will you do so, and when you say this machine you are referring to what?

A I am referring to Exhibit V.

Q All right.

A And the machine which is represented by the drawing in Exhibit V and physical machine which is also portrayed here in photographs starting with photograph 1402 in Exhibit F-1.

Q D.

A What?

Q F-1-D.

A F-1-D. I am sorry. Now, I have described the testing by test set of the add-subtract mechanism of this device, and Iwill make a general description of the methods of illustrating the operation of the machine in further detail at this time as allied to Mr. Caldwell, but it will be closely followed. This was a routine which we had developed for the purposes of checking out and illustrating the operation of the machine. You will remember that I pointed out that the condensers, that the condensers were sufficiently good so that you could place a charge on the condenser by merely touching the condenser lead on one of the drums, either the KA drum as indicated here, drum No. 2 in the Exhibit V or the CA drum, drum No. 1 in Exhibit V, touching the terminal. Now, you needed to touch the terminal, if the terminals were at zero potential, this would, in the coding of the day, this would represent to a sufficient degree of precision a zero in the number system, and in order to get a one in a number system you had to apply a negative voltage to that terminal and if you had a B battery with, say, 60 or 90 volts, and if you provided yourself with a high voltage resistor in series with your lead so you wouldn't short circuit the B batteries, B batteries being expensive and hard

to come by, then you just touch that lead to the exterior terminals of drum 1 or drum 2 and you could put one's on any terminal which you touched. And in this way, the drums were charged with -- electrically -- in such a way as to represent numbers in the base two number system.

Now, there was provided, as is depicted in Exhibit V, a bank of tubes to which I will point and which is located in the central portion of the picture and which has a lead, which has a legend attached called, "Memory regenerating circuit." It is a group of tubes located in the back, and this group of tubes has been otherwise described by exhibiting a photograph of Mr. Berry holding a bank of tubes in his hands and it was this bank of tubes which Mr. Berry was holding in his hands, and it is -- I will have to do reference -- well, there is in the photographs which I have supplied to this case such a picture of Mr. Berry holding this bank of tubes in his hands.

Q Would you look at Mauchly Exhibit GG?

A I do. I have looked at it.

Q Is that is that not the photograph you were speaking of?

A That is the photograph to which I am referring. Mauchly Exhibit GG? GG. Now, when the system was operated, when the motor was started, the drums would start to rotate and certain brushes -- let us first consider drum No. 2 --

4

certain brushes bear upon the contacts of Drum No. 2 and through the agency of these brushes and through the agency of the device which I have described as -- as has been otherwise described as memory regenerating circuits, the charges on these condensers would be regenerated and they would not decrease with time but their full strength would remain within reasonable limits and sufficiently accurate limits for the purpose at hand, and this fact would represent such a test -- would represent in itself a test of the agencies herein described, and this was a demonstration which was made.

This demonstration is sufficiently described by my previous words except that I should now say that it was necessary to attach a cathode-ray oscilloscope to a certain terminal, a certain brush terminal on Drum 2. This brush terminal being otherwise described as the last terminal contacted in any given revolution by the drum, and this terminal is not a terminal of unduly low impedence, and so that the attaching of a -- the terminal of a cathode-ray oscilloscope to this point does not otherwise disturb the circuit, and then if the sweep circuits of the cathode-ray oscilloscope are suitably interrelated to the rotations of the drums, the picture on the oscillograph tube will depict the numbers which reside on drum No. 2, and with this interpretation we could verify that the numbers on Drum No. 2

were sustained by the regenerative circuit and did not degenerate with time. That was a part of the demonstration which was given.

Now, similar remarks apply to Drum No. 1, but in this case there is no separate regenerative circuits. The regenerative function is performed as a matter of course by the mechanisms contained therein, hereinbefore described as add-subtract mechanisms, and these devices furnish the voltages which were necessary for the regeneration of the signals on Drum No. 2 and the method of tests was the same as before.

Q I think you said Drum No. 2?

A I am sorry. Correction. It should be Drum No. 1.

Q Were there other demonstrations?

A There were other demonstrations.

E-5-2

Q Describe them, please?

A One demonstration that was given was to demonstrate that the machine had the ability to add base two numbers. In order to perform this function, it was necessary to place on Drum 1 and Drum 2 by the methods described, arbitrary Base 2 numbers. I might add a detail which perhaps should have been emphasized before, that, of course, we will be working simultaneously with corresponding circles of condensers on each of these drums.

Since the first, normally speaking, the

6

first circle of condensers on Drum No. 2 and the first circle of condensers on Drum No. 1 co-act with a certain add-subtract mechanism which can be labeled as add-subtract mechanism No. 1, and I do not remember where it was located in that assemblage of add-subtract mechanisms, and when things are arranged in this way, the numbers which were contained in Drum No. 2 would be regenerated as previously described and would remain on Drum No. 2 and likewise for Drum No. 1, the signals which were on Drum No. 1 would be regenerated by add-subtract mechanism 1 and would remain on Drum No. 1. However, we could close a switch here called the temporary one-cycle switch on Exhibit V by pressing our finger on it until the switch jumped inward and then quickly taking our finger away so as to not interfere with a later time when the switch would jump outward. In this way, for one cycle, there would be an inner action of Drum No. 1, Drum No. 2, add-subtract mechanism No. 1 and certain other parts of the circuit to perform an addition of the numbers of the number on Drum No. 2 into Drum No. 1 so that after this cycle there would appear on Drum No. 1 a number which is the sum of the numbers previously residing on Drum No. 1 and Drum No. 2, and this constituted the addition of numbers by this device.

Q How was that demonstration capable of being seen?

A Well, what had to happen, you then had to have a

cathode-ray oscilloscope on Drum No. 1 attached to the brush, to the second brush of Drum No. 1 and this -- and the motions of the oscilloscope would then depict the fact that the number on Drum 1 had changed and now corresponded to the sum instead of the original number which was on Drum No. 1.

Q Were there other demonstrations in connection with the main machine and Dr. Caldwell's visit there the first time?

A Another demonstration which was made at the time of Dr. Caldwell's visit was to do a subtraction and in order to do that the voltages being applied to the two terminals of the add-subtract mechanism No. 1 were suitably changed whereupon add-subtract mechanism No. 1 would think it was a subtracter instead of an adder, and the course of the experiment would otherwise be -- the course of the experiment and/or the demonstration would otherwise be the same, but after the actuation of the temporary one-cycle switch for one cycle there would appear on Drum No. 1 the difference of the number, which was formerly on Drum No. 1 after subtraction of the number which is on Drum No. 2 therefrom.

Q Were there any more of such demonstrations that were in existence at that time?

A Oh, at that time there would be, after having this operated with particular numbers, then a few special experiments would be performed such as the problem of having

Drum No. 1 empty and subtracting from it a single unit on Drum No. 2, whereupon the device would carry throughout its range and there would therefore appear upon all positions in Drum 1 a "1", a fact which would be depicted by a suitable representation on the cathode-ray oscilloscope which was attached thereto.

There were certain other experiments which I could describe. A common one was to put a number in a certain form on Drum No. 2 and have no number at all on Drum No. 1 and add this number in successively and notice after two additions why the number, the signal which appeared on Drum No. 1 would be the same in shape as that which appeared in Drum No. 2 except it would be shifted one base two position as a consequence of doubling or we could add it in four times and then it would have been shifted two positions. This was a common demonstration of the -- well, perfectly good demonstration of certain facts in the operation of the machine.

Q Are there any others that you can now describe as having occurred at or about the time Dr. Caldwell was there?

A No other demonstrations occur to me at this time.

Q By the time of Clifford Berry's thesis which you have heretofore identified as having been submitted, and when was that, approximately?

A During the summer of 1941.

Q By that time --

A The middle of the summer, July or something of the kind, the 8th, I believe the thesis had to be submitted by July 8 to secure the degree.

Q By that time had there been any progress in the construction of the main machine beyond that that it had when Dr. Caldwell was there earlier?

A Yes. You see Dr. Caldwell's demonstration was done with a partial array of add-subtract mechanisms. During that interval the rest of the add-subtract mechanisms were constructed.

Q At the time that Dr. --

A There --

Q Excuse me?

A There were other apparatus, during this interval, that was constructed. For instance, the base 10 card reader was constructed during that -- during the first half of 1941; the base two card reader and punch were constructed during that time, and I believe that the power supply, I mean the filament transformer which is indicated by the proper legend in Exhibit V was moved across the chassis. For certain purposes of the machine it was desired that the machine operate synchronously with the AC potential so a change had been made and instead of the motor being belted to the device as is depicted in certain photographs which have been

supplied, we now find the motor being geared to the high speed shaft as is indicated in Exhibit V, and we see the motor, motor indicated there, and a gear box which connects with the high speed shaft.

Q Can you describe in words now the work on the machine, its various stages of construction until the last time that you had anything to do with it while you were at Ames?

A Yes. I can make an attempt at that.

Q Will you do so, please?

A A great many additional appurtenances were added during this period. The exact circuit for punching, for base two card punching was selected and transformers provided in a box which is called, "Transformers for punching," given here.

Q On Exhibit?

A In Exhibit V. There was the boost and carry drum, and during the early experiments which were witnessed by Mr. Caldwell, there was only a part of the structure, but the complete unit was constructed and installed. A great deal of thought was -- let me say first, the, these units here which were constructed, as I told you before Clifford Berry's -- at the time of Clifford Berry's thesis, were installed permanently in the machine and geared thereto and interrelated thereto so that their relation would be controlled by the

operation of the machine. A great deal of thought was given to the matter of the overall control of the machine, and devices, therefor, were designed and constructed.

#6/1
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They are in a position which is not visible in Exhibit V. There was located a panel containing devices for such control. The temporary one-cycle switch was removed therefrom, and this function was taken over by relays and other devices necessary for such functions; and another drum was provided, called timing control contacts for controlling the inner relationship of such controls with the other operation of the machine. It was necessary to interrelate them to the motion of the machine and it was the purpose of this drum to do this interrelation.

I believe I have run out of memory at this point.

Q When was the last time that you saw that machine, as nearly as you can tell?

A Well, I left -- I will try to be responsive here. I would say 1945 or thereabouts.

Q When did you leave Iowa, or Ames, rather?

A I left Ames for employment with the Naval Ordnance Laboratory in the later part of September of 1942.

Q And from that point forward, were you a resident at Ames or somewhere else?

A I was a resident in Washington from that point on. I maintained, for some time I maintained a voting residence at Ames, if you speak in that legal terminology.

Q I was thinking more in terms of living.

A Where I lived and ate was, of course, Washington, D.C.

Q And how long did you maintain Washington or its vicinity as your living place?

A Well, I have maintained Washington and vicinity as my living place until this very moment, I guess, in some sense.

Q As of the time you departed from Ames to go to the Naval Ordnance Laboratory in 1942, whenever it was, can you describe the then state of the main machine?

A Well, I think I have largely exhausted such descriptive material by describing the changes which took place before I left, before the end of the period when the machine was worked on. As far as photographic material, I can refer you to 1419 as representing rather awkwardly the appearance of the machine at the last time I saw it. Yes, 1419.

Q Do you have 1419 before you now?

A I do.

Q Is that the one that you intended to refer to in your testimony just previously?

A It was.

Q Will you look at Exhibit 1412 and tell us, if you can, how nearly, if at all, that shows the appearance of the machine as it existed prior to your departure, immediately prior to your departure for Naval Ordnance Laboratory

employment?

A It is a good picture thereof.

Q As of that time, can you describe how that machine then operated, if it did?

A At that time, the machine operated, of course, for addition and subtraction in the fashion which has been depicted. The one-cycle switch had been removed and in its place was functioning other mechanisms containing the controls which would enable the machine to add or subtract. Certain controls had been provided which would permit the machine to do a specie of division, and I say a specie of division because this was a function which I was reaching strongly for, a specie of division so as to eliminate one unknown from two equations whose coefficients were placed upon the cylinders thereof -- whose coefficients and constant term, correction, are placed upon the cylinders thereof. The data in and data out, the base ten data in device was operative and you could place a base ten card on the base ten reader and this card would be, this base ten number would be converted to a base two number and that base two number would be stored upon one of the cylinders, and this precise cylinder was the cylinder herein called CA, it being, corresponding to the drum number one. This is necessary because only CA will conduct a computation and computation was necessary in this machine for converting a base ten number to a base two number. The

controls were not otherwise operative. The base two data in and base two data out devices which were necessary for the effective use of the machine in a rapid calculation had been constructed, but the total of device and material had not been effectively cojoined.

Q By material, you mean what, sir?

A The paper which is used for the cards punched.

Q Is that something you have earlier spoken of as dielectric?

A You can speak of it as dielectric if you wish.

Q It seemed to me that you had earlier spoken of that yourself, and I wasn't sure.

A It's a good word for it. It has other properties besides those of dielectric, however, and I don't want, unless you desire a specific description of the paper problems, why, I will not launch into a description of the exact properties of the papers which are necessary for the purposes thereof.

Q I was only wondering whether when previously you had spoken of the dielectric, you were also talking of the cards you are now talking about?

A I believe this is true, yes.

Q All right.

A If that is all you wish. Now, the performance of these devices, but these devices had worked on occasions but the performance of these devices in toto was incomplete.

Q I noticed that while we convened at 10:00 o'clock and you have been sitting here this time, you haven't been testifying all that time, but it's now ten minutes of 12:00 and you haven't had a break in the course of the morning.

A I would like one.

Q Would it be agreeable if we take our noon break now and maybe come back a little early?

A Fine.

MR. HALLADAY: Is that agreeable with all?

MR. DODDS: Satisfactory.

THE WITNESS: We will be back at quarter to 2:00 or a quarter after 1:00?

MR. HALLADAY: Quarter after 1:00.

(Whereupon an adjournment was taken until 1:15 o'clock p.m., December 3, 1968.)

LA#7

December 3, 1968
1:15 o'clock p.m.

(APPEARANCES AS HERETOFORE NOTED)

Whereupon,

DR. JOHN V. ATANASOFF,

a witness having been previously sworn, was examined and testified further as follows:

DIRECT EXAMINATION (Cont'd.)

BY MR. HALLADAY:

Q Dr. Atanasoff, you have before you Exhibit 1419 and also 1412. Can you recall whether or not the last time you saw the main machine it was or was not in the condition or approximate condition reflected by those two photographs?

A I cannot verify that all of the structures which are present in these photographs were on the machine the last time I saw it.

Q And do you have personal knowledge of your own as to whether or not the main machine still is in existence?

A I am not sure what you mean by personal knowledge. This is a technical matter, and I am not quite sure what you mean by that. I have personally sought the machine and parts all over the physics department and subterranean and other areas connected therewith, and I have found nothing of this character except we have found one drum that we know where

it is, one of the drums, and I don't know whether it was a CA or a KA. They were the same, I can't tell which it was, one drum, and a box containing some of the brushes that we used on this machine which turned up in the last three or four months at Iowa State University since somebody's disk, which has been recovered, without any doubt came from that era.

Q Other than --

A It also contained -- it certainly came from my personal possession because it contained a film of, a roll of exposed film of my children but unprinted, which has since been printed and verified, so without any doubt it was a box of material which came from my own possessions.

Q Other than those objects you have just described, have you found any other parts or portions of the main machine as we have called it?

A I have not.

Q Now, after you went to work for the Naval Ordnance Laboratories, and from that point forward, could you give us a brief description of the balance of your career?

A To date?

Q To date.

A Well, in September 1942, I went to work for the Naval Ordnance Laboratory. I was soon in charge -- I went to work on acoustic mines. I was soon in charge of

evaluation of the characteristics of all naval acoustic mines. I directed work to those ends and designed and built test apparatus for this purpose and evaluated the mines for the purposes of warfare and then as the war drew to a close -- oh, yes -- I should say, I should enumerate one other item in my personal history. There was one acoustic mine in the very low frequency region which is so low that it's not even called an acoustic mine, it's called a pressure mine. The pressure waves have a period of a minute or two and this is called a pressure mine and this mine had been developed at the Naval Ordnance Laboratory but it had been withheld from combat because of an agreement between Roosevelt and Churchill.

Then just towards the end of the war the Germans themselves developed this mine and commenced dropping it something like, somewhat before, I believe, D-day and in about 24 hours we had one of these mines in our laboratory. One of them didn't explode for some reason or another, and they pulled it out and brought fluid over and we had it in our laboratory, and low, it was the very animal that we had ourselves worked on and withheld from service. It was withheld from service on the principle that it would have been extremely injurious to the commerce into England if it had been in existence.

Now, we were faced with the opposite

thing, and although our purpose was not to build -- was to build mines and not to build countermeasures, it was soon clear we were the ones that had knowhow about this mine, and the Bureau of Ships whose cognizance it was to build countermeasures didn't have too much background at first, and so we went to work on countermeasures, and I designed a countermeasure for this mine which I will describe no further. Partly because of this act and for other reasons, as the war drew to a close, I was given one of the first distinguished, of the Navy's newly-created Distinguished Service Awards, the highest award given to civilians, and this was more of an event on that day than it would be today.

We then commenced plans to move the laboratory to White Oak. The laboratory had up to this time been in very poor quarters in the gun factory, and I was then made head of the acoustics division of the Naval Ordnance Laboratory and my cognizance and responsibility changed some and I commenced gathering a group of people together and after they had a few wooden buildings put together at White Oak, they commenced pressuring me to move some of my men out to White Oak, and I can imagine, White Oak is 20 miles, perhaps, from the gun factory, and I can imagine myself spending most of the time going back and forth from White Oak, and so I went out and visited the situation out to White Oak, and I told them if they would give me the whole thing I would move my

whole division out there and I did so. Nobody else wanted to move, and I just moved everything of mine out there. So it satisfied the other people and satisfied me.

Well, of course, at this time there was getting to be an intensified interesting computing machines, and for a time there was the decision that the Navy would build a computing machine, and the agency who would build the computing machine would be the Naval Ordnance Laboratory, and I commenced new work on computing machines. I say anew, because it's clear that the new technology and new means were different in scope than the ones that we had previously used, and although many problems were exactly the same, well --

Q Approximately when was that?

A Oh, goodness, it was during the year '46 if my memory is correct. The whole enterprise took place, I believe, in the year of '46. I haven't refreshed my memory, if I had my book here I could read it out of there but I will just guess '46.

W-8-1

Q How long a period of time did that activity continue?

A Well, in the first place we had no means, no means were provided and I had to commence recruiting men and I recruited three or four men and started them behaving according to Civil Service system of running up job descriptions, hiring additional men and getting those approved, why, then, it would mean six or eight months later the Navy was commencing to decide that they didn't want to build a computing machine after all. It was kind of an abortive effort but I record it for the sake of accuracy here. We did -- we were looking -- we had -- we were looking into the subject of cathode-ray memory at that time, also magnetic drum memory. There was no magnetic core memory, that hadn't been devised.

Then the new building was, the large building was built in the Naval Ordnance Laboratory there at White Oak and I and my staff and the group in the acoustics division occupied the space in that building, and we had, we constructed there a very large an-echoic room for the making, measurements on acoustics and air, and then we continued doing those things which were necessary to the normal function, to those normal functions of the Naval Ordnance Laboratory , which included mines, but other things, torpedoes, countermeasures of all kinds against them, detection devices against ships, men and weapons and the like.

Then, oh, goodness, I suppose in 1949 I took a position as scientific advisor for the Chief Army Field Forces and spent, I guess, eighteen months as Chief Scientific Advisor to the Field Forces of the United States Army, and at that time I returned to the Naval Ordnance Laboratory as Assistant Director with full charge of the Navy's mine program. I guess this was in '50, perhaps, and I was in charge of that until early in '52, at which time I resigned from Naval Ordnance Laboratory, formed a corporation and went into research and development work on my own. I had -- I was the principal stockholder, but I had associates.

Q What kind of research and development work?

A Well, you know when you start a thing like that you do what you can get, and what I could get readily because of my strong background, of course, was research and development with regard to fuses, and the first contract we had was in vacuum tube fuses, V.T. fuses, proximity fuses for the Armed Services of the United States, and later we took on a great variety of other jobs; and I maintained this group in operation until late in '56, at which time I was approached by two prospective purchasers of my division. It got to be fashionable to go into Washington and pick up small companies and add them on as a satellite onto your organization. So I had two purchasers at one time, which was a favorable state of affairs, and as it turned out, well, one of them was

Taylor Instrument Company and the other one was Arrow Jet General Corporation of California, and we sold out Arrow Jet General of California, and somewhat subsequently I became vice-president of Arrow Jet General of California, and resigned, I believe, in '51 -- I am sorry, in '61 or '62, I resigned and retired in '61 or '62, intending to do only a casual job of consulting after that time, and this is a state of affairs that I have been able to follow mainly since that day.

1

WS#8/2

Q Between your exposure, if I may call it that, to this Navy project of a computer that you said was aborted and the end of your period of time with Aero Jet General as an officer or employee thereof, what other exposure did you have to working in the field of computers?

A I had no -- well, you know, no other exposure except as a scientist normally would. I myself, I am sorry to say, at this moment do not know how to program a machine upon a large computer, and some of my friends say it will take me seven months to learn and some say two. I haven't done it. I ought to do it, but I don't know, I have had some contact as a scientist to date, of course, must have some contact with the computing art, but no other art -- no other contact than that I -- that is as far as the art. You were asking about the art itself?

Q And working in respect thereto.

A Yes. Well, we used computing machines but only -- we never had access, I believe my company during its existence, now that outfit is using computing machines pretty extensively, but I believe we never had a project upon computing machines, literally, during that period.

Q While you were associated with the military did you have anything that required you to have a top secret clearance, anything of that sort?

A I did.

Q What required you to have that?

A Well, I was associated with a project called Crossroads and later with the other atomic projects, and so it was necessary for me to have Q clearance.

Q What was the nature of your connection with operation Crossroads?

A Well, you know, part of it was acoustics. Beyond that I believe I should not say, in view of the possible remaining classification. I don't think it amounts to much, but I believe, unless you insist, why I will go no further.

Q What was operation Crossroads?

A Operation Crossroads was the first postwar atomic operation held in Bikini Atoll. When, I don't know. I will figure it out if you insist.

Q Were you there?

A I was there.

Q What did you do?

A Well --

Q Within the limits of your ideas of security, anyway.

A Yes. Well, I worked like hell every day, long hours, aboard ship and aboard shore, largely in the island of Enyu , and didn't wear many clothes and one day --

Q What were you doing?

A Doing electronic work.

Q Of what character?

A Well, acoustic in character.

Q Was it measuring, detecting or can you give us a word that would describe the character of it?

A It was measuring and detecting and I will put a period there. I don't wish to go further.

Q Did you have any similar activities while associated with the military?

A Oh, yes, I had another operation called, well, project Helgoland. You can call it Project Helgoland. The military came up -- they had seized the German island of Helgoland off the north coast of Germany there, off Wesermunde and they decided to destroy it once and for all. They had done it once, they had destroyed it once after World War One but they decided to destroy it for good this time and it had been used as a storage depot for conventional munitions, and they decided -- and by they, I mean, I guess, principally the British decided to explode all those conventional munitions that remained there without being moved for many, for a considerable period of time, and it was believed that it would be dangerous to attempt to move them and destroy them otherwise, so they decided to wire them all together with something called shock cord. Shock cord is a piece of material which is a cord but it contains, it conducts high explosive. It contains material which is in the high explosive category and it conducts shock waves down each section, and they wired

them all together with a shock cord and were going to set them off and destroy the island forevermore.

And somebody in the division of the Navy called ONR, decided this was the largest man-made explosion which ever had been undertaken, and that we should now use that to get some idea as to how you could measure the pressure, the seismic waves from high explosives. Up to this time, seismic waves had always been associated with nature made events.

Well, they went all over the scientific world and asked for help, but there was only some two or three months remaining before the explosion was to take place, and as a last resort they came to Naval Ordnance Laboratory and approached me and asked me if I would instrument for these tests, and I don't know, I thought I shouldn't, but I knew someone should, and I knew it was a good chance of losing my shirt in an indirect way because the instrument manning at that time for the detection of seismic waves at arbitrarily selected sites without special long-time instrumentation didn't look like too good a proposition, and Dr. Merle Tuve of the Department of Terrestrial Magnetism of Carnegie Institution in Washington had strongly advised me against having anything to do with it, but I did it anyhow. I told them all right, if they would get me the highest priority that the Navy had and supply me with the money and means I would do it, and I

believe six weeks later I took, I drew my material almost entirely from the stockpile of raw material, stocks of vacuum tubes and stocks of brass, and six weeks later I shipped to Germany by way of American Airlines, I will have to count, I guess something like 20 seismographs which I constructed -- it happened that in my files I had some plans. I had once planned to build a seismograph and I had these plans in my files and I drew them out and they looked pretty good to me and I built according to the plans that I had touched on before, and we shipped to Germany something like 20 seismographs.

Now, in addition to that, I decided that simultaneously we should measure the air pressure so I also built a microbarograph and attached them to the expedition, and we also had to train observers, and you have a lot of training of observers because you have to do a lot of training, you know, in accurate timing of these. You have to set up a system of time signals so that you get accurate timing of the events at all stations, and we set this chain of stations up across Europe from, oh, east -- west of Hamburg on the north clear down to Goritzia in North Italy, and each station received signals in useful form except one in which there was an interruption due to the Army supply Jeep driver breaking his leg and it was considered, and I considered it kind of a good series of events.

Q While in the service associated with the military in connection with the acoustic or other work, were you exposed at all to electronics work and circuitry and things of that sort?

A Yes. Of course, that is the substance thereof, I would say, you know. Acoustic work today is almost, well, 75 or 90 percent electronics.

Q What was the proportion while you were actively in that area with the Naval Ordnance Group?

A Perhaps in such proportions as these. I can't add anything. You know, these things can't be exactly measured.

Q Then, Dr. Atanasoff, I am going to go back in time again and ask you if you can recall when you first met John W. Mauchly?

A Will you read the question?

(The question was read)

THE WITNESS: I can.

BY MR. HALLADAY:

Q When was that?

A That was between Christmas and New Year's in the year 1940 at a meeting of the triple A,S, American Association for the Advancement of Science, probably in the physics section meeting at Philadelphia, and the exact day, it's oh, the 27th or plus or minus a day or two, I don't know.

Q Before that event, do you recall what you had been doing immediately prior?

A Well, it happened that I was in Philadelphia because I was, I had some business in the East, and, of course, one of the things that I had planned to do while in the East was to visit these meetings of the triple A,S, an event which I considered important from a scientific point of view.

Q Where had you been before going to Philadelphia?

A Well, I had started with my -- a very rare event in my life, I started with the family from, including three children, from Ames, Iowa. I had driven to New York State where I had relatives, then into New York City and then into Philadelphia.

Q And the family that was with you consisted of what persons by name, please?

A My wife Laura, and three children, Elsie, Joan and Johnny, John, Jr.

Q Is Joan one word or two words?

A It changed somewhat with time. I believe it's still one word and originally it was spelled J-o-a-n, and I think it's now spelled J-o-a-n-n-e, but I am not sure.

Q Do you have a memory of staying overnight in Philadelphia?

A Yes.

Q On that occasion?

A Yes, I did.

Q Do you have a recollection of where you stayed?

A I do not.

Q Will you describe for the Court your best memory of your meeting with John W. Mauchly on that occasion?

E-9-1

A Well, you know what you do when you go to scientific meetings, you take out the list of papers which are going to be presented and you look over them and you decide which ones have some interest and, of course, it's perfectly obvious that you have to be selective because you can't possibly see and hear all the people who speak, and so it came that on this late afternoon I was sitting in the back of a -- I don't know whether they call it a lecture hall or a classroom, and the exact location of that lecture hall or classroom I do not know at the moment -- listening to a man by the name of John W. Mauchly discourse on some statistical problems that he was, that he had been working on and also discussing a harmonic analyzer which he had constructed.

Q Do you recall the site of this discussion, s-i-t-e?

A Will you spell it again?

Q S-i-t-e?

A The site of this discussion?

Q Yes.

A Oh, yes, very well. I have imagery of very exactly what happened after the meeting, quite clear imagery. I don't know, some things come back to persons and some things don't, but I remember I approached the podium and --

Q Well, that's not what I meant to ask, so by spelling the word, I somehow misled you.

A All right.

Q I am trying to find out if you can locate where in Philadelphia or in its environs, where this took place.

A I am sorry. I cannot. I thought I previously said not, and I therefore believed that you wanted something else.

Q No. I had understood you to say you couldn't say whether it was a lecture hall or a classroom.

A Yes. I said I cannot -- I believe the record will show I said that I cannot remember the place where this took place.

Q All right.

A I believe I said that. I hope I did, at any rate.

Q If you did I didn't understand it. Then will you tell us your recollection of what transpired?

A Well, I approached the podium, and I said, I gave him my name, and we commenced a discussion. They had been, as is usual in the case after a lecture, why two or three people remained, but there weren't many and in a moment I was talking to him and we were all alone. And we walked towards the back of the classroom, and the conventional benches of that site are clear to me today. I remember one particular thing that there was a bunch of junk piled toward the back of the classroom as sometimes classrooms in American universities get pretty, in pretty bad shape, and of course they are subjected to a continual shower of chalk dust, and the room was

was extremely dirty and dusty.

I remember standing at the back of the room with windows on one side and chairs of the room on the other, carrying on a conversation for perhaps a half hour with Dr. Mauchly.

Q Will you now do your very best to tell us that conversation?

A Well, words, the exact words do not present themselves to me. I have no memory of them. I know roughly what was said. We discussed his -- I was interested in his Fourier analyzer, and then I told him I was interested in computing machines, as a matter of fact, I was building one, and I suppose a good many other things were said but I have no memory of them. He seemed to be a very nice and likable person, and we seemed to strike up a very warm and cordial relation.

Q What, if anything, did you tell him about this machine that you were building?

A I told him, I told him -- I had a stock in trade of what I told people, and I told him how many vacuum tubes it contained, that it operated on vacuum tube principles. I told him it was a digital machine, although I didn't use that word because that word was not available at that time.

Q What word did you use?

A I said it was a computing machine which although

4

electrical in character, worked like a standard calculator, like, we will say a Marchant or a Monroe. I used such words as that, and I also in those days, and I don't know whether I did with Mauchly, I might have said it is a computing machine, it is a proper computing machine as contrasted with an analog machine. Now, the word analog at that time I am almost sure I used in discussion because I had been, I, myself, independently commenced to use this word. It was current in my thinking and writing at the time, and I think I used that word analog but the word digital I did not have.

Q What do you recall, if anything, of what Dr. Mauchly said to you on that occasion?

A He said he was very interested in it.

Q What else?

A He told me about his job at Ursinus, I remember something was said about that, he was professor of physics there, I guess.

Q Did he at that time describe to you anything that he had done by way of work on a computing machine?

A The only work which could be contrasted in this category was his work on the analog Fourier analyzer.

Q Did he describe to you at that time any work done by him on any ring counters?

A He did not. To the best of my memory and belief I don't believe that any such description was given.

Q Did he then describe to you any work done by him involving electron or electronic or vacuum tubes?

A I have no such memory.

Q Did he describe to you at that time a device built by him that could be employed to simulate the activities of a railroad crossing signal or anything that sounds like that?

A Now, I am in this position: I know that in the course of those early days he described to me a circuit employing neon tubes. Now, I am not sure whether this disclosure was made at this meeting or at a subsequent meeting with him. So I cannot answer beyond this point.

Q Did Dr. Mauchly at that meeting in Philadelphia show you any papers that you can recall?

A Show me any papers?

Q Yes. Papers, documents, drawings, sketches, anything of that sort?

A No. If he showed me any papers it was something relevant to the paper which he had just given, but I don't even think he showed me anything at all.

Q In the course of the deposition of Dr. Mauchly, he identified for us Mauchly Deposition Exhibit A-3. I have here a Xerox copy of that or a part of that here with me which is the best I can do at this time.

A Yes.

Q And which I am placing before you. Now, recognizing

6

that we are dealing with a Xerox and not with the original, of course, has some limitations to it. Will you direct your attention to a name and some initials?

A I have.

Q On that Exhibit A-3?

A I have.

Q Now, can you say whether -- can you say whose name that is?

A It's my name.

Q By whose hand was it put on?

A By my hand.

Q Do you have a memory of writing your name on anything in this course of the discussion?

A I do not, but I might just remark that the equasion above looks a little bit like an equasion relating to Fourier analysis, it just has a remote character of that kind.

Q Now, on Mauchly Deposition Exhibit A-3, the equasion above to which you refer, is that in your hand or not?

A I believe not.

Q And also on that exhibit there is something that resembles a square in the lower left-hand corner and some other markings of symbols which I can't interpret even if I were looking at them right side up, which I am not. Can you identify the authorship of those markings?

A You know, I can't be sure, but I suspect they are in

7

my hand.

Q Does that recall to your mind any subject of discussion at that meeting in Philadelphia?

A I know what the meaning of that is, it's some kind of a layout of a determinant or of coefficients for a system of equasions.

Q Would you explain what you mean by that?

A Well, you know, when you are studying a system of equasions, the unknown variables really don't count, the only thing that counts is coefficients, and you see there are some A's and B's which were letters I was inclined at that time -- now, this identification in toto cannot be called secure, I can't swear that that is in my hand, it seems to be in my hand and it seems to be something that I might have done in the course of a very -- in a very sketchy way in the course of the discussion of systems, solution of systems of simultaneous equasions.

Q Do you recall anything of such a discussion at that meeting with Dr. Mauchly?

A Oh, I expect the fact that the computing machine was designed to solve systems of equasions would be one of the things that -- was one of the things I told him, but beyond that I have no memory.

Q Then on the reverse of Mauchly Deposition Exhibit A-3, at least as it appears in this book from which I am

obliged to work for the present time, there are some other markings and some writing, will you direct your attention to the writing, please, on that page, and it looks like it starts with a capital G, just so you will have reference to what I am asking you about?

A I believe that --

Q Can you identify that hand?

A I believe it is in my hand.

Q Can you interpret what that writing says?

A It says the name of, "Goetz," but there were German authors extant by the name of Goetz, but I have no particular one in mind that could be associated with this, and as a matter of fact, the whole lot of them seem to escape me at the moment. I don't know what it means.

Q Then also on that sheet of Mauchly Deposition Exhibit A-3 on the upper left is a sketch --

A That would --

Q -- with some circles in it.

A I can roughly -- I can roughly unravel what the meaning of that sketch is.

Q Before we get there, can you say whether or not that sketch was drawn by you?

A I do not believe it was.

Q Do you have a recollection of discussing with Dr. Mauchly anything to which that sketch pertained at the meeting

in Philadelphia?

A You see the records will show that awhile ago I told about the discussion either at this event or some other event of some utilization of neon lamps, and this looked surprisingly like a circuit employing neon lamps which would be unstable and would cause one light to light and then the other, or perhaps to stick in one position or the other, and this has some significance in the counting art.

Q Do you have a recollection beyond that?

A I have no recollection.

Q Of the discussion?

A Beyond that, no.

Q Now, there are other markings on this portion of Mauchly Deposition Exhibit A-3. Can you identify any of the other markings as of your authorship?

A I don't know, you know, I am not a good psychologist, but they have a test called a Rorshach, and this is likely to commence, get close to a Rorshach test. I don't know if the name has been said right, but I think I can not verbalize beyond this point with sufficient reliability to make it worth while.

Q I am not sure you understood my question. The question was simply whether you can identify the authorship of the other markings?

A I cannot.

10

Q All right. And at this point it would be Rorshach in type to ask you to interpret them, is that what you were saying?

A Yes. You put out some kind of symbols and a man's mind commences working and builds up. I am pretty sure about the build-up with regard to that circuit, their being accurate and right to the point, and it convinces me as I look at it that as a matter of fact it was at this meeting he told me about his employment of the neon tubes, this convinces me of it, but in a fairly reliable way.

Q Do you now have a recollection of seeing Dr. Mauchly draw the circuit on Mauchly Deposition Exhibit A-3 in Philadelphia?

A Is this A-3?

Q Yes. It's part of it that you have before you.

A Well, I do not.

Q Do you have a recollection of writing the word "Goetz" on that document?

A I do not.

Q Do you have the recollection of writing your name on that document at that meeting in Philadelphia?

A No.

Q All right. And have you told us now everything you can remember about the meeting in Philadelphia between you and Dr. Mauchly?

11

A I emphasize the dirt in the back of the room again because I know that he couldn't lay anything down and I couldn't lay anything down because the desk was so dirty. I know it seemed like I guess I stated, it seemed like a cordial meeting and a warm one, each hand. This concludes my memory of that meeting, I believe, as far as I can at present recall.

Q All right. In a letter which you wrote to Dr. Mauchly some time after this meeting in Philadelphia, you may recall a statement to the effect that you would explain to him the two dollars per digit business, I think that's approximately the language of a later letter, do you recall that approximate language?

A I do. I even recall it from the day. It's strange.

Q Well, do you recall that language employed in any way in your discussions with Dr. Mauchly while at Philadelphia?

A I do not.

Q Do you now know what the reference to the two dollar per digit business is or meant at that time?

A I believe I do.

Q Will you state that, please?

A This was some kind of an estimate that I made at cost of producing a computing machine of this character which seemed to me to be a very modest sum for the production of a computing machine.

Q How does that translate into two dollars per digit?

A Well, a bit is a base two digit, you see, and this meant two dollars a base two digit, not two dollars a base ten digit; meant two dollars a base two digit, and roughly that would mean, I will multiply that for you, about six dollars a base ten digit.

Q And in what way does two dollars per digit at that time relate to the computing machine that you were then working on?

A Well --

Q If it related at all?

A Well, it was related because you see I felt that I had happened on a way to build computing machines which was extremely reasonable and practical. You know there had been efforts previous to this time, I don't know how much you want me to expand, but in which grandiose computing machines had been conceived, as far as I aware, of a mechanical nature, principally of a mechanical nature, at any rate, and these went -- nobody was willing to pay for them because they just weren't considering the speed and the cost. They were out of proportion to the then need of mankind.

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Q Well, what -- excuse me?

A And, of course, when you come to two dollars a bit, it looked pretty cheap to me.

Q What relationship, if any, does two dollars per digit have to the main machine such as is reflected by Atanasoff Deposition Exhibit V?

A You see that machine there, that's -- let's count the bits in one of those memories there, we have, say, roughly 1500 bits per cylinder and that machine would take two sets of drums comprising a total of 1500 bits each and to operate with them, and that meant that at two dollars a bit, which you base it on, that would mean you could construct such a computing machine for $3,000, and that, I don't know if this calculation is just exactly how it worked out, but it seems -- it seemed roughly correct to me at that time. Now, obviously it hasn't got much relevance to the present cost of duplicating entities.

Q After the meeting in Philadelphia, did you come directly back to Ames?

A No. I did not.

Q What did you do in the meanwhile?

A Well, I drove down to Washington and spent about a week in Washington.

Q Doing what?

A Well, I visited some friends. I -- but most of my

time was taken up with a search in the Patent Office for the state of the art relative to computing machines.

Q In that activity were you alone or accompanied by somebody?

A Well, at that stage of the activity, Clifford Berry took a bus from Ames into Washington and arrived and joined me in this activity. He stayed at the same motel that my family and I were staying at, and he and I spent all of every day and some evenings in the office or nearby working on the records and the patents that we could buy and the records of the office.

Q Then after that did you go back to Ames?

A We did then return to Ames.

Q Now, we have already made reference to the correspondence that ensued between you and Dr. Mauchly, and I won't go over that.

A All right.

Q Do you have a memory of the next personal meeting with Dr. Mauchly?

A I do.

Q What is your memory as to when that occurred?

A I believe that was on Friday the 13th in June of 1941. The date is subject to a little hazard but not much. I had received a letter from Mauchly telling me that he was -- that he was coming into Iowa on Friday and that he was, I believe he was coming, at any rate, he was attending meetings at the

University of Iowa, and that he would be -- that he would conclude those meetings on Friday, and I wasn't quite sure whether he would come Friday or Saturday. I -- my memory is that he came late in the evening and Iowa is, perhaps even in those days, two or two and a half hour drive. So I remember distinctly it was approaching dusk as he arrived, and I am almost certain from memory, and from the memory of events, it was on Friday that he arrived.

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Q Do you have a memory of seeing his arrival?

A Oh, I remember suddenly becoming aware that a car had driven into my drive and I believe I was working around a little ways away from the drive, and as soon as I became aware of it, expecting his arrival, I moved towards the drive and the house, and there was his car and there was John Mauchly coming around the corner of the car accompanied by his son.

Q Will you tell us what happened then?

A Well, we greeted each other as is conventional in such cases, and he, I remember that he said he brought his son along because he was giving his wife a vacation, something to that effect, and I don't know how many children he had then, I have no memory of that. The boy was perhaps six or seven and he was taken in tow by my children for his entire stay. My children, my youngest was, the youngest was six and Elsie was, well, 13, perhaps, and Joan was in between somewheres. Then it was getting near dinnertime and I guess we had some expectations he would arrive, and dinner was served, and, of course, we sat around and commenced to talk about a variety of things, about his trip at first and then how he liked the meetings at Iowa City, but almost at once about computing machines.

Q How long did Dr. Mauchly stay in Ames on that occasion?

A I believe until the following Thursday.

Q Is your memory such that you can separate the events and the discussions of that Friday evening from those of the following days so as to say what happened day by day?

A I believe that the state of my memory is such that I remember that we did some thing -- I remember certain events, but placing them accurately day by day is going to be hazardous at this date from the state of my memory, and I have some memories which relate to the timing of events which I can get, but there are other cases in which I cannot tell whether a given event occurred on one day or another.

Q Then would you do this, please. Tell us what transpired in connection with the computing machine, leaving out personal things of eating or whatever, as best you can, telling it day by day as best you can, and when you can't, tell it without reference to the days, give us a running history, then, of what transpired, to the best extent that you can.

A On Friday evening we did not go to the physics laboratory and visit the computing machine, but sometime over the week-end we did so. We had discussed the computing machine in some detail at my home before this visit. The machine was in the basement of the physics building, the place where it was constructed and where it had always been located. I took Dr. Mauchly over by myself in my car and there was nobody around and the machine was covered with a dust cover and I removed the dust cover and we stood and looked at it

and discussed the computing machine.

Now, I made no attempt at this time to operate the computing machine or even turn it on, and I don't know whether you know about the state of things around a university, but when a man has an able assistant, why he generally leaves turning things on and off in the assistant's hands because the assistant is less likely to damage something or blow a fuse. I wouldn't have thought of turning the computing machine on. I remember that. I said, "Here it is," and we talked about this part which we could lay our hands on, the various parts of it, and talked about it. And -- now, I have another event, another event that took place perhaps on Sunday or perhaps a subsequent evening. He and his son and my family and I went over with him to visit the computing machine. This is another occasion in which the computing machine was discussed but on which no operation was conducted.

This could have been either, again, even over the week-end because we had Saturday and Sunday to carry on discussions and we carried on full discussions about the computing machine during that period.

Then come Monday morning, I remember that when I had gotten this letter which you have, which I have in my file here, saying he is going to be here over the week-end, Friday or Saturday or something of the kind, I said,

"Clifford, how is the machine?" And, of course, Clifford had some shaft or something out of the machine, and he told me about it. I said, "Would you put that back into operation?" and I remember that distinctly, and Clifford said, "Of course," and so the machine, when Mauchly and I first looked at it, it was intact and substantially of a degree of completeness that I suppose I will outline before I get through here.

Now, come Monday morning, however, why, here we are over there and Clifford Berry is present and we are all looking at the computing machine and the machine was then operated and demonstrated for Mauchly and it was operated and demonstrated on several other occasions.

Now, my memory of what happened during this period encompasses similar events besides the computing machine, but relatively few. I would say that a principal part, probably two-thirds or three-quarters of our waking hours when Dr. Mauchly and I were in company, and this comprised most of the hours of the day during his visit, we were discussing computing machines, either this exact computing machine or the theory of computing machines or the future of computing machines. All of these subjects came in for a turn at that time.

Now, he during his stay, on one day he was a visiting fireman and I had to do him the due courtesy of a visiting fireman and I said, "Well, why don't you give us

your lecture on the subject of your dissertation last December in Philadelphia or anything else?" and he said he would do it on that same subject, and so I went around trying to get an audience together, and I had certain influences, some, certain proper and certain improper influences around the physics department. I was able to get an audience together of perhaps 15 bodies, and I remember getting up in one of the lecture rooms there and introducing Dr. Mauchly for the purpose of his giving a discussion on the computing machine, on his problems and statistics, not on the computing machine, on his problems and statistics and on the harmonic analyzer. I want to get this right because I once slipped on that. And some of the audience, I was professor of theoretical physics at Iowa State University at the time, and, of course, it would be likely to be some of my students who would have an interest in this, and I remember there was a short discussion afterwards, but a rather brief one.

Now, I believe that we made a trip to the statistics department at Iowa State University and then we also ate three meals a day. Sometimes I had something to do, but this was in the summertime and to the best of my knowledge and belief, I had no classes at this time. I am practically certain this is true, and so I wasn't called away, but sometimes something would call me away and I would leave Mauchly in my office perusing some of the material, or I

would leave him with Clifford Berry. He seemed to get along extremely well with Clifford Berry and they were soon on good workable terms. He was given an opportunity to read the, what I call the manuscript or booklet, and I can make that reference clear from the material which is at hand, if you wish. It is a booklet which is in green covers and of which I have two copies dating before that day in my possession here today, and he was given a chance to read this. He did so. He asked permission to take one home and he did take a copy to my house and peruse it in the evening. We discussed it in the evening. We discussed it during the day. We discussed it, as far as I could see, in detail. I know of no part of it that was not covered in discussion at this time. He was at any rate given full access to it. There weren't any pages tied or pasted or anything else when he had the booklet in his hands. I remember his relation to a few parts of the machine.

For instance, if you will observe on Exhibit 1419 there, you will see part of the machine called -- well, it is in this drawing, too. It's called --

Q Exhibit --

A It's Exhibit 5.

Q V, excuse me.

A Exhibit V?

Q V for victory.

A All right, Exhibit V, not 5. All right. I call to your attention the thing called IBM card reader which is situated there and refers to this device here. I remember during the period previous to his visit that we had been working on four things. In the first place, we had been working on a cure box for connecting a synchronous motor to the high speed shaft. That was being done during that period. These two devices here were being worked on during that period and this device was being worked on during that period. I can also state that roughly at that period that covers for the drum behind were being produced, but that makes little difference. Now, this device right here --

Q Excuse me, Dr. Atanasoff.

A This device was called IBM card reader --

Q I know this is a problem and I hate to interrupt you but in your answer given just before the interruption, you said "this device here and this device here" and you pointed to two parts of the machine on Exhibit V.

A All right. I will read those devices out. "This device here", the first meant base two in device as recorded in Exhibit V. The next "This device" referred to base two out as recorded in Exhibit V.

Now, the third device is the one which I believe I did spell out, namely, the IBM card reader was not finished but was partly constructed as of that time, and

I can remember Dr. Mauchly -- I don't quite know, I suppose somebody was working on it and they had it in our shop which is adjacent to the, which was on the floor with the computing machine there and I remember us going into that shop and Dr. Mauchly standing with part of that device there in his hand, the matrix, the bottom part of it, holding it in his hand, and our discussing the details of that device.

Q Is there any of the photographs that gives us a pictorial representation of that matrix?

A Not very clearly. Perhaps the best one, I can run through them and try to find one. There is one that hints at it, but hardly more. Well, there are two that hint at it. I will lay this one out. All right, now let's look at two photographs, 1411 and 1414.

Now, 1411 shows Mr. Clifford Berry with the IBM card reader open and there is an IBM card in there right in front of his left hand which is resting upon this element which I called the matrix and which will be read by the brushes which are in the hinged part relating to his right hand, being held up by his right hand. Do you see those diagonal little strips there? They are all brushes and those brushes are going to read through the IBM card into the matrix. They are going to contact the matrix through the holes in the IBM cards, such holes as there are.

Now, I could call your attention to

another photograph, 1419, in which edges of the matrix are shown and which the guides control the position of the IBM card resting upon the matrix. One of them is clear and one end of another one is shown there underneath the black object which carries the brushes.

And then I call your attention to 1414 in which at the left-hand side you notice some wiring which is enmeshed in a peculiar way and this wiring is enmeshed because those wires are descending in this photograph, really ascending in the normal position of the device to contact the elements of the matrix, the contacts in the matrix.

Q Now, with reference to what you observed Dr. Mauchly observing, does any of these photographs to which you have made reference give a pictorial view of what was before his eyes?

A It is unfortunate that we did not take a picture at the time of Dr. Mauchly's visit showing the exact state, but my memory is quite clear on the status of the device, and I will attempt to express this status if that's your desire, if that's what you are asking me.

Q If you would, please.

A If that's what you are asking me.

Q I am particularly now referring to the matrix that you were just discussing.

10

A The matrix, oh, you are referring to the matrix?

Q Yes, only that at this time.

A I have covered the photographs as they describe the matrix, as far as I am aware.

Q Well, the question was whether or not any of the photographs give a pictorial representation of what was before Dr. Mauchly's eyes or whether they don't?

A Not a very good one, no, I wouldn't say so.

Q When Dr. Mauchly looked at the part of the matrix that he looked at, was it separate from or attached to the main machine?

A It was separate from the main machine and it was separate from the rest of the IBM card reader. It was separate.

Q Now, you have said earlier that Dr. Mauchly had access to the manuscript, so-called, and you spoke of it as a green book?

A Yes, sir.

Q You said you had it with you?

A I do.

Q Would you produce it, please?

A This is not a production of the exact book which Dr. Mauchly had because I have no knowledge of the exact book. It is a book which was written, which had already been written at that time, and I have two of them here and they go under

the numbers 455 and 456, 0455, 0456, and it was either one of these booklets or one, as far as I am aware, of exactly the same typing and one or the other of these two booklets which he had in his hand at that time.

Q Did the booklet which he had in his hand during that time have photographs in it?

A It did.

Q Were they the same or different photographs that are in either 455 or 456?

A The same photographs, the same set of photographs and they were the same photographs, and those photographs are also enlarged in this set here.

Q Do you recall when you first handed or saw to it that Dr. Mauchly had access to this manuscript as now marked 455 or 456?

A I remember three or four occasions on which we were standing around discussing the manuscript. This was -- I have no further memory. It was not at the last instance of his stay but rather early in his stay because I remember the discussion which took place relative to the manuscript. That is my only memory about it.

Q Do you have any memory of discussing the manuscript while at your home?

A I do.

Q What is that memory?

12

A Well, we were in my study and he had the manuscript in his hands and we were going over some part of it, but the part I do not know.

Q Do you recall when that was?

A I cannot tell you when that was. That was in an evening. It wasn't during the day. It was in the evening when we normally would be at home, but which evening it was, I do not know.

E-11-1

Q Do you have any recollection while in your home of ever drawing anything, sketching anything or seeing him do so?

MR. DODDS: Objected to, that is leading.

THE WITNESS: I think that -- well, I am positive that we did draw things, but I have no exact memory of any occasion on which we drew.

BY MR. HALLADAY:

Q Whether it was at home or somewhere else?

A Somewheres else, no.

Q What is your recollection of drawing, without regard to where it may have occurred?

A What is my recollection of drawing?

Q Yes.

A I said I had no exact recollection of a drawing, of an occasion on which I drew for Dr. Mauchly.

Q Do you remember doing any drawing at all?

A I don't remember any drawing at all. I have a rational reason for believing we drew because we never stayed together for many minutes, scientists never stay together for many minutes without drawing, but beyond that I have no other reasons for believing in drawing on that occasion.

Q All right. Do you have any recollection of Dr. Mauchly being introduced to Clifford Berry?

A I do not remember the occasion exactly in any way. I am sure he was introduced to Clifford Berry, but this certainty

is from other events and not from an exact visual memory of Clifford Berry and Mauchly standing before me and me performing the introductions, that I do not have.

Q Do you remember any occasion on which you left Dr. Mauchly with Mr. Berry?

A Yes. I remember occasions of this type.

Q Can you describe them?

A Not in any further detail. The exact occasion for meeting him is not in my memory in spite of the fact, as I previously recited, I had very few active duties, I had some -- I was a member of the graduate committees at Iowa State College, then college, not university, and as a consequence I know there were graduate students around there in furtherance of whose work I had to take some steps, and on these occasions I felt it perfectly free to go off and leave him in my office or leave him with Clifford Berry and he was left in both places.

Q Do you have a recollection now of persons other than Clifford Berry and your family who met Dr. Mauchly on the occasion of his visit to Ames?

A I remember Mr. Sam Legvold meeting Dr. Mauchly. I have a memory of Mr. Sam Legvold going to lunch. Lunch was generally eaten at the Memorial Union there at the, what was then and still is the Memorial Union, and we would go over and eat lunch together, and I remember an occasion when, it was

3

mostly Dr. Mauchly and I alone, but sometimes Clifford Berry and Mr. Legvold would join us.

Q Do you recall any others who met Mr. Mauchly, Dr. Mauchly --

A I have --

Q -- during that visit?

A I have no certain memory of any others.

Q Do you recall the names of any persons who attended this gathering at which Dr. Mauchly gave a talk?

A I could make some -- no firm recall.

MR. HALLADAY: It's 20 minutes of 3:00, would this be a convenient time for our recess?

MR. DODDS: All right.

(Recess taken.)

E-11-2

BY MR. HALLADAY:

Q Dr. Atanasoff, directing your attention to Exhibit V which we have before us on the easel, can you tell us the extent to which that drawing represents the condition of the machine while Dr. Mauchly was there and the extent to which it does not?

A I believe I can.

Q Will you do so, please? And when I say Dr. Mauchly was there, of course, I am picking up there at Ames, Iowa?

A Right. At the time Dr. John Mauchly visited --

Q By the way, you are facing away from the reporter

now so please keep your voice up.

A Right. At the time Dr. John W. Mauchly visited Iowa State College and visited the computing machine project there, the machine had a general appearance not too different from this but there were certain differences. The motor drive, synchronous motor drive hadbeen completed two or three months before that time and was in place and operating. All of the add-subtract mechanisms had been completed, whether they were all in the machine or not I do not know. I can imagine that perhaps they were just partly in the machine. It didn't make that much difference, we could operate the machine with only part of the add-subtract mechanisms in place.

The array of tubes here called memory regenerating circuits had been completed long before and was installed in the machine and was operating.

The filament transformer was in position in the lower left-hand corner of the drawing as illustrated in Exhibit V.

The base two in and base two out devices were substantially complete and had been in the machine, I believe they were set in the machine to show their position while Dr. Mauchly was there, but they were available separately.

This base ten card reader was not in the machine, but as I described, Dr. Mauchly saw the matrix thereof.

The transformer banks for punching was not in place.

Of course, the shafts, high speed and low speed shaft were in position.

The temporary one-cycle switch was in position. That had not yet been replaced by another device.

The boost and carry drum was not in position. Its function was carried by a small model of itself, I mean which just related to, instead of relating to every position across the memory drum, just related to one position or two positions at a time.

The timing control and contacts were not in position. The drum which I call base ten to base two drum had been completed and was in position on the shaft, but you see its principal wiring would be to the matrix contained in the base ten card and that wiring was not in place at the time Dr. Mauchly was there.

Now, the power supply and regulator were in their last form at the time he was there.

I believe this covers the appurtenances which are immediately evident from review of the Exhibit V.

Q With respect to the legends on Exhibit V and the arrows pointing to the position of brushes, can you state what of such brushes were in positions reflected by the legends on Exhibit V as of the time of Dr. Mauchly's visit?

6

A Well, the brush holders had been constructed, but I believe that they were only partially occupied by brushes at the time Dr. Mauchly was there, a few positions being occupied by brushes and the rest vacant. The brushes were put in there and held in place by a little set screw, and so you could easily leave the brushes out. A great deal of the wiring was in position. I pointed out some wiring that was not in position, that from the base ten to base two drum over to the matrix for the -- I mean the terminal board for the base ten, base -- I mean base card reader, IBM card reader, that wiring was not in position, but a great deal of the wiring across here was in position. I believe all this wiring was in position or was in its last phase of completion, and the wiring, and a great deal of the wiring to this, from this device down to that, down to the memory generating circuit was in position, from the Drum No. 2 to the regenerative positionwas in position, the wiring to timing and control contacts was not in position and neither was the drum finished or in position at the time he was there.

E-11-3

Q Again it's my problem with the record here that some of this repeats what you have just said.

A Sure.

Q Directing your attention to the words "brushes," to the left on Exhibit V, immediately above the drum that is captioned with the legend "base ten to base two"?

7

A Right.

Q There is an arrow then from the word "brushes" down to a position in the drawing which I am attempting to indicate and which you now are pointing to which would be --

A There are two arrows for the word "brushes".

Q Excuse me, Dr. Atanasoff. Just let me finish this part to try to get it into the record, and I may be doing this in a very laborious way.

A That's all right. I am sorry.

Q I am just directing your attention to Exhibit V, the word "brushes" and the arrow leading from the word "brushes", that is furthest to the left on the drawing?

A All right.

Q And have you now looked at that arrow pointing to brushes in that general location?

A I have.

Q As of the time of Dr. Mauchly's visit were brushes situated in that position?

A They were not situated in the position of the left-hand arrow, no. There were no brushes at that position.

Q Moving from left to right then, the next arrow leading from that left legend, "brushes," with some --

A May I add a phrase to my explanation of the other?

Q If you wish?

A The other, the brush holder bearing upon the base 10

to base 2 conversion drum was not in place at the time of Dr. Mauchly's visit.

Q Neither the brush holder nor brushes nor wiring therefrom?

A Right.

Q Were in place at that time?

A Right.

Q For the base 10 to base 2 converter?

A Converter, yes.

Q And moving over to the position on Exhibit V where the arrow points near Drum No. 2, "KA," what are the facts as to the presence or absence of brush holders or brushes at this position on Exhibit V at the time of Dr. Mauchly's visit?

A The brush holders were completed at the time of Dr. Mauchly's visit. Certain positions of the brush holders had brushes in them. My memory is that it's three or four positions at the left-hand side.

Q Moving further then to the right to drum No. 1, "CA," where there again is an arrow from a right-hand legend or word, "brushes," the first of which points to, if I am reading it correctly, from where I am sitting, brushes in connection with the timing control contacts drum?

A There was no brush holder at that position at the time of Dr. Mauchly's visit. There is no wiring to brush holders and no brushes and the drum itself was not in position at the time

9

of Dr. Mauchly's visit.

Q Then next to the right on Exhibit V is drum No. 1, "CA," and another arrow leading from the right-hand word or legend, "brushes," and as of the time of Dr. Mauchly's visit, describe the condition of that brush holder and those brushes?

A The brush holders were in position, certain of the positions were occupied by brushes, I think three or four of the positions at the left were occupied by brushes at the time of Dr. Mauchly's visit.

Q As of the time of Dr. Mauchly's visit, were there wires leading from brush positions or only from positions where brushes actually were installed?

A The entire wiring harness was in leading from Drum No. 1 to brush holders associated with drum No. 1 across to the top of the rack containing the add-subtract mechanisms. The wiring was in position running from Drum No. 2 down to what is recorded as memory regenerating circuits, but the other wiring there was not in position.

end
take

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Q Then further to the right with reference to the right-hand word or legend "brushes," is another arrow pointing to something that on Exhibit V is described as boost and carry drum. What are the facts as to the presence or absence of brushes at or about that point when Dr. Mauchly was there?

A Well, may I first recall that I stated that at the time of Dr. Mauchly's visit that brush and carry drum was not in position. Its function was being carried by a small device of the same character but a temporary one.

Now, that had a temporary brush holder associated with it, and those brushes were in position but the presently depicted brushes and brush holder were not in position.

Q What about wiring in connection with the brushes that were in position?

A It was just a temporary wiring.

Q To what?

A To -- you see, that wiring had to go from, let's say, boost and carry, it had to go to a brush upon drum 1 and a brush upon -- no, let's talk about boost first, separate boost and carry. Just consider boost. There had to be a wire running from the boost over to drum No. 1 and drum No. 2. There also had to be, we had to have a separate carried brush for each set of brushes for each place that could be utilized. At the

time of Mauchly's visit, we could only utilize two or three places in the left-hand side of the drum. Those wires run from the temporary brushes which were near the present position of the boost and carry and they went across to the add-subtract mechanisms.

Q And what, if any, connections were there between drum No. 2, KA, and the add-subtract mechanisms at the time Dr. Mauchly was there?

A The connections from drum No. 2 to the add-subtract mechanism went by way of the temporary one-cycle switch at the time Dr. Mauchly was there.

Q While Dr. Mauchly was there at Ames on this occasion that you have been describing for us, what, if anything, did you do in the way of tests or demonstrations in his presence?

A The tests and demonstrations were those, were exactly the ones that I stated that were done for Mr. Sam Caldwell. They consisted, first, of a test of the unit on the test set; second, of a test of the regenerative principles applied to the memory circuits of the machine; and third, tests of the computing power of the machine to add and subtract. These were the tests which Dr. Mauchly visited -- witnessed, and they are the same tests that I have previously described.

Q In the process of so doing, did you use or did you not use any test set?

3

A We used the test set which had previously been devised and employed which provided the material, the physical material for the associated circuits to the add-subtract mechanism. It included a transformer for supplying the filament current, a power supply, including a transformer, rectifiers to produce a plus 120 volts and minus 120 volts which are utilized in the circuits in question, and also produced the input signals necessary to actuate the add-subtract mechanisms; and then also available were the additional, the deflection instruments necessary for describing the output of the test set -- not of the test set, of the add-subtract mechanism.

Q You said deflection instruments. By that you mean what?

A I mean moving needle instruments.

Q Or meters?

A Meters, right.

Q I have previously had the reporter mark as Atanasoff Deposition Exhibit W, an enlargement entitled "Fig. 1." Are you able to see that from where you are seated?

A I am.

Q Do you recognize that as being merely a simple enlargement of figure 1 from your manuscript, Exhibit 455?

A Yes, I do.

MR. DODDS: Objected to as leading.

THE WITNESS: This has been redrawn by following the contour, as far as I have been able to determine, by exact examination of the original drawing of Figure 1 which is contained in the manuscript, and it represents a photographic reproduction of this drawing.

BY MR. HALLADAY:

Q Would you take your manuscript, Exhibit 455, from your original files, so that you have it before you, please?

A I will. All right.

Q And tell us now whether or not Atanasoff Deposition Exhibit W is an enlarged duplicate of Figure 1 in Exhibit 455 or if there are some differences?

A I notice that one copy has had B-1, B-2 and B-3 written down in ink. I believe this ink, as far as I know, this ink is from those days, but the other copy has B-1, B-2 and B-3 in the original legends.

Q Is there some difference in the mechanical appearance of them but no difference in substance, or what is the difference you have been discussing? You see, I don't know what you are talking about.

A I am sorry. He is pointing out a difference in the way the letters are placed on the drawing. However, these letters are witnessed by lines at the points to which the letters witness are correct in each case as far as I can

determine.

Q Well, then, just for the record, can you determine by looking at Atanasoff Deposition Exhibit W, whether it is more nearly, whether it more nearly resembles Figure 1 in Exhibit 455 or Exhibit 456, and if it resembles 1 more than the other, tell us which one it resembles more nearly?

A It doesn't resemble either one very closely.

Q And in respect only to the identification of B-1, B-2 and B-3?

A Only to the placing of the letters B-1, B-2 and B-3, not to the points which they witness.

MR. FALLON: Mr. Halladay, let the record show that I entered into a colloquy with the witness because you asked something about or the words "photographic reproduction," was brought up, and in this respect, the reproduction is not photographic.

THE WITNESS: That is true.

WS
12/2

BY MR. HALLADAY:

Q Save for that, is Exhibit W an accurate reproduction of either Figure 1 in Exhibit 455 or 456?

A In a technical sense it is, as far as I am aware, an accurate rendition of either one.

Q Then what does Figure 1 show?

A Figure 1 shows in a schematic way the memory regenerative circuits and the connections during addition and subtraction between cylinders KA and CA. Also shows the add-subtract mechanism, the input and output terminals of the add-subtract mechanism, but the mechanism itself is depicted only in a block, by a block symbol. It also shows the boost -- I am sorry, the carry cylinder.

Q When you refer --

A It's marked boost but it's really the carry cylinder. It fooled me for a second.

Q When you said, referring to Exhibit W, or Figure 1, as the case may be, that it shows the add-subtract mechanism in the form of a box, is that the rectangle containing the letters A, D, E, C, G, F, B, reading clockwise, underneath which are the three letters ASM?

A It is.

MR. HALLADAY: Mr. Fallon, would you be good enough to lift that down just so that we can see the one behind it? I am sorry, I thought there was

2

one behind it.

MR. FALLON: Yes, there is.

MR. HALLADAY: The hand is quicker than the eye.

BY MR. HALLADAY:

Q I now have before us, Dr. Atanasoff, Atanasoff Deposition Exhibit X also labeled "Fig. 2." Can you identify that?

A This is a schematic drawing of the add-subtract mechanism as employed in the computing machine, the large computing machine which has been under discussion. It depicts each triode in a separate envelope, but you must remember that to this extent it isn't accurate, because, as a matter of fact, I believe it's triodes one and two, and so forth, that are in a common envelope. Except for this symbolic difference, the wiring diagram here is the wiring diagram of the add-subtract mechanism of that day.

Q Referring back to Atanasoff Deposition Exhibit W or Figure 1 of the manuscript, Exhibit 455, do you have any recollection of a discussion of that Figure 1 with Mr. Mauchly on the occasion of his visit to Ames?

A I do not.

Q I didn't hear your answer.

A I do not.

Q And referring to Atanasoff Deposition Exhibit X or

3

Figure 2 from the manuscript, Exhibit 455, which we now have an enlarged version before us, do you have a memory of discussing that diagram?

A I do.

Q Do you recall when that discussion occurred?

A I do not recall.

Q Do you recall whether it occurred once or more than once?

A I am positive that it occurred more than once, but my memory only tells me once, of once.

Q Would you tell us what that discussion consisted of?

A It consisted of a discussion of the way that such computing circuits operated, the logical principles of devising computing circuits of this type.

Q Can you say now what words you used in that discussion?

A I certainly cannot.

Q Can you give us the text or context or gist of what you said?

A Well, I think that it is a noteworthy thing that you can make, it was as of that date a noteworthy thing that you could make a circuit compute in this way, and it is of that that we spoke.

Q Can you say what you said in substance?

A I remember -- I cannot.

Q Can you remember any part of the discussion?

A I remember one part of the discussion.

Q State that part.

A That part was as follows. I remember discussing this point, that it is a requisite of active elements for a computing circuit that they be done linear.

Q Anything more that you recall saying to Dr. Mauchly about the logic or the logic of the circuit?

A Not in specific form enough for the operation of memory to allow me to present it here.

Q Directing your attention back -- and I appreciate the scene shifting, Mr. Fallon -- to Atanasoff Deposition Exhibit W, is that a correct representation of the circuit involved in the regenerative memory portion of the main machine?

MR. DODDS: That is objected to as leading.

THE WITNESS: I am about to admit that the thing is not quite right, and I think you saw that, Mr. Dodds. There is a mistake in it.

BY MR. HALLADAY:

Q All right. What is the character of the mistake?

A Well, it is a draftman's error.

Q In what respect?

A It is in regard to the plate connections of the two depicted by the symbol T sub 1.

Q Now I am mounting a piece of relatively transparent plastic over the symbol for T-1 on Exhibit W, and just in case it's necessary to replace it at another time, I am going to put at this point registration marks where the corners of the plastic are away from the body of the drawing. Do you want to recap it? Can you mark on the superimposed piece of plastic what would be necessary to have Exhibit W correctly reflect the actual circuit?

A Yes.

Q Will you do so?

A Well, the lead running across from S-2 should move into this position, contacting the plate lead at the effective position there and not contacting the upper end of it.

MR. DODDS: Excuse me, Doctor. I think you said S2. Is that what you mean?

THE WITNESS: Say that again.

MR. DODDS: I think you said S2.

THE WITNESS: I am sorry. Thank you. From switch S3, the lead coming over from switch S sub 3 connects directly into the plate of T1, between the plate of T1 and the plate resistor shown in the original diagram. The plate resistor is in the correct position. The lead on the other side is correct. I will draw it as it is.

Now, we have to interrupt this circuit

6

here and I am going to show the interruptions by just little strikes across them cutting out those leads. It wasn't too handy the way I did it, but I did it well enough. Now, however, that tube is left without plate voltage and we must take a lead off and bring it up and call that plus 120 volts. Now, I believe that is -- all right, plus 110 volts, I should have said, but that will do well enough. Since I said minus 110 volts, we always kept the voltages roughly the same. They might have differed 10 volts, and I perhaps should have said plus 110 volts there, but it makes little difference. There is a little confusion in the legend here. Sometimes we used 110, sometimes 120, so the whole literature has kind of got this error sifted through it.

BY MR. HALLADAY:

Q And just for certainty, can we now tell by the positioning of the plastic overlay the condition of the original drawing, Exhibit -- or the reproduction of Atanasoff Deposition Exhibit W as it was, and then with the overlay in position as actually reflecting the circuit in question?

A Yes.

E-13-1

Q With reference to the circuit on Atanasoff Deposition Exhibit X, can you tell us whether or not that accurately reflects in a diagramatic fashion the add-subtract mechanism circuit that shows up inside of the box?

MR. DODDS: Objected to as leading.

MR. HALLADAY: On Exhibit W?

MR. DODDS: Objected to as leading.

THE WITNESS: I believe that that diagram Figure 2 exactly represents the connections and condition except for the proviso previously stated that the envelopes are here assigned to each triode instead of being assigned to triodes in pairs. Except with that one correction which is superficial and as far as the language of electronics goes, is a schematic error only, I believe that this exactly depicts the add-subtract mechanism.

BY MR. HALLADAY:

Q Then earlier in your testimony, Dr. Atanasoff, you had referred to the fact that the dual triodes that appear on Exhibit V in the add-subtract modules had grid caps, but of the seven, one did not have a grid lead. Is this reflected in any way on Exhibit X?

A It is.

Q Describe that?

A You will notice that here is the item which exactly

illustrates that. You see there is a grid lead there without any connections at all, a so-called free grid of the electronic world.

MR. FALLON: I think you ought to --

BY MR. HALLADAY:

Q Does that which you have so identified --

A It is --

Q Excuse me.

A I am sorry. This is a grid of what we call triode 9 in Figure 2 or Atanasoff X.

BY MR. HALLADAY:

Q All right. When you say this, you mean --

A The free connection, the unconnected grid is associated with the triode 9 in Figure 2. All right. Thank you. I am getting a little tired.

Q For the benefit of the Court, Dr. Atanasoff, can you explain how either with reference to these drawings or diagrams or without reference to them this main machine added or subtracted and how in the process would you describe how you could tell it was doing that, and you should have in mind if you would, please, that the Court may or may not be familiar with base two numbering systems. Now, recognize I may have given you by this, perhaps deceptively simple question something of a tall order?

A Well, let me --

Q But what I am asking you to do, if you can --

A Let's begin by --

Q -- explain how it operated to, for example, add, and how you could tell it was doing it?

A I will first give a one-minute discussion of the base two number system. The base two number system is a system of numbers which instead of having the digits 1 to 9 and then the zero which were invented by the Arabs, so many years ago, to indicate a circle and to indicate 10. We use the Arab zero but we only use one other digit, that is the digit one, so we are restricted to these two digits, zero and one. And we start to count in the following fashion: zero, which is nothing, one. Now, we are done with the digits and so we have to go to the device which is employed in the Arabic number system also of order. So we run, so we run -- so we shift the order and put this symbol down. This means one circle, one time around the number system and one time around this number system means two. It means, more precisely, I will give you a mathematical depiction of that. Then we have the digit, the number 11, just adding one to this and then these places are filled up and then we have to go to this number, this number representing what is called an Arabic notation, I mean in the base 10 number system 4, zero, 1, 2, 3, 4. After this comes, of course, 1 zero 1 meaning 5, 1 1 zero meaning 6, 1 1 1 meaning 7 and again we have run out

of positions in the first three digits and we have to advance to the fourth digit position and we have this number.

Now, if you want to, I can give you a mathematical description of the base 10 number system in these terms and the base 2 number system in these terms.

Q Excuse me, Dr. Atanasoff, just for completeness, you have gone through 8 in the decimal system with the corresponding binary system opposite on what you are drawing there?

A I have.

Q Would you mind putting 9 down?

A (The witness complies.)

Q Thank you. Now, I interrupted. Would you go forward with the statement of whatever you consider necessary to illustrate the question?

A At least for the record, I hate to go through this without any exhibit of erudition, so I will describe a number system in the following terms: A number system is an arrangement of this kind where --

Q You should speak up, please, sir, it's hard to hear you. I am sorry.

A Right. A number system is an arrangement of the following kind. Now if I can still do it, I will do it. It has things called digits and places in which we put symbols, and it has another situation which we call place, order of the symbol. Now a number system is depicted this way in which

any number N is depicted as a sum, and B is a number called the base and A is a coefficient which is multiplied into that base, and I should say a sub I is a coefficient of B raised to the ith power and in which a equals zero, one and so forth, but ending with a minus one. And you will find that in those terms any number system can be described and it describes this number system, of course, here base is ten and we have all the digits running up to 9 in evidence and zero also as -- that's true of any i, and also applies to this representation in regard to the base 2 numbers. That's the first step. That is a description of the number system.

Next we will do some operations with the base 2 numbers for illustration. I am sorry to impose this on everybody but -- suppose I put down a couple of arbitrary numbers. You see, you put them down by writing zero's and one's along here. Let me change that to a 1, may I do that, without bothering you? I have a reason for doing that.

EA 13/2/1

Q Now, you have written down what, just so that you say what you have written?

A I have written a couple numbers and I have to figure out what they are to satisfy counsel.

Q Just for the record --

A And I will have to figure out what they are because I do not know.

Q Dr. Atanasoff, bear with me. Just for the record what are the figures you have written down?

A 101011 and 110011.

Q One underneath the other?

A One underneath the other.

Q All right.

A Now I am going to do an addition. Of course, one and one isn't available in this number system so we put down a zero and carry a one in the upper position like that (indicating). Now we have to add three ones together and three ones together, three is of course written this way (indicating) but putting 1 there and carrying a 1 in that position, when you add this column you get a one, here you get a one, here you get a one and here you get a one zero.

Now, that is the way the base two number system works. I wanted a one there so as to illustrate as far as reasonably possible the method, the problems that you encounter in developing a logic circuit to do this job which

is done mentally by us here and which seems so elemental. Of course, you can devise a logic circuit for numbers to any base. They get to be pretty complicated if you don't work to base two and various devices are used to simplify the problem when bases other than two are used.

Q Dr. Atanasoff, you have said that as you wrote your 101011 on the board --

A Right.

Q And the 110011 on the board?

A Right.

Q That they were arbitrary numbers?

A That they are.

Q What did you mean by the term arbitrary?

A I mean that I haven't, except in this slight business of changing the zero to one in order to get an extra problem in the record, I haven't chosen them with any designs in mind and they are as if they were manufactured by a machine which is capable of uttering zeroes and ones at random.

Q Well, then, do you now know without thinking what the decimal equivalents are of 101011?

A Well --

Q Or 110011?

A No. I do not.

Q Can you --

A No. I do not know, and I will use these, the changing of these numbers to base ten digits to illustrate this principle depicted above in the theory.

Now, this means one 1, and this means one 2.

Q When you say this means, what do you mean?

A The right-hand digit.

Q Thank you. Now, I presume that this, well, it's hard, isn't it -- I don't know. The right-hand digit means one 1, the next digit, the second digit in the upper line means one 2, the zero there means, no 4, that 1 means one 8, this zero means, no 16, and that zero means one 32. So when we add those up, we get 43. That is the meaning of the upper number.

Now, the next number. This means one 1, the right-hand side in the second number, the right-hand side 1 means one 1; the second number means one 2; then we have no fours and no eights, fours and eights being powers of two, you see; but one 16 and one 32; so we add, adding them together, so we have those two numbers in Arabic notation in base ten number system written on the board. I hope my mathematics are accurate.

MR. FALLON: It is. Add up the last one.

THE WITNESS: Thank you.

BY MR. HALLADAY:

Q Then you --

A Then you must evaluate the meaning of the next symbol and it means --

Q Excuse me. Would you read the next symbol into the record?

A The next symbol is, read the sum, let me check the sum again. Yes, it seems to be all right. Yes. The next symbol reads one zero one one one one zero. That means one 2, one 4, one 8, one 16, no 32's and one 64, and that adds up to 80, 92, 93, is that right?

MR. FALLON: 94.

THE WITNESS: I guess it is 94 which is the sum of the other two.

Now, we can do a problem in subtraction the same way. I don't know, is it --

BY MR. HALLADAY:

Q I would rather stick just to the addition at this time if you please.

A All right.

Q Now, having given us this illustrative approach and some understanding of the two systems, how could you tell or how could the judge tell if you took him by the hand to your computing machine that it in fact was accomplishing addition of this sort?

A Well, you have on, let's say on CA you would have this number and that would have to be told by reading a cathode ray oscilloscope as far as the evidences which John Mauchly saw. This number would be on KA and then after the addition took place, this would be on KA and so on, I call it KA star -- I am sorry, I thought this -- I am sorry, corrections. This is CA, this is KA and this last number is CA star. I am sorry.

Q Meaning what?

A Meaning that that is a new number which appears on CA after the addition has taken place. Now, this number would have to be verified by a reading of a cathode ray oscilloscope attached to a brush bearing upon the CA cylinder.

Q What would be the appearance of the face of the oscilloscope tube while that was going on?

A It depends a little bit on the coding. Generally, you see, you got negative values for ones, so you would see here, roughly speaking, this number here would look like this (indicating), you have a depression there, then it would have a zero in the next position and then it would have a one in the next position, a one in the next position and a one in the next position, a one in the next position and a one in the next position, and then it would go up to zero and it would be like that.

Now, I guess I have, yes, all right. It might be exactly that way.

Q Could you put the legend CRT near that drawing you have made?

A I will, CRT, and it might be that the tube would draw -- I warn you that I might have drawn, I would conventionally hook a cathode-ray tube up so it would draw zero on the left instead of the right. Why we do that I don't know. We could draw it either way, but I am afraid that I would conventionally do it the other way. It doesn't make a bit of difference but you have to know how you connect it, and then you, having your coding in mind, then you can read the imprint from the cathode ray oscilloscope, and you can tell what the number, what number that represents, and that would be the method of verification that the computing done by this machine was correct.

Q Well, now, while Mr. Mauchly was there at Ames, did you actually go through anything that resembled this?

A We went through exactly this on the machine and on paper, doing it on paper and then doing it on a machine, verifying that the number, each number, each number that is being added on the machine was, as a matter of fact, the number that was on the machine and verifying that the sum was correct. We went through with such, with such illustrations of the operation of the machine.

W-14-1

Q In such an illustration, would you say that that was static or dynamic in character?

A I would say that this is dynamic, a dynamic illustration of the performance.

Q What does that mean?

A That means I am testing the machine, but I am also testing the add-subtract mechanism under conditions where it's actually running at a certain rate of speed and it is not merely a static device depicting the state as of one moment.

Q Did you do that on one occasionor more than one occasion with Dr. Mauchly when he was there in Ames?

A We did it on a number of occasions. There was at least two sessions in which the machine was operated and various sums and differences were displayed.

Q You say various what were displayed?

A Various sums and differences were displayed. We haven't talked about difference here, but I will --

Q When you use the term "difference," what was the machine doing?

A The machine is subtracting instead of adding.

Q While Dr. Mauchly was there at Ames, did you ever operate the machine so that it continued to run and continued to add?

A We did.

Q Can you describe that?

A Well, this is some of those tricks that the boys devised to display a machine in operation, and Clifford Berry had a way of counting the number of turns which a machine made, and then he could let the machine run for an extended period of time, counting the turns, and then verify that the sum of the adding a certain number of times into the machine was correct.

Q Can you recall just how that was done?

A How the counting was done?

Q Well, how -- what was this method Mr. Berry had derived or arranged for?

A You know, he had a revolution counter and he stuck the revolution counter in there, and at the same time closed the switch.

Q What switch?

A The switch, the one-cycle switch, but he just held the one-cycle switch closed. He didn't take his finger off. He just held his finger in there so the machine would continue to add during the period of the exhibit, and then he could put 100 turns in there if 100 is what he wanted to do, and then he could calculate what the results would be and verify this with a cathode-ray oscilloscope, an extended test as of this day.

Q I didn't hear that last.

A An extended test as of this day.

Q Which day?

A As of that day.

Q All right.

A Mainly about June of 1941.

Q Did you observe this actually going on?

A Sure.

Q While Dr. Mauchly was there?

A Sure.

Q Did you ever observe Dr. Mauchly actually punch any part of the machine while he was there?

A Sure.

Q Describe that?

A Well, I remember his helping Clifford Berry in various minor assembly work with the machine while he was there. You know, Clifford Berry -- there was development work on the machine going on at the time Clifford Berry was there, so this or that part of the machine was disassembled and some other item changed or modified, or whatever, and these operations in which some part was taken off the machine, I remember that there was considerable work going on on the brush holders, on some of the wiring harnesses while Dr. Mauchly was there, and I remember the work going on in the shop on the base two card reader, and then I know that Clifford was carrying on at that time work on the punching mechanism, and he had a separate little setup, not the main

machine, for recording numbers by the method which we proposed to use on this machine and which we broke down dielectric in order to record numbers, and I know that there was some work going on that on one of the benches nearby during the period. You see, on July 8th Clifford Berry was coming up for a Master's degree and this was pressuring him, and he felt that pressure a little bit.

Q Were there any other tests with the machine in operation while Dr. Mauchly was there, beyond what you have described?

A Well, I think this -- it may not be quite complete, but essentially, it represents what Dr. Mauchly saw as it relates to the computing machine itself. Of course, we had other tests on the add-subtract mechanism which we attached at that time a good deal of importance to the tests which I previously described and which were --

Q Have you, in connection with your work in respect to this matter, had occasion to participate in the building of a test set?

A I have.

(Atanasoff Deposition Exhibits Y and Y-1 marked for identification.)

BY MR. HALLADAY:

Q I have had marked Exhibits Y and Y-1 and I have put Exhibit Y before you.

MR. HALLADAY: And may it be understood, Mr. Dodds, that the marking is somewhat temporary, the reporter having had some difficulty getting to it, but he will make that identification more complete and official at another moment.

BY MR. HALLADAY:

Q I have put Atanasoff Deposition Exhibit Y before you, Dr. Atanasoff. Will you state what that is?

A That is a test set.

Q And can you tell us what is inside of it, at least in a general way?

A Well, the same thing in part; the things inside of it are the same things that were inside of the test set which was employed at that time. It contains a transformer, arrangement for furnishing the filament current for the add-subtract mechanism, which is in the other unit.

It contains a power supply inside of it for furnishing the positive voltages and the negative voltages which are employed in that add-subtract mechanism.

It also contains devices, just as the original test set did, for duplicating the input signals to the add-subtract mechanism so that they are under the operator's control, and can be demonstrated here.

It, however, in addition, contains two lights which are used to replace the meter movements of the

6

original demonstrration. It was felt at the time that this machine was designed that the meter movement wasn't very good for demonstration to a large number of people, but the lights would be much better. The lights, however, improved -- however, involved some modern innovations because they have silicon control rectifiers in their physiognomy, and that is a device which, as a matter of fact, is a form of transistor.

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Now, with the exception of this device employing silicon control rectifiers to indicate the output of the add-subtract mechanism, this device is, as far as I know, a substantial reproduction of the original test set. I say as far as I know, because, you know, I don't have at hand any diagrams of the original test set so I can't say this condenser and this filter may be of slightly different connection or something of this kind, but the material meaning of this test set is the same as the material meaning of the test set as of that day.

As far as the registration of output of the add-subtract mechanism, this is a different arrangement.

Q You had earlier in describing the test set spoken of a tin box. Is there also a difference in respect to the material of the box?

A Oh, I guess not. I guess it's about the same thing.

Q Well, is it tin or is it some other kind of metal?

A It's steel coated with some metal, which I call tin. It's plated -- well, I don't know, it might be an aluminum box. Maybe it is an aluminum box. I guess this is an aluminum box. All right. I will give you a change in a minute.

Q Is there any other respect, so far as your memory is concerned, in which Exhibit Y differs from the test set that was employed in 1941?

A Well, it's got a wire here on it and a plug at the end, and that was true of the device as of that time for furnishing AC power to the test set, and on the other end it has a multiple conductor connected to a female end into which the add-subtract mechanism is plugged.

Q And turning your attention to Exhibit Y-1 how does that compare, if at all, with the add-subtract mechanism modules of 1941?

A As far as I know, there is no difference except those demanded by the available material of the day, which, as far as I have any reason to believe, are of no consequence. This is an exact replica. We have gone to great lengths, and the only way we had of doing it to make sure that each tube performs the same function as the tubes did in that day, not mixing the tubes up in here, we had this circuit diagram but we had to go, we had to look at that photograph of the underneath of the unit, and I think if you examine that photograph, and I will get the number for you here in a moment, it is 1406, and you looked at the underside of 1406 and compared it with the underside of this, and we believe --

Q Excuse me. Did you say 1406?

A I did, yes.

Q Is that correct? Well then, we have one with a different number on the back -- excuse me. I was looking -- you had two photographs in your hand and I was looking at the

back of one.

A Oh, thank you so much.

Q I am sorry.

A I am sorry.

Q 1406 is correct?

A 1406 is correct.

Q I am sorry for the interruption.

A And --

Q If you look --

A You will notice that like the item of the day, it contains one double triode --

Q Excuse me, Dr. Atanasoff. Please mention Exhibit Y-1 as you go along.

A Y-1, all right; Y sub 1 or Y super 1?

Q Y-1.

A Y-1, all right.

Q Lawyers have their own strange conventions.

A Like Y-1, like the item of the day, contains a center vacuum tube with grid cap on the top, but without any grid connections thereto. Probably the resistors are of different material. Some of the vacuum tubes came from nearly that day. We have them in old cartons. We received them in old cartons. I know these don't look like the old ones. These look like new ones but some accident of fate, but some of the vacuum tubes that have been used in these devices, we

produced four of them, where actually from approximately this date, and they are obtainable today only from the purveyors of old and obsolete tubes, of which Arcturus is one.

We had no drawing of the scale and we used a method of scaling this picture to get the size and we believe this is within a quarter of an inch on the exact size. I remember the exact shape of this chassis which is depicted in the picture.

Q Picture 1406?

A Picture 1406. There was a change in material here. I remember that those chassis were mounted upon, I mean the metal bases of that day were of steel, cadmium plated to avoid rusting, and this one, not wishing to buy steel and have it bent and then have it cadmium plated, we just used aluminum, which makes no substantial difference.

Q What about the material of the wires? Is there a difference or a similarity between that in Exhibit Y-1 and the module of 1941?

A You can be sure that that was the push-back wire, wax coated, and these wires are of plastic. Then we have three or four condensers in the structure of the machine, and the condensers are a little different. The condensers of that day were of paper insulation, and these condensers are of Mylar.

Q Of what?

A Mylar, M-y-l-a-r, I believe.

Q What other differences are there in Exhibit Y-1 and an add-subtract module vintage 1941?

A Electrically, there are, to my knowledge, no differences. There are a few physical differences. I believe the plug here, the female plug contains one more wire, has one more position available. I believe those were ten prong. I believe if you count them you will find that is ten prong in the picture.

Q Picture 1406?

A Picture 1406. It is ten. I believe this one is eleven. If I got it changed as I planned to change it, it is eleven. I counted twelve. I guess it's eleven. I will have to count it again. That's the only thing I can do.

Q Will you do that so as to be certain, please?

A One, two, three, four, five, six, seven, eight, nine, ten, eleven, twelve. It is twelve, I guess. Twelve. That one is a ten.

Q That one meaning --

A Meaning the one depicted in 1406 is ten. We used the grounded chassis to carry one lead here. This is -- it was very hard to get such things in those days and -- I want to count this once more. That seems to be ten without any question.

Q You say "that seems to be ten." You are referring

to what?

A The plug in the photograph 1406 seems to be ten and the plug in the module under discussion here seems to contain twelve points.

Q What difference does that make, if any?

A It means a slight difference. The connections inside of the machine are exactly the same but there's some differences in the lead-in wires, some slight change in the lead-in wires.

Q Can you tell us whether or not if Exhibit Y operates properly can be employed to illustrate the operation of a test set on an add-subtract mechanism?

A It can.

Q Do you have a power supply beneath your feet there?

A None available. They are all in use.

Q Well, is there a spare there?

MR. HALLADAY: That is a telephone outlet, Mr. Fallon.

BY MR. HALLADAY:

Q Will it bother it to be used in an octopus type arrangement?

A I don't know. We will see. Thank you.

Q Dr. Atanasoff, will you describe the appearance of the test set in the condition which it had immediately after you connected the plub to the power supply with respect to the

lights?

A Well, when I connected the plug to the power supply there was a transient phase which caused both lights C and light A on the face of the test set to glow.

E-35-1

Q Now, directing your attention to Exhibit Y, there are two objects labeled respectively from left to right as those of us around the table look at it, C and A?

A Yes.

Q They are, of course, reversed to you unless you crane your neck and look at it from the front with us. What are those intended to be?

A Those are two little incandescent lights which are controlled by silicon control rectifiers interlocked with the electronic circuit, the electronic circuit, of course, connected by the cable to the add-subtract mechanism.

Q Now, on the, or in connection with the test set that was employed in 1941 which you have said had two needle meters, in what respect does the appearance of the lights on the test set, Exhibit Y, correspond to what showing there would have been on the meters of 1941?

A Well, the lights have two states, a zero represented by a dark condition and a one represented by a lighted condition. Each light has two states, the meter had two positions, roughly speaking, a low position and a high position, and the satisfactory operation of the digital computer, it's either -- it never -- it's never a hybrid, it's either on or it's off, and that's characteristic of the whole digital principle, and according to this, the meter never read medium, it just always read low or high, and likewise

the lights never read medium, either read on or off, and these on or off characteristics are those which describe the digits of the base two system.

Q And then further referring to the legend C and the legend A with respect to the lights, do those legends have any connection to any legendry on any drawings or diagrams?

A They do.

Q State that connection?

A Well, the legend A indicates a number to the right below the line in the sum or difference and the number C indicates the number to be written at the top of the next column as a carryover into that place.

Q Directing your attention to Exhibit W -- excuse me -- and the box pertaining to the add-subtract mechanism depicted thereon, is there any connection between the A on Exhibit Y and the A inside of the add-subtract mechanism box on Exhibit W?

A Well, you see -- yes, there is. That A is an output. I should describe the add-subtract mechanism as depicted in Exhibit W.

Q Will you do so?

A As having a series of letters thereon, A, B, F, G, D, E, and C thereon, well, these -- of these letters A -- I am sorry, B denotes an input into the add-subtract mechanism. Also D denotes an input from the other memory , KA memory; also E represents an input from the carry mechanism.

C and A represent the two outputs of the add-subtract mechanism. Now, you see the two outputs are depicted here by the lights, it doesn't connect to anything in this case, it just gives an indication of what goes there instead of being connected electronically, it just gives us an indication of what goes there, and here at the top are three buttons and those buttons are the three buttons which denote the inputs and instead of having a connection between this device and the rest of the circuit, we get the inputs back by pressing our fingers upon these buttons and buttons B, D and E denote the equivalent circuit connected into the mechanism, add-subtract mechanism, as of this point right here into item B -- D, is it? Is it D there on the block diagram? I am sorry. The D there, D here is the, corresponds to the D there.

Q Excuse me, Dr. Atanasoff. We will get the record confused if we say D here and D there, and I am sorry for these interruptions.

A Yes. D on the Exhibit, what is it, Y?

Q Y.

A On Exhibit Y corresponds to the letter D on Exhibit W and E on Exhibit Y corresponds to E on Exhibit W. So that there is a one to one correspondence, and we can, if we please, use this device to test the operation of the module statically as we did in that day except that here we have different kinds

4

E-15-2

of outputs in the test set.

Q Then directing your attention back to Exhibit Y on the part that has the label on it, there is another device that protrudes from it above which is a "A" and below which is a "S". What is that device and what does the A and S mean?

A That is a switch, the switch controls certain voltages which are supplied to the add-subtract mechanism. These voltages instruct the add-subtract mechanism to either add or subtract as the case may be; and A on that switch means that the switch is instructing the thing to add and S on that switch means that the switch is instructing the add-subtract mechanism, Exhibit Y prime or Y-1?

Q Y-1.

A Y-1, to subtract.

Q With respect to Exhibit Y-1, are the glass objects thereon what you and I have heretofore had some trouble, I insist on calling them tubes and you call them envelopes?

A Yes. That is a sufficient agreement, tubes or envelopes. I hate to have you call them triodes because each one of these envelopes or tubes contains two triodes, that's my argument.

Q. If I say a triode you automatically think --

A Of a half a one.

Q Only describing half of it?

A Yes.

Q All right. Now, can you say in words how you went about employing the test set while Dr. Mauchly visited you at times in June of 1941?

A Yes.

Q Will you do so?

A We outlined the elements of base two computation. I will now do so on the board employing a crayon.

Q Shall we take and give you a fresh sheet?

A That is not necessary but --

Q It might help a little bit. And before we go further, let's have the reporter identify that sheet in case someone else wants to refer to it.

(Atanasoff Deposition Exhibit Z marked for identification.)

BY MR. HALLADAY:

Q Will you observe, Dr. Atanasoff, in a lawyer's laborious way I have now had your first sheet that was used for instructional purposes with respect to base two, base ten numbering systems, marked Atanasoff Deposition Exhibit Z?

A I observe that.

Q All right. Will you now, using the sheet before you, give us the preliminaries to a static test?

A I would just like to have a little order here as I go. I will use this for reference to make sure what I do corresponds exactly to that, and I am going to --

6

Q Could you please speak up?

A I will try. And I will try to get -- I have never been noted for speaking low before. I must be running out of juice.

Let's see, I am going to try to commence to bring my notation into relationship with figure 1 so that when we get through we will understand what we are talking about. Now, in addition we have the following mental sums. Now, you remember we have one part which comes from CA which corresponds to -- enters upon the circuits at a point B, and I am going to put a "B" right there in parenthesis. This is just for my reference purposes, and then, that is one of the numbers to be added.

And here is another number to be added, it is a KA which enters the picture. KA enters the picture throu these devices and back over here into D, so I will put a D there. As far as getting in a computing structure, it will enter by way of that regenerative circuit back into D. And then there is also the carry up here, and the carry enters the picture right here by way of E.

Now, the kind of numbers we have I will depict next. We have such sums as this (indicating), and then sums employing two 1's, and that describes, and then one more sum which has all 1's; and those are the different kinds of elemental additions which you can have and those are the ones

7

that this machine must be capable of doing.

Q Which machine?

A The add-subtract mechanism of the current device.

Now, we know what the answers are in each case and we will write them down and then we will label them and then we will do them on the machine.

Now, this one should give, oh, there was one that went before that, went like this, didn't it, I forgot one. Now, that 1 came out zero. Now, this 1 comes out 1. This 1 comes out 1, that 1 comes out 1, but the 1 means 1 in that position, but it doesn't supply an impulse to be carried into the next position, but here we get a zero in that position but carries 1 into the next position, and I will tell you where that appears there in a moment. This also gives one zero and this gives one zero and this gives one one. Let's do these elementary systems on the test set. I hope the darn thing works.

15/3/1
EA KL

Q It's on subtract?

A I am now approaching the test set --

Q Thank you.

A Exhibit Y.

Q Yes. And --

A I am about to put my fingers on the various buttons, on the red buttons on the top thereof.

Q Is it on add or subtract?

A And it should be on add since I am working on a problem of addition, and I move the lever to the add position. Thank you, sir. That is hard to understand. We will press the button, notice all three buttons are up, meaning all three zeroes, we have already verified this, haven't we?

All right. Now, that one there means push button B but leave the others. Now, there is light there and that means into this position goes one but there is none into the carry position indicated by the letter C below.

All right. Now, the next one says push button E. I push it. It gives me the same result.

This one says push button D. I push it. And it gives me the same result, giving me a one in that position, and I could have written it here if you like. Maybe I should, giving me a zero in the next position, and of course this has two zeroes there, doesn't it?

Now, we are going to try pushing two

buttons and it says there in the first column to push E and B. Now, you notice in that position, the position A, the light is out, meaning put a zero in that position, but the light connected with C is lighted, meaning 1 in that position and accurately depicting the conditions which are required there.

The next one says push E and D, E and D. Again we have the carry button, the carry output lighted, showing that we have a 1 in that position and a zero in the position where we are doing the addition, that is, in the A column.

Now, we have the third two buttons E and D, or did I do three already?

MR. FALLON: You didn't do B and D.

THE WITNESS: I didn't do B and D. All right. I didn't do B and D yet. I will do B and D next. You notice the result is just the same.

And now we are going to push all three. You know that they are both lighted meaning 1 in that position and 1 in that carry position; and that means that this device is operative at the moment as measured by the test set in a problem in addition.

Let's do a problem in addition, just working it out instead of using our heads, let's just do a very short problem in addition where we have to carry and everything of that kind. I am fooling around

just to make a problem as illustrative as possible, but I will just go through with that.

Now, I am going to label these just as I did there. You see I am going to label this one B, and I will label this one D, and up above is E, and I haven't got any numbers written in E, so I push B and D. It says to put down a zero and carry one, doesn't it, so I do it. I push B and D, it says the same thing, put down a zero and carry one. Now, I push E and D, it says the same thing, put down a zero and carry a one.

Now we press all three and it says put down a zero and carry one. Now, watch me, I carry it right up into that position and then I push only E and that says put down a 1 below and quit.

MR. FALLON: Is that right, this one?

THE WITNESS: Is there something wrong in there? We are -- I pushed the wrong thing. Allow me to go back and do this place over again. I should push E and B and D there, and now we get the right results, it says put down a 1 and carry 1. Now I am correct in it and now it says push the E alone.

Now, the machine actually does this automatically. That's all that's going on inside the machine is that operation, and I would like to -- shall I give the table for subtraction?

Q No. Before that, just for further illustration, will you put the decimal equivalents? Would you please down below show how you arrived at the conclusion that one one zero zero zero in the binary system is the same as 24 in the decimal system?

A Yes. Now, this is in the fourth place which means the power is three here, so that one there is equal to 8 and this one is equal to 16, and 16 plus 8 is 24.

MR. HALLADAY: It would be convenient for me, because of some personal commitments, if we adjourn at this time, and what is the reporter's pleasure as to tomorrow morning, and yours, Mr. Dodds?

MR. DODDS: Any time you say.

MR. HALLADAY: How about 9:15?

MR. DODDS: That is fine.

(Whereupon an adjournment was taken until 9:15 o'clock A.M., December 4, 1968.)

12/4/68
CA#1
KL-1

VOLUME VII

UNITED STATES DISTRICT COURT

DISTRICT OF MINNESOTA

FOURTH DIVISION

Honeywell, Inc., Plaintiff,	:	
-vs-	:	4-67 Civ. 138
Sperry Rand Corporation and Illinois Scientific Developments, Inc., Defendants.	:	

Continued deposition of Dr. John V. Atanasoff taken by Plaintiff, before Earl G. Anderson and Ward L. Sutfin, Notaries Public, State of Minnesota, County of Hennepin, at 2515 First National Bank Building, Minneapolis, Minnesota, commencing at 9:25 o'clock a.m., December 4, 1968.

(APPEARANCES AS HERETOFORE NOTED.)

Whereupon,

DR. JOHN V. ATANASOFF,

a witness having been previously sworn, was examined and testified further as follows:

DIRECT EXAMINATION (Cont'd.)

(Atanasoff Deposition Exhibit W-1 marked for identification.)

MR. HALLADAY: For the record, may it be understood, Mr. Dodds, that I have had a sticker made and marked Atanasoff Deposition Exhibit W-1 to put on the plastic overlay that we have positioned on Atanasoff Deposition Exhibit W so that it will have its own identification, and that I am placing that sticker at the top of Exhibit W-1 so that for future reference it will give us the top of the overlay.

BY MR. HALLADAY:

Q You observe what I have done, Dr. Atanasoff?

A I do.

Q Then yesterday at about the point of recess Mr. Fallon, I think it was, called to our attention the fact that in the drawing which you had done on what has now been marked Exhibit W-1, the effect of the overlay when examined separately makes it appear as if there is a gap in the wiring that is on that overlay whereas the wiring shows up when the

overlay is flat up against the background of Exhibit W. Would you be good enough to step to the board, Dr. Atanasoff, and complete the wiring diagram on the overlay Exhibit W-1?

A Right.

Q Now, if you lift, does it now appear that the wiring corrections are completed on the overlay Exhibit W-1?

A It does.

Q Thank you. Yesterday you were employing Atanasoff Deposition Exhibit Y in connection with Atanasoff Deposition Exhibit Y-1 to illustrate for us the employment of those devices as a test set for the purposes of accomplishing addition, at least in a general way that was the subject matter of the discussion at that time. Now, I would like to ask you this question: In what way, if any, can the test set Exhibit Y connected to Y-1 be employed to demonstrate the action of Exhibit Y-1 in performing subtraction?

A The first step is to reach this lever and push it downward so ithat it is in a position of subtraction, whereupon certain voltages are induced in certain leads which pass into the add-subtract mechanism which order the add-subtract mechanism to stop adding and start subtracting. I will now place a problem of subtraction on the board, and we will go through that problem of subtraction using the test set and add-subtract mechanism to give us the orders or the logic of the steps.

W-2

Q Before we -- excuse me. Before we do that, perhaps I can remove the sheet on which you had written your addition problem and have it marked so that we will have a record of identification, and then we will start with a separate sheet for subtraction.

(Atanasoff Deposition Exhibit AA marked for identification.)

BY MR. HALLADAY:

Q Dr. Atanasoff, just for the record, you observe that the sheet that you employed yesterday to illustrate addition in connection with your demonstration of the test set, Exhibit Y, connected to module Y-1 has now for the record been marked Atanasoff Deposition Exhibit AA?

A I cannot verify the AA.

Q Showing you a sheet which has been marked, will you identify it?

A I now identify it.

Q Then, please, will you give us a statement on subtraction in the binary mode?

A We have a little problem. Oh, it might as well be this one, I guess.

Q Would you be good enough to write "subtraction" at the top of the sheet to correspond with a similar identification on Exhibit AA, please?

A Is this Y? What is the name of this?

Q The test set box identified as Exhibit Y. Do you want, Dr. Atanasoff, figure 1, which is Deposition Exhibit --

A I do. I want it where I can see it.

Q Exhibit W.

A I will need it where I can see it. Just set it up there. I will need to glance at it only a moment or two.

Q Dr. Atanasoff, a technical interference by the lawyer. You have written at the top of this sheet, "Subtraction with Exhibits Y and Y prime" and it is really Y-1. Thank you.

A Correct. Now, you know this is going in KA -- I am sorry, CA and CA enters the picture by way of (B), and this one is, this one is KA and KA enters the picture by way of (D), and then we are also going to put the carry-overs above and the carry-overs are being carried up above and they enter the picture by way of (E).

All right. So we are ready to begin. We have put a one --

Q Excuse me, Dr. Atanasoff. For the record, you have entered certain numerals or digits on a chart before us?

A I have.

Q Will you state what they are?

A I have put a digit above one one zero one and below one zero one one to illustrate subtraction. The one one zero one is thirteen and the one zero one one happens to be 11, if my calculation is correct.

Now, I am going to enter -- of course, here we have no carry-over into the first place at the right, no carry-over, and there is really a zero there, and so I put -- I do not touch (E) but (B) I push and (D) I push, and I don't get a thing so I put down a zero here. That means nothing, and I put a zero up here. I now push the one, I have only one and (D) to push. So I push one and (D) and they both light, they both light, don't they, so I put down one and I carry one. And now I have (E) and a (B). (E) and a (B). I push them both and nothing happens, so I put down zero and carry nothing, and then I push the (B) and (D) and nothing happens, so I get zero, and that answer is equal to two, and that is verified at the right.

Q Did you, while Dr. Mauchly was at Ames, engage in a test of an add-subtract module of the sort which you have just now done on Exhibit Y connected to Y-1?

A I did, with a single exception, that instead of using lights as an indicating instrument, the test set as of that day employed moving vane meters, moving needle meters.

Q Did you ever observe while Dr. Mauchly was at Ames any manipulation by him of the test set?

A I am not sure whether I observe manipulation. He was free to manipulate it , but I have no memory of this.

Q While Dr. Mauchly was at Ames on this occasion that has been the subjectof your testimony, did you describe to him

4

the use of your machine in solving equasions in any way?

A I did.

Q Can you tell us your best memory of what you said on that subject?

A Well, of course, I had explained to Dr. Mauchly my interest in large systems of simultaneous equasions and the reason why I have been motivated to build this machine, this computing machine, and he was aware of it. Of course, he understood the problem of systems of equasions without, I believe, as far as I am aware, having any particular experience in large systems at that time, and so he was keenly interested in it.

Q Can you remember what you said about how your machine was intended to solve such systems of equasions?

A I do not remember much of the conversation, but one aspect of the conversation is very clear to me. I believe I spoke yesterday about division. The reason division enters into the solution of systems of equasions is that we use the division to eliminate an unknown, an effective division to eliminate an unknown. I was at that moment deeply aware of the method which was used by division in a Monroe or a Marchant, I guess was in existence at that time, in which you first do a subtraction until you overrun, then add it back in one and then shift, and, of course, such patterns had been in my mind as I planned the operation of this machine.

5

Now, this particular scheme of division wastes a little time while you overrun and back up and go ahead, but in base ten this waste of time is not large because you subtract perhaps an average of five times, then you subtract one additional time and then I believe they subtract an average of four and a half times. Then you subtract an additional time, that's one count. Then you add an additional one point count, so you have raised the effort from four and a half to six. But when you apply that method to the base two system, the method of operation is quite different, because you subtract on the average of a half time. Then you certainly take one additional one to overrun and then you take an additional one to come back, so you have increased your efforts from one-half to two and a half. So this is an odious principle for division, and I devised a different one, and I explained this different principle to Mauchly at that time.

EA#3-1

Q Will you state what your explanation was?

A I stated as follows: That what you did, you subtracted until you overrun, you immediately shift, you add until you overrun and then you immediately shift and continue this process. Then a simple accounting of the number of times you subtract in the overrun and add in the overrun gives immediate evidence of the quotient.

Q Is such an action demonstrable on the test set with the operator doing the shifting?

A I believe not.

Q All right.

A I believe not, no, because a test set means, you see, you have subtracted a long series of numbers and then overrun -- the overrunning I could demonstrate on the blackboard without the use of a test set perhaps better.

Q Would you do so?

A I will have two long numbers and I trust you will bear with me that these are base two numbers.

Q Draw a line below what you have done there now to separate the parts?

A I have drawn a wavy line to separate the two materials.

All right. Now, I am going to divide this number into that one but you will have to keep track that's what I am doing.

Q Would you be good enough to state what number you are dividing into what number?

A I am dividing one one zero one one by one zero one zero zero. Do you wish the English -- I mean the Arabic, the decimal equivalents of these?

Q Would you please?

A Yes, sir. I am dividing twenty-seven by twenty-four.

MR. FALLON: No.

THE WITNESS: Is what I am doing. Now, what we do --

MR. HALLADAY: If you want to check your figures for accuracy?

THE WITNESS: Is there something wrong with that?

MR. FALLON: Your divisor.

THE WITNESS: It is wrong. Twenty. Thank you, gentlemen. I like the problem better. Let's see, you subtract, and when you subtract, now I am going to add -- I am going to subtract, and subtraction gives me the following results -- I am sorry -- gives me one one one. I inadvertently got myself messed up with binary decimals, but I guess I can survive the onslaught. Well, as usual, I have -- I haven't carried through yet. You know I got some zeroes out here on the machine, I haven't carried through into those.

All right. Go ahead and subtract it again. That's what we mean by carrying through, carries through then the machine with ones, just like the ordinary computing machine carries through with nines into the machine, same old process. All right. Now, just keep track of what I have done there and I have got -- I have subtracted twice in the first position. The first position I have subtracted twice until I carried through. Now, just keep a record of what I have done that way and then we will interpret that record in a moment. Okay.

Now, what I do is add until I carry through in the next position. And, of course, this is the only -- the only digit that I have before the decimal, but I am going to just add, I am going to now shift my divisor to the right just as you ordinarily shift it, and watch me now, you better watch me, I guess. I got some more zeroes out here. Yes. I guess so, yes. And I add, I did not carry through. I mean I did not remove a carry-through is what I meant by those words. So I will add again. I did carry through. So in the second place I added twice.

Now, I will shift and start subtracting. I shift this number towards the right and it

now becomes, it don't matter about those zeroes on the right because we are keeping everything in order. I subtract. Am I right? That's right. I did not carry through so I subtract again and I will do that down below. I get the zeroes over here, and I hope you are helping to keep this straight -- Now, I have now subtracted in the third place. Did I subtract twice? I did subtract twice.

Now, we will go to a fourth place and I have to carry the thing up here, and then I will have to show you that this is running it out in base two decimals. The quotient is being carried out, and we will do the quotient in our mind here, and it turns out in our mind to be one point thirty-five in the decimal notation. I think we can easily verify that, now we will forget that and in the binary notation we will carry this out. I have a long succession of ones and finally come to a zero one zero zero and the one was just to the left of this zero. I had the one here before, but I now shift again and I am going to add so I shift it to here and I now add. This is in the fourth place and I add again and I have now carried out -- now, we have an interesting result there, you notice I have added twice, but you know now I will attempt to

5

the interpretation of these counts here as a quotient thereof, you see. You keep track of it this time. The quotient I subtracted twice. Of course, when you subtract that gives you one so I really have as a result of this, I have the first estimate one zero, first estimate of the quotient is one zero point; subtraction twice is two and two in the binary notion is one zero, right?

Now I have added twice here but addition is not the usual practice in subtraction so I have added twice. So now I now have to put a correction in there and the correction looks like this. This is just an interpretation of that notation in the binary system. Now, this here means I added, I did divide twice and it means a plus in the binary notation, that's a third term entering the picture in that way, and the fourth term entering it like this, also shifted over there still one further. So now we will work out that decimal, work out that decimal as an approximation of the quotient in the base two system, as an approximation of the quotient of the base two system. Let's see this one is minus, of course. Now, one comes out, of course, going to put a one there, isn't it, and that comes out next plus one borrowing that and leaving, that has been borrowed, so it's nothing there. Now, in the next place we have a

s

one, so that is a quotient. It doesn't seem quite right. I wonder if I got a mistake in there. I know when I get it going. This problem is entirely contrived so I could easily have an error. I don't remember what it ought to be, I have a feeling for what it jought to be. Let's see? Two is clearly too much for the quotient. All right. And we subtract this and that is clearly too small for the quotient so far, and then we add a half, yes, I am interpreting this wrong anyhow. Okay. All right. I have here, and I will interpret this for you. I will interpret this for you. That is one point two five, that's the answer that I get at present, one point two five, not a very good approximation of one point three five, but watch, if you please. Notice I am getting a repetition of the subtraction there. So we see this should go on exactly that way forever. I hope I am right.

In other words, this answer became a repeating decimal in the base two system, while not a repeating decimal in the base ten system it is a repeating decimal in the base two system and we will have to interpret that result. And let's -- I will write this down for you. This is one, of course.

Now, interpreting it, this is twenty-five hundreths. This one here is, this is a sixteenth,

zero six, this is something else, we are getting closer to the answer, we are at that position right now, and that illustrates the method of division which I had in mind.

Now, you may say, well, in this case that method of division didn't help us a darn bit. Well, the whole base two system didn't help us a bit here but, of course, we have to do with complex numbers where no regularity exists anyway and so this non-existence of regularity here is just typical of the general situation.

E-3-2

Q Do you recall whether or not while Dr. Mauchly was at Ames, engaging in any writing of the character you have done here for illustrative purposes?

A I did. I did, yes. I went over this system of division with him very carefully. I am sure it was not the same example because it's no way that it could have been.

Q While Dr. Mauchly was there, did you have the machine at that time in any condition where it could illustrate subtraction and division of the sort you have here described?

MR. DODDS: Objected to as leading.

THE WITNESS: Well, I would simply say that we had no controls suitable for detecting overdraft at the time Mauchly was there, no control, no detecting device suitable for detecting overdrafts, those were later incorporated in the machine and those were not mentioned yesterday, but they comprised an important part of the machine, and no control suitable for controlling division by any method including this one.

BY MR. HALLADAY:

Q Did you discuss that subject with Dr. Mauchly while he was there?

A Yes. Well, he understood clearly -- wait a minute, doggone it.

Q Did you discuss that subject with him?

A I stated to him that, of course, controls would be

devised for this purpose.

Q Did you state to him the character of those controls?

A I stated to him the general character of those controls.

Q What did you say?

A I do not remember.

Q What was the gist of what you said?

A That there would be controls for the purposes of controlling division, was the gist of what I said and that it would be detection of overdraft and this detection of overdraft would control the operations in the way that has been specified herein by the example which you have just been given.

Q Did you describe those controls in terms of their components, their parts or of what they would consist in any way?

A Only the general principles were discussed.

Q Describe those principles?

A The principles are the ones that have been illustrated on the blackboard at length in the division which has been given.

Q Do you have your original documents with you this morning?

A I do.

Q Dr. Atanasoff, would you please in those documents turn to --

A B-10?

Q Folder B-10?

A We will.

Q And see if you can locate in that folder Exhibit 93, a letter dated May 31, 1941, from yourself to Dr. Mauchly?

A I do. I have located it.

Q In the second paragraph of that letter there is a reference to, "An idea as to how the computing machine which we are building can be converted into an integraph," do you observe the reference that I have just read?

A I observe that reference.

Q In Exhibit 93?

A I do.

Q While Dr. Mauchly was at Ames on this occasion that you have been describing, was that subject discussed at all?

A It was discussed.

Q And you recall now what the discussion was?

A I can give you the subject matter and the gist of the conversation.

Q Would you do so, please?

A At that time the literature was full of the Bush Integraph. This is a device constructed by Dr. Vannevar Bush of Massachusetts Institute of Technology to solve differential equasions, integral equasions and various problems of that type.

As I look back upon the history of the

integraph, of course, I realize it represented a kind of a mechano-toy of the era in which we had some parts which could be put together to simulate the -- to simulate the differential, differential of other equasions in question which would then be used to simulate a solution. It was strictly an analog device. I had attempted, as it is recorded, that I have attempted to solve systems of linear equasions by analog methods. This effort had finally been abandoned because of one principal thing, and that is accuracy, accuracy which is attainable in these terms, and this question of accuracy continually beset the people who built differential analyzers.

W-4-1

Q All right.

A I have used two terms here, differential analyzer and Bush Integraph as equivalents. Please record that they are essential for the purposes of my present discourse, that they are essential equivalents.

Now, the fact that occurred to me as I wrote this letter on that day was that if you would stop trying to do the integration by the analog principles like wheel and disk or ball and disk type integraters, and do the integration, replace integration by a numerical type of integration in which you use small increments and counters, and which methods were becoming very available to me in the terms which I was coming to be possessed of, why, one could remove this problem of accuracy without carrying the burden of great accuracy in the parts; if you wanted ten times as accurate you had to make your parts ten times as accurate, and if you make your parts ten times as accurate, pretty soon you run out of accuracy. You just can't do it. So -- but, in problems of numerical integration -- by methods of numerical integration this limit is not upon you. This is the story that -- this is what I had in mind at the time I wrote this letter and this is the story I told Dr. Mauchly during his visit.

Q Did you describe to Dr. Mauchly the method that you then had in mind, if any, to convert the machine that you were

then building into an integraph?

A I am not sure how I should answer this question, inasmuch as I had no active plans for converting my machine as it stood into an integraph. I had no active plans. These were theoretical plans and they hadn't been formulated into terms of exact machinery, and vacuum --well, the vacuum tubes would be the vacuum tubes of the counters in question, but the exact interrelation of the parts in order to do a structure analogous to Bush's had not been worked out, and as far as I know, had not at this moment been worked out. They could be worked out, that I will assert and they could have been worked out at the day if I had turned my attention, as of that day, if I had turned my attention to it, or they could be today.

Q One point that I had forgotten to ask you yesterday, Dr. Atanasoff, which has nothing to do with the questions I have been asking you now. It just popped into my head.

On the test set Exhibit Y and the module, Exhibit Y-1 subject, the envelopes or tubes on Exhibit Y-1 have not been identified for the record other than by saying they are Arcturus, that they were dual triodes and they had grid caps and some of them had leads.

Is there another description for such tubes?

A There is a description which was historically common use and is now largely unused, but it is, the

description is 6C8G, 6C8G. Now, the C and the G are capital.

Q Then yesterday in looking at Exhibit Y-1 it was difficult to see whether or not on the glass there was a representation of that nomenclature.

A They have gotten to where they appear on the glass very very faintly of late years, and you have a heck of a time finding it. I don't know whether I can find it here or not.

Q In any event, are those tubes identical?

A They are identical.

Q In Exhibit Y-1?

A To the best of my knowledge and belief, they are identical and they are 6C8G's.

Q All right. Thank you.

A I don't see the darn thing but I think -- I see those numbers, but those numbers are different.

Q Well, on one of the envelopes in Exhibit Y-1, if you will permit me to --

A It would be something just about like that, barely visible.

Q If you permit me --

A Do you see one?

Q -- to move it, if you will look at the envelope nearest to the numerals seven seven eight on the base or chassis and the tube base itself has seven seven eight on it, and -- excuse me -- I know this is difficult, on the portion of the

tube which is nearest to the interior part of the chassis and nearest to the center place tube, is there something that is partially visible on that?

A Yes, the gentleman has found it. It's 6C8G, all right.

Q All right.

A It's hard to see, but it's there.

Q Is that identification on the tube that has the label on it seven seven eight on the base, just for the record? Permit me to turn it for you.

A I would have to take it out, I think, to tell.

VS 4/2/1

Q I am referring to the superimposed numerals on the base of the two. Do you see what I am indicating here, seven seven eight?

A Yes.

Q All I am trying to establish is that the faint six C eight G is on that particular tube, if you can see if it is.

A Well, I am in doubt, I mean, it's doubtless there and it's doubtless due to my eyesight that I cannot see it.

Q You can't see what?

A The six -- I see the seven seven eight, but not the six C eight G.

Q You and I aren't communicating well at all.

A No, we are not.

Q Let's find the seven seven eight.

A I see it.

Q On the base of --

A A vacuum tube.

Q A vacuum tube. Now, can you see whether or not that's the same tube that also has a very faint representation of six C eight G on it, or is it a different one?

A I see what you meant. It is the same one. I thought you had gone around to the other side and trying to show it to me.

Q No, sir.

A I am sorry.

Q Now, diverting from the diversion and taking your mind back to Dr. Mauchly's visit to Ames in June of 1941, while Dr. Mauchly was there, did he say anything to you about any concept of his own concerning computers?

A I have researched my memory exhaustively. I have stated previously that the only thing that I can remember connected with a digital computing machine on his part -- now, I am using the word "digital" here because you must remember thathe worked on, he did describe to me the elements of his harmonic analyzer and harmonic analyzers and analog machine, but there's a sharp differentiation between an analog machine and a digital machine. The only work that could have any relation at all was a far cry from a digital machine, but the only work that he represented to me that could have any relation to a digital machine was his work involving the use of neon glow lamps. These neon glow lamps somebody had just at that time invented a plug type fuse that had a neon glow lamp in it so that when you screwed it in, when the fuse burned out, why the neon glow lamp would glow.

Now, that was the source -- I remember his describing to me that that was the source of his glow lamp, his neon glow lamp, and he told me that he had been experimenting with them. Beyond that, now, I am telling you that I cannot remember for sure. The evidence yesterday seems to indicate that he told me about that at the time I met him in

Philadelphia. Whether he again repeated those conversations or we had any conversation on this subject at the time he visited me in Ames, I am not sure.

Q Did he say anything further about any concept of his at that time?

A He did not.

Q Pertaining to a computing machine?

A He did not.

Q Did he during the visit to Ames, Iowa, describe to you any work done by him on or with or in connection with cosmic ray counters?

A I should remark that the cosmic ray counters were very much in the literature as of that time, but I remember no conversation between Dr. Mauchly and myself on this subject.

Q Did he tell you at that time in June of 1941 that he had built any kind of a ring counter?

MR. DODDS: Objected to as leading, and again, I have been fairly patient, but there has been a continuous series of leading questions, and I again reserve the right to move to strike testimony from the record which comprise answers to these leading questions.

THE WITNESS: Will you repeat the last question? I cannot answer it without --

MR. HALLADAY: Mr. Sutfin, would you

read the question, please?

(The question was read.)

THE WITNESS: He did not.

BY MR. HALLADAY:

Q Do you now recall so that you can tell us anything further about the discussions that you and Dr. Mauchly had on the subject at hand, of course, while he was in Ames, Iowa, on this occasion in June of 1941?

A Time is requested for reflection.

Q All right.

MR. HALLADAY: Maybe this would be a convenient time to take a recess.

MR. DODDS: It's all right with me.

(Recess taken.)

BY MR. HALLADAY:

Q Dr. Atanasoff, the question about which you asked an opportunity to reflect on simply was intended to be this way: Does anything more now come to your mind pertaining to the discussions which you and Dr. Mauchly had on the occasion of his visit to Ames, Iowa, that you have not in your testimony expressed to us?

A In spite of reflection -- I am sure there were many other matters, but in spite of reflection, I do not have one in hand.

Q Thank you.

MR. HALLADAY: For the record, would you, Mr. Sutfin, mark this as exhibit BB?

(Atanasoff Deposition Exhibit BB marked for identification.)

BY MR. HALLADAY:

Q Dr. Atanasoff, do you observe I have had the reporter mark as Atanasoff Deposition Exhibit BB, the sheets taken from the display board on which you had put your illustration of subtraction at the top and your illustration of division by subtraction, if I may call it that, at the foot underneath the wavy line?

A Yes, I do observe that.

Q Do you have a memory, Dr. Atanasoff -- strike that. I am sorry. I have forgotten something.

You had said earlier in your testimony, I believe, something about Dr. Mauchly asking for a copy or to take a copy with him of your manuscript which we have earlier referred to as Exhibits 455 or 456, at least I think you said something about that. Do you recall having so testified?

A Dr. Mauchly asked me during the time of his visit, Dr. Mauchly requested permission to take a copy of my manuscript with him. I denied this request, and to the best of my knowledge and belief, he did not take a copy away.

Q Does your memory tell you when next after he left Ames, if ever, you saw him again?

A My memory tells me, it's vivid about the occasion, it is slightly vague as to the date, but I was sitting at my desk at the Naval Ordnance Laboratory, and with only the slightest of warning, here came Dr. Mauchly.

W-4-2

Q When you say your desk at the Naval Ordnance Laboratory, where was that desk located?

A That desk was located in a large room, again, full of dirt, in which many men worked and in which there was a great loud continual din, not only of voices but of hammering in building, well, maybe building 184. I will be a little, I will qualify that slightly, building 184 of the gun factory, near the Anacostia River in Washington, D.C.

Q You have heretofore spoken of moving to White Oak. With respect to that, White Oak what?

A Maryland.

Q Approximately when did that move occur, as best you can recall?

A Oh, the move occurred, I believe that the plans had been formulated as early as 1945, and something like 1946 the move was under way, and, of course, it probably was 1947 or '48 before it was entirely completed by the laboratory.

Q Then will you describe for us, please, this next visit of Dr. Mauchly and yourself?

A Well, the way I remember it is that he just appeared. Now, it may have been that I got a very brief call or that my secretary got a brief call stating that he would arrive. I don't remember that call. The impression I have is that here he was, and why he was here and what it was all about, I did not know, because, of course, we were operating under condition

of severe security at the time and he came down with a normal clearance badge, probably confidential in level, and so he was cleared.

Q What took place at that time?

A We sat down and talked and we talked about what I was doing and what he was doing and we talked about computing machines.

Q Give us the conversation as best you can.

A Well, I am not going to be able to do very much for you here. I remember that he said he was working on some kind of a computer for the Army. Now, again, I am a little vague because this was the initial one of a series of visits and I don't know whether it was on this visit or on a subsequent visit that he made this disclosure. It may have been on the first visit, I will put it that way. He knew that my computing machine, or I told him, the discussion spoke of a computing machine on which I had worked, and I said it was back in Ames, and I didn't gain the impression that he was working full time on computer machines or anything of the like. You know, many --at the time, many universities had government projects of various kinds, and my principal memory of the event was my surprise at his arrival.

E-5-1

Q Will you turn to your folder B-10, please and Exhibit 95 therein, a letter from Dr. Mauchly to you of September 30, 1941. Do you have it before you?

A I have it before me.

Q In that letter in the fourth paragraph the following statement is made which I would like you to read with me:

"A number of different ideas has come to me recently anent computing circuits ---- some of which are more or less hybrids combining your methods with other things and some of which are nothing like your machine."

Are you reading with me?

A I am following.

Q "The question in my mind is this: Is there any objection from your point of view to my building some sort of a computer which incorporates some of the features of your machine? For the time being, of course, I shall be lucky to find time and material to do more than merely make exploratory tests of some of my different ideas with the hope of getting something very speedy, not too costly, etc."

The next paragraph:

"Ultimately a second question might come up, of course, and that is in the event that your predesign were to hold the field against all challengers and I got the Moore School interested in having something of

the sort, would the way be open for us to build a 'Atanasoff Calculator' (a la Bush Analyzer) here?"

Have you followed my reading of that excerpt from this?

A I have followed that reading, that is a matter of record in Exhibit 95.

Q In this first meeting with Dr. Mauchly at your desk in the building at the gun factory that you have just been referring to, tell us whether or not anything of like effect or purport was said to you by him on that occasion as this that I have just read from Exhibit 95?

A I remember some general discussions about the computing machines but no such request was made of me at that time to the best of my knowledge and belief.

Q To your best recollection was any request similar to that which I have just referred to made at any later time by Dr. Mauchly to you?

MR. DODDS: Objected to as leading.

THE WITNESS: I am uncertain as to the answer to this.

BY MR. HALLADAY:

Q In the discussion at the gun factory quarters that you have just been testifying about, what is your memory as to what Dr. Mauchly said about the work he was then doing in connection with computing machines or a computer?

3

A He said he was working on a computing machine. He said it was classified and that was that.

Q Did he give you a verbal description of any of the components?

A I would like to ask a question here to refine -- I am not sure as to the question and the implication of the question.

Q You want to ask me a question?

A Am I testifying about the occasion of his first visit?

Q Yes.

A Alone?

Q Yes. Just that?

A All right. Then I am clear. He did not give me a statement of the components.

Q Did he say whether or not -- strike that. Did he describe to you verbally the principles that he was employing or attempting to employ in connection with the computing machine that he was then working on?

A I am uncertain. He may have told me that it was an electronic machine, except for that he did not describe the principles. I am even uncertain of that, but I have some such impression.

Q Did he then state to you the name or names of any persons other than himself who were engaged in that activity?

A On the occasion of his first visit to me?

Q Yes.

A No. The answer is no. To the best of my knowledge and belief the answer is no.

Q Can you now recall anything further about this first discussion that you have not told us?

A He remained with me only a short period of time, perhaps an hour or hour and a half, and then he went away.

Q Do you remember anything more of the discussions during that hour or hour and a half?

A I do not at this moment remember more of the discussions.

Q Were any persons other than the two of you present in company during that hour or hour and a half?

A I may have had the company of Mr. David W. Beecher during that time, during part of that time, not all of it.

Q Do you recall what, if any, conversation he participated in on that occasion?

A This is slightly ludicrous because if you knew Mr. Beecher you knew he didn't participate, he sat there and listened.

Q Do you recall what conversations occurred while he sat there and listened?

A I do not.

Q Do you have a recollection of seeing Dr. Mauchly

again after that?

A I do.

Q Can you tell us where?

A It was certainly in the same room in the gun factory.

Q Can you tell us how long after the first visit the second one occurred?

A Well, I suppose this is going on and on, and I have some impressions of this, and I suppose counsel is within his rights to ask me such questions. I will have to be rather sketchy as to my answers. I would like to testify as follows and see if this satisfies the inquiring mind of counsel. Over the next year or so, he came to my desk in the same building and in the subsequent building in which I worked a number of times, the number of times may have been five. During these visits there was some conversation about computing machines. I have no particular memory or refining information which I can furnish as to the nature of these conversations.

I remember that during at least the first three or four times my curiosity as to the means Dr. Mauchly used for gaining entrance to my desk was ever with me. In other words, I didn't know who was sponsoring him and how he was gaining entrance to the gun factory because it was a place of high security. He was in general cryptic about any activities he was engaged in other than his presence at the gun

factory. He exhibited interest in the work which I was doing and as his visits continued his interest in this work grew. I did not inquire how he managed to get in the gun factory at this time and no one ever told me, to the best of my knowledge an belief at the time, and since that time I have made an exhaustive inquiry to find out how he got in there and I have been -- I have located a number of the parties concerned and I have been unable to -- Ihave been unable to ascertain exactly how he was getting in. It's been of interest to me to know how he was getting in and I still don't know.

EA
5/2

Q What memory do you have as to any discussions in which you and he participated in which the subject of computing machines was brought up?

A We discussed -- we discussed memory and logic.

Q Can you tell us on which number of occasions this was discussed?

A I will not tell you because I do not know.

Q Do you recall whether it was discussed on one or more than one occasion?

A I believe it was discussed on several equations.

Q I think you said equations?

A Several occasions.

Q And can you give us the substance of that discussion?

A I cannot give you the substance of that discussion. I mean my memory does not enable me to give you the substance of that discussion. I have not reflected directly on this point and I -- on a question of this caliber -- and it seems to me as if I would have previously but sometimes counsel surprises me and I am unable to help further.

Q In any of those succeeding discussions what if anything did Dr. Mauchly tell you about what he was doing in the computing machine field?

A I have answered that question on probably two previous statements here. I will answer it again. He told me, to begin with, that the specific machine on which he was

working was classified and there were no details given beyond those that I have mentioned.

Q Do you have Exhibit 95 still before you?

A I do.

Q On any of the succeeding occasions about which you have been testifying, did he make a request to you like or similar to that contained in Exhibit 95?

A I do not remember such a request.

Q Have you ever met a man named J. Presper Eckert?

A I have.

Q What is your recollection of having met him for the first time?

A Well, I was in Building No. 210 in the gun factory in the Navy Yard in Washington, D.C. near the Anacostia River. I do not remember why I did not have a regular office in Building 210 on that occasion, but I was discovered there or perhaps I received a phone call and told to go there. Mr. Eckert and Dr. Mauchly arrived with a messenger because I was not surprised because this was the usual method for introducing visitors without need to know when specific clearance.

Q Can you tell us approximately when this event occurred?

A Oh, goodness, late in the war, perhaps 1944, say in August of 1944.

Q What transpired on that occasion?

A They told me they were interested in computing machines.

Q Will you give us your very best recollection of what the discussion was at that time, please?

A This is the only occasion -- I might remark that this is the only occasion on which I ever met Presper Eckert. They had come to me for something specific. They told me they had in mind to use a mercury delay line for a memory. They had attempted to do this and were having difficulty with this process. They were requesting my assistance in resolving the difficulties thereof. I believe some other -- I believe there were mutual discussions in regard to other forms of memory, but these -- my memory of these other discussions is vague.

Q How long did this discussion last?

A Oh, perhaps an hour and a half, hour, I am not sure.

Q Were any besides the three of you involved in the same?

A No.

Q Was any inquiry made of you at that time by either of them as to the then condition or state of your machine at Ames?

A I believe that there was, that there were words passed on this subject. They were casual words.

Q Did either of them then disclose to you in anything other, further or additional to what had been said to you before about the activities of either in computing machines?

A They told me they were interested in a mercury delay line memory.

Q Was there anything further said on that subject at that time?

A There was a good deal of discussion at that time on the subject of mercury delay line memories.

Q Can you give us a substance of that discussion?

A The subject of discussion was why in the hell -- pardon me -- why they wouldn't work. And I made some remarks on the subject.

Q Can you tell us what those remarks were?

A I remarked that the problem -- the reason that the thing wouldn't work was related to the subject of dispersion.

W-6-1

Q Anything further?

A Well, the question was how to get rid of the dispersion.

Q Yes. Anything more?

A I told him that I thought that there were remedies, partial remedies available for getting rid of the dispersion, that there might be more drastic remedies which could be employed but these were of somewhat doubtful utility. We -- I told him that the dispersion was probably due to the interference of surface waves in the wave planes which traveled down the Mercury delay line -- I am sorry, the interference of the surface waves -- did I say that -- in the plane which traveled down the delay line. I pointed out that for effective operation, not only dispersion would have to be held down, but that the transducers which occupied the position at the end of the delay line would have to be devices capable of introducing a plane wave without distortion into the delay line.

Q When you use the term "plane wave," is it p-l-a-n-e or p-l-a-i-n?

A P-l-a-n-e.

Q What further occurred during this discussion between yourself, Dr. Mauchly and Mr. Eckert at that time?

A There was some discussion about how they would proceed to get me to help them more actively.

Q Anything further?

A I don't remember the exact words or the content of the discussion, but I know that that was the subject that was discussed, and then they went away.

Q Did anything further occur in that connection thereafter?

A As far as I am concerned, nothing further occurred.

Q Did either of them at that time say anything to you about patents?

A The answer is no.

Q After that time, did you see Dr. Mauchly again?

A Well, I'm afraid that the general picture that I have attempted to give you of Dr. Mauchly's visits is incomplete. I did not intend that this should be so. Now, we can do, by the use of records I could do better than I am doing, but what actually happened was roughly this: There was first a period in which Mauchly arrived at my desk three or five times, or however many times at irregular intervals in which I was in doubt as to how in the heck he got there. Towards the end of that period, I didn't quite know what to do with Dr. Mauchly when he came and I introduced him to Dr. Ellingson, a member of my staff who was working on statistics, because I knew that Dr. Mauchly had been active in the field of statistics.

Towards the end of that time, he

commenced to spend more and more time with Dr. Ellingson and less and less with me on those visits.

Now, this resulted in the end to his being employed by the Naval Ordnance Laboratory to work in the field of statistics, and he came and did so work. His work consisted of discussions with Ellingson. This work, the time that he actively worked for us was of short duration, a period of several months, say, two or three times, two or three times -- oh, I don't know, a number of days a month, a number of days a month. He wasn't there only a relatively small fraction of the time. The number of the days of the month I have no memory of, but he was there a small fraction of the time.

Then later after my move to White Oak, he again visited me and the visits of Dr. John W. Mauchly to White Oak amounted to one or two, and at that time there was a further discussion of computing machines.

Q Have you finished the explanation?

A I have finished. I wanted to get a general explanation in to form a basis for further discussion.

Q Thank you. When, with reference to the visit of Dr. Mauchly and Mr. Eckert, did Dr. Mauchly enter into some employment type of relationship with the Naval Ordnance?

A Well, you have got the record, I haven't. I don't know.

Q I am simply asking whether it was before or after?

A I don't know.

Q You have no recollection?

A I have a recollection but it's a vague one and I do not attach certainly to it, and it seems to me that it's undesirable that I voice it.

Q On the occasions when Dr. Mauchly visited you at White Oak, Maryland, can you recall now what was said on the subject of computing machines?

A Everything was said on the subject of computing machine on those occasions, the subject of logic, the subject of-- we were going through our minds on that occasion through the subject of pulse versus static conditions within the logic circuits. You know, it was possible to build logic circuits which consist of individual counting of pulses and it's possible to build other logic circuits which are similar to the one that is close to my hand, in which an equilibrium condition comes to exist, and during the duration of the pulse, a substantial, and I want to be careful, a substantial equilibrium comes to exist during the length of the pulse, and there are perhaps other bases for construction of such elements, and these were discussed.

Q Who, if anyone, besides the two of you was present during these discussions?

A During these discussions there were other people

around who had an interest in the subject, and these would include the following: Shall I list some names?

Q If you would, please?

A I would have to reflect to be absolutely certain, Mr. Robert Elbourne, Mr. Calvin Mooers, Mr. David Bobroff, Dr. A. E. Brandt, Mr. David Beecher, and perhaps others. I perhaps don't think of all of them.

Q One name I missed, and I suspect the reporter did, too, David Bobroff?

A Bobroff.

Q Can you spell it?

A B-o-b-r-o-f-f.

Q At that time, what was your activity at the White Oak facility?

A At that time I was chief of a division of the Research Department. This division had to do with acoustics. It had to do with acoustic phenomena, both in air and in water. It had to do with seismic waves and it had to do with sonic waves. This gives -- of course, this has to do a great deal with electronics. This gives some idea of the activities of the division.

Q When did those visits at White Oak by Dr. Mauchly occur in relation to the work you have heretofore described on the Navy's computer project?

A The occurred during this project.

Q Was that during a period of time when Dr. Mauchly was, to your knowledge, in any employment relationship or its equivalent with the Navy?

A I believe that this occurred, that these visits to White Oak occurred entirely after that period of employment.

Q After the last visit, if I may call it that, the last contact you had with Dr. Mauchly while at White Oak, did you see him again personally at any time before the institution of the lawsuit with respect to which you are testifying?

A I did not.

Q In that interval of time from the last visit until the institution of the lawsuit, did you have any communications to or from Dr. Mauchly by telephone or by writing, by telegraph, or if there is another way or ways, such other way or ways?

A I did not.

MR. HALLADAY: I have no further questions at this time.

6/2/1
WS KL

CROSS-EXAMINATION

BY MR. DODDS:

Q Dr. Atanasoff, as you might expect, I have one or two questions.

I show you what purports to be a letter from Mr. Trexler to you dated February 23, 1943, a document which apparently is not found in your files, and ask if you can identify that as a copy of a letter which you received on or about that time?

MR. HALLADAY: Does it have some exhibit identification on it, Mr. Dodds?

MR. DODDS: Not at this point. This was a document, I might say, which was identified by Mr. Trexler during his deposition in another case.

THE WITNESS: What do you request of me?

BY MR. DODDS:

Q If you can identify this as being a copy of a letter which you received on or about the date it bears?

A I would have to do so by memory and my memory does not suffice for this. I presume I received it.

MR. HALLADAY: Can we have an identification of the case and the exhibit number, the deposition, if any, so we can determine what this is?

MR. DODDS: This is Exhibit PPX-35

identified during the deposition of Mr. Trexler in the case of Sperry-Rand versus Control Data.

MR. HALLADAY: Do you have a further reference to it by court or file number?

MR. DODDS: Civil -- it's in the District Court of Maryland, Civil Action No. 15823.

BY MR. DODDS:

Q I show you what purports to be a reproduction of a carbon copy of another letter from Mr. Trexler to you dated June 29, 1943, and ask if you can identify that document?

MR. HALLADAY: Could we have the exhibit identification, please?

MR. DODDS: In the same case, Exhibit PPX-36.

MR. FALLON: What was the question?

MR. DODDS: I asked him if he can identify this as a copy of a letter which he received from Mr. Trexler on or about the date indicated.

THE WITNESS: It's a reasonable request. The request of counsel is reasonable, of course In this case, I have a little feeling of warmth relative to the statement herein. It seems to me as if I might have received such a letter. I cannot be definite.

BY MR. DODDS:

Q You cannot definitely identify it?

A That's correct. If it were in my files, why, then, I would have a basis -- did you state that that was not in my files?

Q This was not found in your files that you produced here.

A Yes, of course.

Q Or that you showed --

A You know, I must presume in these cases, I must presume that I did receive the letters. I do so presume. I don't know what the correct form of reply to a request of this kind is. If I have any memory, I will state it.

Q Dr. Atanasoff, I show you another reproduction of a letter, a signed letter by yourself to Mr. Trexler dated April 28, 1968 -- did I say 1968?

A You did say '68, sir.

Q I am sorry, April 23, 1968.

A Yes.

Q From yourself to Dr. -- to Mr. Trexler, and ask you if you can identify that document?

MR. HALLADAY: Does that have an exhibit identification?

MR. DODDS: No.

THE WITNESS: This letter I did write. I recognize my signature and I remember the subject matter thereof.

MR. DODDS: I should like to have this marked in evidence as Defendants' pretrial exhibit Number One, and hereafter for brevity, I will merely use the designation DPX-1, the letter identified by the witness.

(Defendants' pretrial exhibit No. 1 marked for identification.)

Are you keeping copies of the exhibits? This is off the record. May we have an agreement that this is off the record?

MR. HALLADAY: Yes.

(Discussion off the record.)

1
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MR. HALLADAY: On the record. Mr. Dodds, while we were off the record, you asked me a question and I responded off the record. Do you want it off the record or on the record?

MR. DODDS: I am --

MR. HALLADAY: You exhibited to the witness two documents, one which you said was dated February 23, 1943, identified as PPX-35 in the deposition of a Mr. Trexler in the case of Sperry-Rand versus Control Data, File No. 15823, if I heard it and marked it down correctly, in the United States District Court for the District of Maryland; and another letter apparently from Mr. Trexler to Dr. Atanasoff of June 29, 1943, marked for identification in, apparently the same case, as PPX-36. I have not seen those documents that you exhibited to the witness and therefore have no further comment thereon except to ask you to give me copies of same . Since you exhibited them to the witness I think I am entitled to see them and to have a copy.

MR. DODDS: Since you decline to stipulate their authenticity and therefore it will be necessary to subpoena Mr. Trexler, I think appropriate time to distribute copies is when we ask Mr. Trexler to identify them.

MR. HALLADAY: In effect you ask me to stipulate to something which you showed one of to me and that's where it stopped so I have nothing to consider.

BY MR. DODDS:

Q Dr. Atanasoff, would you refer to your folder D-2, document 530, please?

A 530, is that the correct number, 530?

Q Just a minute. I don't find it in my folder D-2, a letter dated June 24, 1954, from Mr. Etienne to yourself.

A What is the date?

Q June 21, 1954?

A I have the letter.

Q Is it 530, is that the number, is that correct?

A It seems to be 530.

Q Yes.

A I am not sure I heard you correctly. I was asking.

Q The index indicates that letter is in that folder but it doesn't seem to be in my folder at the moment. You notice that that letter refers to a number of patents which Mr. Etienne says he is enclosing to you?

A Yes.

Q Did you receive those patents?

A I certainly received the letter and as to the patents

a search of my files fails to disclose a copy of 827, so I must presume I did not receive it.

Q You have no affirmative recollection that you did not receive it?

A I certainly do not because I only have the failure - I did not read that at that time -- I may have received it, but my habits of management of material which I receive are such that that should have been in my files and it's not in my files. I have not -- I have sought for the patent ending in digits 827, I have not sought in my files for the other two patents so I am not sure. I cannot speak as to them.

Q May I see that a second? The first paragraph of the letter expresses, "An appreciation for your courtesy in talking to me," I am quoting, "in talking to me extensively last Tuesday afternoon." Could you tell us of the circumstances of that visit?

A I received a communication from someone and I suppose it was Mr. Etienne stating he desired a conference with me. He arrived at my office which was then at the -- I was then operating a company which I had formed which had the name Ordnance Engineering Corporation. It was located in Rockville, Maryland, on the property adjacent to a -- I don't remember the exact address -- but it was on a property adjacent to a ready-mix concrete plant. He entered my office which was in the left rear of the building and sat

upon a red leather sofa which I had situate there. He discussed the subject of the then state of the patent situation relative to computing machines. He made certain statements to me relative to the work which I had done. As I remember it, the basis for this discussion was conversations that he previously had with Mr. Clifford Berry. He did not state the subject matter of any patent then issued or in progress, but he did discuss the relationships of the work I had done.

Q Relationships to what?

A To the general patent situation.

Q Was there any discussion of the 827 patent?

A There was no discussion of the 827 patent at that time.

Q The patent number was not even mentioned?

A To the best of my knowledge and belief, I have no memory of it. I believe it was not.

Q You notice Mr. Etienne states in his letter, "In accordance with my statement at that time," meaning the time of the visit, "I am enclosing for your files copies of a number of patents," including the 827 patent?

A I believe he did say he was going to send me some patents and he did. I have no further memory that I can give you on that matter.

Q Did you say Mr. Etienne initiated this visit?

A He did. Yes, sir.

Q And was anything else discussed other than what you have just related during Mr. Etienne's visit?

A You mean whether other subjects of discussion, is that your point?

Q Yes.

A Mr. Dodds, apparently there was another subject for discussion.

Q I am only interested in discussions relative to computers, of course.

A Quite correct, and I am trying to follow. I am, of course, trying to follow it as best I can. There was a discussion that I should join International Business Machines, support a suit by International Business Machines against somebody. Now, the somebody was -- had a name Rand connected with it, so it was then -- Sperry-Rand -- I think probably a predecessor of Sperry-Rand, that I should join them in a suit against Sperry-Rand or a predecessor thereof.

Q That was supposedly Remington Rand?

A It might have been Remington Rand, I am not sure.

Q How long did this discussion last?

A I would say that it lasted for an hour or so.

Q And in what manner did Mr. Etienne suggest that you "join" with IBM in contesting certain patent rights?

A My memory, for the sake of the record I will here state that my memory of the form of the questioning was such that I gather that these patents which were to be contested were still in the office. I do not know for sure that this was it, but this was the impression I got from his discussion. The manner -- I will continue -- the manner in which he asked that I should cooperate with IBM was in opening my files to access by IBM and by giving evidence thereto.

E-7-2

Q Was there any discussion at that time about the ENIAC patent or patent application?

A I gained the impression, I don't know whether the word ENIAC was used, my memory does not suffice -- I gained the impression there were several patents which would be the subject of such litigation, more than one. I can't say several but more than one.

Q Were there in general patents of -- patents or patent applications in the names of Dr. Mauchly or Mr. Eckert or both?

A I believe that those names came into it, but I wasn't at all sure from the subject of that discussion that they were restricted to those names.

Q Did you have any subsequent discussions with Mr. Etienne?

A I have before me a letter which was written to me by Mr. Etienne.

Q The letter of June 21, 1954?

A Yes, sir.

Q Were there any subsequent discussions or correspondence with Mr. Etienne?

A After receiving the letter of June 21, 1954, all communications between me and the International Business Machines suddenly ceased.

Q I notice in Mr. Etienne's letter a statement,

"You will try to go through your documents with regard to your computer and that if you find any documents such as a draft of the patent applications which is directly in point with regard to the regenerative condenser feature, you will then consider whether you will turn a copy of this material over to us for our study enabling us to come to some kind of determination as to whether we shall proceed further." Did you in fact go through your documents and supply any copies of any of them to Mr. Etienne?

MR. HALLADAY: That is objected to as a double question.

MR. DODDS: All right. I will rephrase it.

BY MR. DODDS:

Q Did you at the time review your documents relating to your computing machine?

A I did not, and I will add one item of information if permitted as to the situation I was then in.

Q You may, if you will?

A At the time of Mr. Etienne's visit, I remember that I told him that I was in dire straits as to my -- the use of my personal time. I had the Ordnance Engineering Corporation on my hands, and I had invested in the Ordnance Engineering Corporation all of the wealth I then possessed and it was a matter of principle concerns me how that organization progressed.

I explained this to Mr. Etienne. I said it would be hard and it will take me some time before I am able to transmit such information. That was the basis on which the subject was left. This was more or less a courtesy letter in regard to that visit. When I received no further visits and no further communications from Mr. Etienne, I gathered that he had no further interest.

Q Did you in fact send any documents to Mr. Etienne or to any other representative of IBM on or about this period in 1954 or later?

A I did not.

Q I notice the third paragraph of this letter in question, Exhibit 530, refers to the documents directly in point with regard to the regenerative condenser feature, you see that language?

A I see that. Yes.

Q Do you know whether or not this regenerative feature had any relation to the 827 patent?

A At that moment I had no knowledge, no such knowledge.

Q You know that now?

A I, of course, know that now because, well --

Q I would like you to tell me just in a little more detail what Mr. Etienne told you during this visit?

A He told me that he had been in communication with Clifford Berry. He stated that he felt that the development work with which I had been concerned at Iowa State College

had relevance to the patent situation. He stated that I had certain elements in that work which were then of current interest in computing machines. These subject matter I will try to recall. One of them I remember was the regenerative memory, one is the base two, use of the base two number system; one was sequential calculation, and now I hesitate because I don't remember.

Q Do you recall anything else that Mr. Etienne told you?

A I do not believe that I can recall without a leading question. I seem not to recall anything else.

Q Did you have any correspondence, any discussion or correspondence with Mr. Etienne or any representative of IBM after his visit to you and prior to this letter of June 21, 1954?

A I did not.

Q Did Mr. Etienne indicate to you at that time the character of the defense which they proposed, which IBM proposed to interpose to the Eckert and Mauchly patents?

A Well, I am uncertain as to the question, as to the meaning of the question. As far as I am concerned --

Q Well, let me ask you --

A -- I will --

Q I can be more specific.

A Good.

Q Did he suggest during this meeting that your work on your computing machine at Iowa State College might represent a prior invention of someone other than Eckert and Mauchly that would invalidate the Eckert and Mauchly patents?

A Words of this general character were passed.

Q Did he say anything to you about whether or not your work at the Iowa State College, on your computing machine, might have represented a -- cancel represented-- might have constituted you a joint inventor of any patents which might issue on the Eckert and Mauchly patent applications?

A He made no such representations.

8 - 1
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Q Will you refer to your folder B-6 and documents numbered 58 to 60.

MR. HALLADAY: D for Dog or B for bravo?

MR. DODDS: B for boy.

MR. HALLADAY: Thank you.

BY MR. DODDS:

Q Before we come to that, just one other question. Did Mr. Etienne suggest to you as one of the possible defenses to the Eckert and Mauchly, the patents issuing on the Eckert and Mauchly applications or the Eckert and Mauchly patents which may have issued, the question of fraud on the patent office in the procurement of those patents, or patent applications?

A Well, fraud in the patent office is a technical word.

Q Just a minute. Did he discuss with you as a possible defense, either in those words or in other words of the same import, same or similar import?

A I would say that there were such implications in his remarks. That's my best memory.

Q Now, referring to the folder before you and to documents 58, 59 and 60, a letter from yourself to Miss Dawn Henry which you have previously identified, and in the

paragraph commencing at the bottom of page two, if you will read that.

A I will.

Q Have you read that?

A I have.

Q You indicated at that time, I believe this indicates, in the following paragraph that you did not support an effort in this direction, and "in this direction" I see by referring back to the preceding paragraph, "If your records are good enough we (IBM) will break the Mauchly-Eckert patents."

I gather from that that you then were not interested in breaking the Eckert-Mauchly patents, is that correct?

A Will you give me the paragraph to which you referred again?

Q I am referring to the paragraph beginning at the bottom of page two, and the first sentence of the succeeding paragraph.

A Yes. I have read it now.

MR. DODDS: Would you repeat the question, Mr. Reporter?

(The question was read.)

THE WITNESS: I am trying to think of my attitude at the time. I refer to the remarks (b) and (c) in the next paragraph of that letter as a partial

3

answer to my state of mind.

BY MR. DODDS:

Q Well, let me put it simply. Do you believe that the statements in the first full paragraph on page three of this letter, Exhibit 58-60, by reference to the immediately preceding paragraph correctly expressed your then state of mind?

A Will you give me the exact reference which you state and wish me to verify represented my then state of mind?

Q As I understand it --

A Will you read it to me? Just read it to me and I will answer if I can.

Q All right. Do you want me to reread both of these paragraphs?

A Well, just tell me which paragraphs, because I am a little --

Q It's paragraph beginning at the bottom of page two.

A Right.

Q Which describes the letter and visit from Mr. Etienne. Then the first full paragraph on page three indicates what I interpret as your attitude to the request of Mr. Etienne, and I just ask, does that first full paragraph on page three correctly express your state of mind as of the time of Mr. Etienne's visit in 1954?

A All right. Let me think carefully, now that I understand your question. My then state of mind included (a), (b) and (c). It also included another matter which concerned me. I had only gotten the very vaguest statement from International Business Machines Company as to what they wanted to do. I knew that if they intended to make such an effort, I would receive a more direct statement from them. I did not receive such a direct statement from them. If you take (a), (b) and (c) and my remarks as of the present moment, they express my then state of mind.

Q Thank you. I gather that at the present time you are interested in breaking the Eckert-Mauchly patents, is that correct? I am using the language quoting from Mr. Etienne's letter.

A That has technical implications. I have some interests in that general area but whether they are correctly expressed by your remark, I cannot tell.

Q All right. Well then, will you tell me just what are your interests at the present time with respect to the Eckert and Mauchly patents?

A My interests are expressed legally, I believe, and they are a matter of record.

Q Well, I'd like to have it on this record. I believe there is nothing in this record as to what your interests are or may be.

A I have assigned certain rights which I contemplate that I have in this matter to Iowa State University, and Iowa State University has taken certain legal steps regarding the same.

Q We will come to that a little later. Is that the extent of your interests with respect to the Eckert and Mauchly patents at present as indicated by the legal action taken in the case of Sperry-Rand versus Control Data, Civil Action 15823?

A You are asking -- Are you asking me what legal action I contemplate?

Q No. I asked you if you have any interest other than that expressed in the legal action which has been taken?

A Well, I have other interests, yes.

Q What are those other interests?

A The other interest is that the truth in regard to these matters be known.

Q And is that the only other interest?

A I am not sure. I may have within my mind other interests. I am not exactly and overtly aware of those other interests at the present moment. I will be glad to express them if you will give me time to reflect my entire feeling in the matter. I did not expect a question of exactly this tenor and am unable to formulate it simply in the form that you require.

Q Let me ask you a simple question. Do you have any interest in securing a judicial holding of the invalidity of the Eckert and Mauchly patents involved in this case or in the Control Data case?

A I request permission to discuss this question with counsel before answering.

MR. FALLON: For the record, Mr. Dodds, I was about to inquire of you what you mean by interest. Legally speaking, we are talking ordinarily about a financial interest. I think the record has been made clear that Dr. Atanasoff has been retained by Minneapolis Honeywell. Now, that was right at the very beginning of this deposition. If that's the kind of thing that you are going to go into or you want an expression on, certainly he is free to give it, but interests, to my way of thinking, is ambiguous and unless you redefine your terms, I don't think the witness can answer it.

BY MR. DODDS:

Q All right. I will rephrase my question. Is it your purpose to attempt to obtain a judicial holding of the invalidity of the Eckert and Mauchly patents involved in this action or in the Control Data action?

A It is my present purpose that in one way or another the present patent holdings by Sperry-Rand derived from

Eckert and Mauchly will come apart at the seams and be held, and these rights will come to be held in a different way than they are now held.

Q What do you mean by coming apart at the seams? you mean to be held invalid or unenforceable?

A I didn't say that and I didn't mean that --

Q I am asking you --

A I didn't mean that, sir. I meant that the exact holdings of parties thereto will be different in the future than they are in the past.

Q And I come again to the question, is it your purpose or objective or view that this coming apart at the seams will include a holding of the invalidity of these patents in question?

A I request permission to discuss this exact question with counsel, because I do not understand it.

Q Well, what don't you understand about it, Dr. Atanasoff? It seems to me the question is very simple. The question is, are you seeking directly or indirectly in this action or in the Control Data action to have the Eckert and Mauchly patents declared invalid?

MR. FALLON: I think the question is improper because Dr. Atanasoff is not seeking anything. He is not a party to the action. The question

involves a legal consideration talking about invalidity. It assumes there has been some discussions, decisions or something like that. I think he can answer the question if he chooses, but I don't thinkthe question is going to yield any worthwhile facts for this litigation.

MR. DODDS: Mr. Fallon, are you instructing the witness not to answer the question?

MR. FALLON: I am not instructing him not to answer. He has said before, and this is our position, that the important thing he wants to get out is the truth of the matter and let the chips fall where they may. That's my expression, but he said --

MR. DODDS: I'm not asking you, Mr. Fallon. I am asking Dr. Atanasoff what his views are.

MR. FALLON: All right.

BY MR. DODDS:

Q Will you please answer the question, Dr. Atanasoff?

A If you will repeat the question, please.

MR. DODDS: Mr. Reporter, would you repeat the question?

(The question was read.)

THE WITNESS: I have no action before any court in regard to this matter.

9

BY MR. DODDS:

Q That is not a responsive answer. Will you please answer the question?

A Do you wish to know what my desires in the matter are?

Q Yes.

A What my desires are? If I tell you what my desires are, will this suffice?

Q Yes.

A I desire that there be a rearrangement of the manner in which the patent rights which at the moment bear the rights, bear the name of Mauchly and Eckert are held.

Q That is not responsive, Dr. Atanasoff. I asked you what your --

A That is my desire.

Q That is not responsive to the question. What are your desires with respect to the holding of the validity or invalidity of the Eckert and Mauchly patents involved in this action and in the Control Data action?

MR. FALLON: I think the witness is entitled to counsel on this matter, because to my way of thinking, the use of the terms validity and invalidity are legal expressions, and he is entitled to the benefit of my counsel relative to the meanings of these terms, so with that thought --

MR. DODDS: In that case, I would suggest we defer this question and we will come back to it, and we can go on. You can consider it at the lunch hour --

MR. FALLON: Fine.

MR. DODDS: And what I am interested in is the validity or the "breaking of the Eckert and Mauchly patents" as used in Mr. Etienne's letter -- in Dr. Atanasoff's letter to Miss Dawn. Now, he had something in mind.

THE WITNESS: You know, my words there, I was quoting International Business Machines, Mr. Etienne, I was not quoting any expression of myself. I was merely reporting --

BY MR. DODDS:

Q Yes, that's right, but apparently you understood it because then you expressed your views with respect to it. And what I want to know is your views now with respect to that same suggestion.

A I still eschew litigation. That does not make you happy. I still do not like living in the past, but that does not make you happy. I do not have my hands as full as I did then.

Q These are the reasons why you did not propose to

participate in breaking the Eckert and Mauchly patents in 1954?

A Right.

Q My question is, are you, at the present are you interested in, is it your objective, is it your purpose or is it your desire to break the Eckert and Mauchly patents as that term is used?

A Will you define the word "break"?

Q I am using it in the same sense that it was used in Mr. Etienne's letter to you which apparently you understood because you gave your reasons for not complying with his request to break the patents.

A Mr. Dodds, I submit that at the time I was speaking open language. I am now before a Court of law and I will know the legal meaning of the words which I use now or I will not use them, and I do not know the legal meaning of the word "break."

E-9-1

Q I indicated you may discuss this with your counsel. I was just clarifying what I had in mind as to the sort of answer I wanted. So then we will just go on to the next subject.

MR. DODDS: Since we are changing subjects, perhaps this is a good time to adjourn for lunch, shall we? What time would you care to return?

MR. HALLADAY: Would 1:30 be agreeable to all?

MR. DODDS: Yes.

(Whereupon a recess was taken until 1:30 o'clock P.M., December 4, 1968.)

E-9-2

December 4, 1968,
1:30 o'clock P.M.

(Appearance as heretofore noted.)

Whereupon,

DR. JOHN V. ATANASOFF,

a witness having been previously sworn, was examined and testified further as follows:

CROSS-EXAMINATION (CONTINUED)

MR. HALLADAY: I guess we are on the record.

MR. FALLON: Mr. Dodds, we want to thank you for the opportunity of discussing your question over the noon hour, and I think that Dr. Atanasoff is now in a position to tell you of his desires in this litigation.

MR. HALLADAY: May it be stated for the record that that discussion was one in which counsel for Honeywell did not participate in any way.

MR. FALLON: Absolutely correct.

MR. DODDS: All right.

MR. FALLON: J.V.?

THE WITNESS: I have had a chance for reflection and counsel, and I must now phrase my legal language -- my legal activities into common language for you. My first desire -- I have several desires -- the first desire is as follows: That this

patent be held valid, but that I be called a co-inventor thereof.

My second desire is in case this fails, that this patent be declared invalid, and overall, I have the desire that the facts thereof become known.

BY MR. DODDS:

Q Thank you, Doctor. About when did you arrive at the formulation of your desires which you have just expressed?

A Is this with special relevance to the first desire?

Q If different desires came at different times then I would like the time of each?

A Well, that's pretty easy. Until roughly a year and a half ago, let's see, a year ago last May, to be more specific, the matter was far from my mind, and there were no desires relative to the matter therein. At that time it was brought to my attention, some of the facts hereof, were brought to my attention, first by counsel for Control Data and afterwards by counsel for other firms in the United States. As a consequence of this information, of the information I was given at this time, I came to realize that I had desires.

At first my -- the desire that I stated first did not exist because I, my concept was that it had no legal, no possibility of legal fruition, and I was associated

3

with respected and learned counsel of many corporations. As a result of this association, gradually there evolved in my mind a feeling that there might be -- that my first desire might possibly come to fruition, and I commenced to formulate it in my mind. That perhaps gives a summary of my position.

Q And when did you formulate the desire that in the event the first desire should not be fulfilled, that you would like then to see the Eckert and Mauchly patents declared invalid

A About a year ago.

Q You mentioned that you, that counsel, I believe for Honeywell and counsel for other firms, had called to your attention certain facts. Counsel for what other firms, Doctor?

A Counsel for Control Data, counsel for Honeywell, and in those initial days particularly counsel for General Electric.

Q And what facts did they call to your attention which led you to formulate that desire?

A Well, what they did was to sit down with me and read me the respective patents.

Q They certainly --

A The claims in the respective patents.

Q And they certainly said more than that, than just read you the claims, what else did they tell you?

A Not much else. I mean as far as I am concerned, as far as relevance to the question you asked, not much else,

4

no.

Q You mean the only facts that they related to you which enabled you to formulate this desire to be declared a joint inventor was the reading of claims of certain of the patents?

A Oh, now -- now, that -- that was initial information on the case.

Q Yes.

A Then as a consequence, you know, here I am associated with all this learned counsel, Mr. Dodds, and you know they are picking my mind. Now, they are picking my mind to beat the band, and there is no question about it; but, Mr. Dodds, to a much lesser degree, but inevitably I am picking their minds.

Q And so what did you pick from their minds? What facts did you pick from their minds?

A Well, I had a very learned discussion by a learned member of a legal counsel involved in this case on the subject of -- you know, I hate to quote legal terms, but misjoinder and nonjoinder. I don't know much about what these words mean, although I have read the patent code on the subject.

I took pains as a consequence of this exposition by learned counsel to read the code and to study it and to study -- to commence to pick up information.

Q Was that Mr. Allegretti or Mr. Halladay?

A It was neither one.

Q You said counsel for this corporation, as I

understand it?

A I said counsel in this case. I said counsel in this case.

Q What other counsel are there in this case?

A I am speaking of counsel for the defense in this case.

Q Well, I am counsel for the defense.

A You are the man.

Q And what facts did I give you that led you to believe that there might be a misjoinder or nonjoinder of inventors?

A Well, you were sitting at my luncheon table, and I suppose you had come to my place to visit with me and you had brought Dr. Mauchly with you or he brought you, I am not quite sure what happened on that occasion, and it is exactly what happened, I am sorry to tell you, and you can pursue the matter but we will go into details as I can, but if you insist --

Q I would like you to go into details, yes, just what I did tell you at that time that gave you this idea?

A Well, it never occurred to me until that luncheon.

Q What did I tell you?

A You gave me a nice exposition of the power of correction of the named patentees of an invention. Do you remember that occasion? Pardon me. I am not supposed to ask you questions. Strike.

6

Q I do remember a discussion on questions of patent law. I don't actually recall a discussion on that particular point, but it could well have been.

A It happened, sir.

Q You mentioned you had consulted with counsel of many corporations. You mentioned Honeywell and Control Data and General Electric, were there any others?

A I believe not. I believe that was a mis-statement, I used the term falsely or erroneously there.

Q Now, coming back to the visit of Mr. Etienne, and you testified, I believe that he raised an implication of fraud?

A Who? Who?

Q Mr. Etienne?

A Mr. Etienne, yes.

Q Do you remember what the substance of his conversation was?

A Well, you know, I wish I could just pull out of my memory his exact words. I am sorry, but I cannot. But I have the impression as to what went on at that time and with the understanding it's an impression and a memory of substance but not of words, why I will attempt to give you that information.

W-10

Q If you would, please.

A Mr. Etienne suggested that there might be occasions on which the statements contained in the preamble of the patents issued to Eckert and Mauchly were not exactly true.

Q Anything further?

A That's the substance of it. I can't think how to create the impression more exactly in your mind.

Q Did he give any impression that those allegedly untrue statements were made knowingly and deliberately and knowing them to be false or untrue?

A I gathered that was his intent. I again am speaking of it as a matter of substance, not of words.

Q Now, if he made that statement, it must have been with respect to the 827 patent, was it not?

A I have no such memory.

Q Well, you know, do you not, that the ENIAC patent had not issued as of the time of Mr. Etienne's visit?

A I know that now, yes.

Q Well, at the time of his visit, did you get any intimation as to which one or ones of the Eckert and Mauchly patents or patent applications Mr. Etienne had reference?

A Mr. Etienne, you know -- I should state that I didn't really know how to take Mr. Etienne completely. He came to me with these proposals as I have stated. Now, I did not -- I believe he did not name the patents, but if he did name them,

I have no memory thereof. I am, as a matter of present information, I am informed that he had been in an interference relative -- that he had been engaged in an interference proceeding with respect to other patents than the one at that time, and, of course, he had talked to Clifford Berry, and this is the total of my knowledge of his knowledge.

Q Well, since his visit was in 1954 and he made reference to a statement in the preamble of the patent, he must have referred, must he not, to the 827 patent which had issued in 1953?

MR. HALLADAY: Objected to as argumentative.

BY MR. DODDS:

Q You may answer.

A Well, if you can see that, I can't. I don't draw that deduction in my own mind, so I cannot say yes.

Q You have no recollection whatever as to which if any of the Eckert and Mauchly patents or patent applications Mr. Etienne was referring when he raised the implication of fraud?

A I am sorry I used the word fraud, because it carries such a violent connotation, but I did use it and I used it with that in mind, perhaps not in a strictly correct legal sense, but this was the impression he gave me and I have used the word and I will stand by it. Now, I have so previously

that I have no knowledge as to which of those patents or whether he was talking about all of them. I do not know.

Q Do you recall what statements, and I am speaking now of what substance of the statements he indicated were in his opinion untrue?

A Well, I gained it was the oath in regard to originality of invention.

Q An oath --

A Yes, an oath regarding the originality of invention, but I got that impression. Whether he told me that or whether that was just my own derivation from what he told me, I don't know.

Q You stated, I believe, that Mr. Etienne had suggested that the work which you did on your computer at Iowa State College may have constituted you a prior inventor, is that correct? I think that was your testimony this morning. I don't have the transcript.

A I believe that's the words that are properly applied to that situation.

Q And do you recall of what part or feature of the computer he applied that language to?

A You understand, I should point out to you that my discussion with Etienne was of a peculiar type. It was, in the first place, only of an hour duration, and during an hour after you get introduced and get through with the

pleasantries, there isn't too much time left. We went into no legal aspects, and if we had gone into legal aspects, I would not have understood them, probably. There was no legal argumentation used at that time. He recounted the list which I employed in writing the Henry letter, and I remembered those from that occasion. Beyond that, I cannot go.

Q Well,do you have any recollection as to what he thought you were the prior inventor of?

A Well, I will read you the list from the Dawn Henry letter, magnetic memory, regenerative memory, the advantages of the binary number system in electronic computing, sequential processing, and so forth.

Now, I racked my memory at that time and that is the best I have.

MR. HALLADAY: Is that from page 3 of 58, 59 and 60?

THE WITNESS: Yes, it's at the top of page 3, number 60.

BY MR. DODDS:

Q And do you believe that you are, in fact, the originator of these features of the computer which you have enumerated at the top of page 3 of your letter to Miss Henry, Exhibit 58-60?

A Well, now, I will qualify the first one. When I say

magnetic memory, I do not mean magnetic core memory. I mean magnetic drum memory, and I am not speaking of the term inventor in any legal sense. I am speaking about, I am speaking only in terms and I wish to speak only in terms and can only answer in terms of the common usage of the term, namely, that I came across these ideas independently and it's the object of the Courts of the United States to decide who is the true and original inventor, and I cannot attempt to influence that decision.

Now, as in regard to these, in my original conception of these, the answer is yes.

Q Now, if we may turn to another subject. A quantity of internal correspondence among personnel of IBM was made available to counsel for plaintiff and counsel for defendant in this action. I'd like you to just look at these initially and ask you whether you have ever seen them before. The first is a letter or memorandum dated February 12, 1940, from Shoemaker to Packard.

MR. HALLADAY: Will you spell those for us, please, Mr. Dodds?

MR. DODDS: S-h-o-e-m-a-k-e-r; Packard, P-a-c-k-a-r-d.

THE WITNESS: In regard to this letter --

MR. FALLON: What was the question?

BY MR. DODDS:

Q The question is, have you ever seen it before?

A I did not see it anywheres near the date hereof. I may have seen it since that day. I remember having seen one or two letters in the hands of counsel,and which counsel I do not know. I am sorry, I just don't happen to remember along this general line.

Q Was it since the commencement of this lawsuit?

A What?

Q Was it since the commencement of this lawsuit?

A It was. If I saw it, it's since the commencement of this lawsuit.

Q Well, perhaps to save time, there are a group of these documents which I will just identify for the record, and if you will just look through them collectively, the same question, have you ever seen them before, and I mean before, before the commencement of this lawsuit?

A Right. All right.

Q The next is a memorandum from Ehret to Willson, dated February 20, 1940.

MR. HALLADAY: E-h-r-e-t?

MR. DODDS: E-h-r-e-t, yes.

THE WITNESS: I knew Mr. Ehret at the time. I have not seen this letter.

BY MR. DODDS:

Q Either before or after the commencement of this suit?

A Before the commencement of this suit and since the commencement of this suit, I'd say I saw two or three letters involving Ehret, and maybe the man out yonder. I have some letters in my files from Ehret, and, of course, I saw all of those, but I don't believe this came from my file.

Q You do not recognize it?

A I do not remember seeing this document.

Q The next is a memorandum dated February 26, 1940, from Willson to Ehret, the same question.

A The answer is no.

Q To both before or after the commencement of this suit, to the best of your recollection?

A I saw two or three letters since that time, and it may have been one of them. If it was, it concerned me little and I formed no register of this fact.

Q The next is a letter dated March 6, 1940, from Ehret to Packard.

MR. HALLADAY: What was the date?

THE REPORTER: March 6, 1940.

THE WITNESS: I did not see this letter at the time. I believe I have seen it since the inception of this suit.

BY MR. DODDS:

Q The next is a letter dated March 6, 1940, from Ehret to a name which I cannot decipher, D D something, manager.

A I have seen this since the inception of this suit.

Q But not before?

A But not before.

Q The next is a memorandum dated March 6, 1940, from Ehret to Armstrong.

MR. HALLADAY: What is the question?

THE WITNESS: Have I seen it --

BY MR. DODDS:

Q Have you seen it --

A -- before, I have not seen it before the inception of this suit. I am uncertain as to my having seen it since the inception of this suit.

Q Lastly, is a memorandum with the date which is rather illegible in the lower left-hand corner of page 1 and a signature, a typed conclusion which is also illegible, and it starts out, "Professor J. V. Atanasoff called on Tuesday, April 30th."

I ask the same question.

MR. HALLADAY: The date was illegible, if I understood him, but he did quote something about Tuesday, April 30th.

MR. DODDS: What year, I don't know.

THE WITNESS: I am having a little trouble.

MR. HALLADAY: He didn't say from whom to whom.

MR. DODDS: I don't know.

MR. HALLADAY: If he did, I didn't hear it. The question is, has he ever seen this document before?

EA#11
KL-1

MR. DODDS: Same question.

THE WITNESS: I have not seen this document to the best of my knowledge and belief.

BY MR. DODDS:

Q Now, in these documents, I will give them to you if you wish, there is a reference to a Mr. Manieri, a student engineer in the IBM Des Moines office that made a visit to you at Ames, Iowa. Do you recall any such visit?

A Yes, very vaguely, but I recall such a visit and the name seems familiar in my memory.

Q Can you tell me what happened at that visit?

A My rather vague memory of this occasion is that the man visited me and wanted to see the computing machine; that Mr. Berry showed him the computing machine and let him take a look at it and admire the great array of vacuum tubes and other appurtenances thereto and then he went away.

Q Do you know whether or not Mr. Manieri was shown the operation of the computing machine?

A To the best of my knowledge and belief not, and he certainly was given no details of the machine. That was our current policy and I seem to remember that and recall Mr. Manieri.

Q Do you know whether or not he saw a copy of the, "Manuscript"?

A He did not. He did not.

Q Would you refer to your folder D-2, Exhibit 308.

MR. DODDS: Excuse me, off the record.

(Discussion off the record.)

BY MR. DODDS:

Q I believe this is a copy of, a carbon copy of a letter which you have previously identified.

A All right.

Q In the second paragraph you refer to, you make the statement, "My present development does pertain to my previous ideas but goes much further," and this is as of April 6, 1940. To what previous ideas were you referring at that time?

A To my previous attempts which I believe I must have informed Mr. Ehret, but at any rate what I was referring to, previous attempts to use IBM tabulators for the solution of simultaneous linear equations, solution of simultaneous linear equations. There are some items in the files here relative to that subject.

Q Did it include also the, what you have termed the prototype of your computing machine?

A Not at all.

Q This same sentence says that your present development goes much further. Now, what were you referring to by that statement of going much further?

A The developments which I have been testifying about

concerning which I have been testifying here and that was my interpretation of their relations to the previous efforts.

Q Would you refer to your folder B-12 and Exhibit 104. And if you will refer to the paragraph beginning at the bottom of the first page, if you will read that paragraph it refers to a direct approach by patent counsel of IBM?

A Yes.

Q Is this approach the same as the visit by Mr. Etienne about which you previously testified?

A This is the only such visit that occurred and it was concerning the same one.

Q And you will notice that this paragraph refers to the proposal of IBM to bring suit to invalidate the Mauchly and Eckert patents, do you see that language?

A I do.

Q And that therefore must have referred to a proposal made by Mr. Etienne during his visit to you in 1954?

A Yes. He used words, perhaps he said break, perhaps he said invalidate. I don't know what word he used, but this is what I thought was the substance of his remarks, and I believe that was the substance of his remarks, and I believe that was the subject of his visit as we have recalled.

Q You will notice the same paragraph refers to the basis for the proposal to invalidate the patents was, "On the ground that their oath of originality was false," that is in

accordance, I believe, with your previous testimony, was it not?

A It is in accordance with my previous testimony as I understand it.

Q Dr. Atanasoff, would you tell us, relate any and all contacts you have had with IBM or any representative of IBM after Mr. Etienne's visit in 1954?

MR. FALLON: Clarification here, Mr. Dodds. I believe the witness has been interpreting these in the context of computing machines rather than some business he may have had as vice-president of Aero Jet General and buying equipment.

MR. DODDS: That may be understood. Yes. Thank you.

THE WITNESS: Will you repeat your question, please, Mr. Dodds, so I could be sure I can answer it quite concisely?

BY MR. DODDS:

Q Yes. Will you relate any and all contacts by way of conference, discussions or otherwise with IBM or any of its representatives relating to computers following the visit of Mr. Etienne in 1954?

A I believe there are none.

Q I believe you testified that you have beeen employed

as a consultant or some similar capacity by counsel for Honeywell in this case, is that correct?

A I have so testified.

Q And will you describe the circumstances under which that employment was initiated?

A I was entertaining three members of the patent counsel relative to the field of computing machines from General Electric Company at my home. They expressed to me that counsel for Honeywell would have a desire to have relations with me. I raised the question -- I asked the following question: Should I contact them? They said no, we will contact them. They evidently did because subsequently the counsel of Honeywell contacted me by telephone, I believe.

Q When was this discussion you had with the counsel for General Electric Company, approximately?

A Oh, well, it wasn't last summer, it was the summer before, the summer before last. During the summer probably in June or July of, let's see this summer, the past summer is '68 -- '67, summer of '67.

Q Could it have been 1966?

A Goodness knows. Let's see. I haven't gone that far wrong. I returned from Mexico and then I was contacted and then that -- now, let's see, that was not this past summer unless my memory is playing a peculiar kind of trick

on me it could not have. If you desire I can give you the exact date by referring to files but I don't think so. I am sure it was '67, practically speaking. Let's see now, '67, we just passed the summer of '68 -- no, it was in the summer of '67. It was in the summer of '67, Mr. Dodds.

Q Well, I think you testified that you had been working on this assignment from Honeywell for 17 or 18 months?

A Yes. Well, all right.

Q That would have been prior to the summer of '67, would it not?

A Would it? Let's see, that is 16 months anyway I've been working on it with them. I didn't mean this was a precise estimate, and it was, I came into relation with them towards the end of the summer and we are now at December. We are now in December. I think that's reasonable cooperation.

Q Do you know whether or not this lawsuit had been initiated at the time that you were retained as a consultant?

A I am sure it had.

Q Now, what time period does this employment cover, is it for an indefinite period or a definite period, and if so, what?

A Indefinite. Indefinite.

Q And when did the employment actually start, work under the consultant retainership?

A I will have to do reference work. I don't have the

date in mind.

Q What is your closest approximation of the date?

A Oh, it would be some time in the fall of '67.

Q And just what are the nature of your duties as a consultant to Honeywell?

A Well, I can give my conception, I could attempt to enumerate some of the terms of the contract. I could tell you that I am supposed to assist them in determining the facts of the history of computing machines as I know it, that I should assist them in interpreting these histories for the purposes of the suit with knowledge which I possess of the computing machine which I developed, that's a rough discussion of the duties.

Q Is this arrangement you have with Honeywell oral or written?

A It is written.

Q May we see a copy of the agreement?

A I do not have one in my possession. I imagine some arrangement can be made to get you a copy. I don't have one.

MR. DODDS: Can arrangements be made to see a copy of the agreement?

MR. HALLADAY: They may.

MR. DODDS: Thank you.

BY MR. DODDS:

Q Prior to entering into this agreement, I assume there

were some preliminary discussions with respect to it, is that correct?

A There were.

Q And with whom were those discussions?

A They were with Mr. Hanson, Mr. Dmitri Allegretti and Mr. Halladay.

Q And what --

A And Mr. Call.

Q And is that all?

A I believe that's the complete list.

Q What was the substance of those discussions?

A We discussed the history of computing machines as of that date and what work I had done. We read the Henry letter and that represents a general tenor of the discussions as far as I can remember it.

Q Well, I assume the discussions also included with the nature of the work which you would be expected to do?

A Yes. And this nature of the work was, as far as I am aware, as far as I am aware, was right in line with the nature, the nature of the work which I formerly expressed to you.

Q Dr. Atanasoff, I notice that when we first attended a previous session of these depositions you seemed to have quite a familiarity with this office. I assume you have

spent a considerable amount of time here?

A You mean I knew where the hearing was going to be, was that it?

Q You seemed to know quite a few things.

A Well, I hadn't been here so much, to tell you the truth, that isn't quite right. I did know that much though. I spent, well --

Q How many visits, more than five?

MR. HALLADAY: Talking about this particular conference room or my legal offices?

MR. DODDS: Your legal offices.

THE WITNESS: Oh, here, I imagine two or three.

BY MR. DODDS:

Q The period since you started to work?

A Yes.

Q And how much time would be occupied, a day, two days, a week?

A Oh, goodness, you mean here in these offices?

Q Yes.

A In these offices why a week on a couple of occasions would probably express a reasonable -- a reasonable scope.

W-12

Q And did you spend a week or a portion of the week in these offices preceding the first session of your deposition?

A That is one week that I spent here. Now, I am trying hard to think, and I don't believe I spent any other week here, to be exact.

Q And with whom did you confer during these meetings here in these offices?

A Well, when I was at these offices I conferred with Mr. Dmitri Allegretti, with Mr. Call, with Mr. Halladay.

Q Is that all?

A Oh, Mr. Jim Halverson, and sometimes, and on previous occasions with other partners in the firm and other people here.

Q Now, let's consider also the question of conferences in any of the offices of Bair, Freeman and Molinare in Chicago. How many conferences, approximately, have you had in those offices?

A Oh, a great many more.

Q More than ten?

A More than what?

Q More than ten?

A Oh, I would think it may have well been ten or twelve conferences in those offices. This is an offhand estimate without examination of travel records.

Q We are not going to hold you to it exactly.

A You understand I am trying to give you a reasonable

impression of the situation.

Q And with respect to the time which you spent there, was that for durations of a day or several days or a week or more?

A Let's say several days usually.

Q And who were present at those conferences?

A Well, Mr. Dmitri Allegretti, Mr. Call were the principal parties, or on occasions I met with other members of that firm, and I can't recall the names at the moment.

Q What was the general nature of the subject matter discussed?

A Who did what, when?

Q And what were you assigned to do?

A What?

Q What were you assigned to do?

A I was assisting with the discussions of who did what, where and when.

Q To what extent?

A And what interpretation can you give this document and what can we find out from that man, and so forth. It's just the whole basic work of the whole thing.

Q Were there other technical personnel present at these conferences?

A I believe at the conferences that there were not, and --

Q I am sorry.

A I guess the answer stands. I guess there were not. I can't be a hundred percent sure, but that is my immediate memory.

Q Coming back, then, what was the what, where and when as it affected you?

A Oh, you see, what we were investigating is who did what, when and where in this line of the computing development, and we discussed Berry's history. We discussed the entire work of the machine. We went over documents unbelievably frequently, the entire documentations which are in your hands, and I don't know how you can do it, but we went over it so many times, and I must say that on each occasion something new has been derived from those documents.

Q Perhaps I misunderstood you. When you said the what, where and when, you were referring to the past tense rather than the future tense?

A I was, yes.

Q All right. The conferences that you have had in these offices, did each of them, was each of them attended by Mr. Hanson?

A Oh, no.

Q Well, how many would you say were attended by him?

A Oh, three or four total.

Q Did he attend the first conference here?

A I don't think so. He attended a conference at my home at one time. Thatmight have been called the first one. That's the only reason I interpose that statement, but if you don't call that the first one, why, then, he did not attend the first one.

Q And how many conferences have you had in your home with representatives of Mr. Halladay's firm or Mr. Allegretti's firm?

A Oh, perhaps ten, fifteen.

Q And of what duration were they? Were they a day, two days, a week or what?

A Oh, a matter of, I would say an average of a couple of days, perhaps.

Q Have you had conferences at which representatives of any firms other than Honeywell were present?

MR. FALLON: In what regard?

MR. HALLADAY: You mean at which Honeywell was also there?

MR. DODDS: Yes.

BY MR. DODDS:

Q I am speaking of these conferences which you have had with representatives of Honeywell. At any of these conferences, have counsel representing other concerns been present?

A I don't remember any.

Q Are you reasonably sure of that, Doctor?

A Well, if you would name another firm I would immediately be able to answer you with certainty, and I just can't -- there are a lot of people around, you know, all the time, and to answer in general as to whether any possibility of any other firm and then be held to it, I am having a little difficulty, but I am pretty sure, I am endeavoring to assist counsel in his inquiries.

Q I understand. Well, you mentioned two other firms, particularly Control Data and General Electric. Were counsel in attendance representing either of those firms?

A I have attended conferences -- good, that is helpful. I have attended conferences which combined the counsel of Control Data and Honeywell.

Q More than one?

A Yes.

Q Three or four or five?

A Five, ten.

Q And where were those conferences held, in these offices or Mr. Allegretti's office or in your home or all three places?

A All three places -- well, I believe in all three places.

MR. HALLADAY: Was your answer "combined counsel of Control Data and Honeywell"?

THE WITNESS: Well, it was a careless

answer, and thanks for calling me on it.

May I restate my answer to that question?

BY MR. DODDS:

Q Yes.

A I have attended conferences in which there were representatives from Honeywell and Control Data simultaneously.

Q That is what you meant by your preceding --

A That is what I intended to say.

Q -- by your preceding answer. And did these conferences deal with the preparatory work which you are doing to which you previously testified in connection with this case?

A Without a specific memory, it would be my impression that they did.

Q Now, you testified, I believe, that you had separated your files into these folders and numbered them sequentially. I believe the language was, in accordance with their relevance to this case, or some such language, is that correct?

A (Witness nods his head affirmatively.)

Q When did you first learn about "this case"?

A I first learned about this case in May of 1967.

Q Was this upon the occasion of the visit from representatives of General Electric Company?

A It was not.

Q Well, what were the circumstances under which you first learned about this case?

A I learned about it from a representative of Control Data -- I mean, counsel for Control Data.

Q Was that at a conference that you had at the office of Control Data or was it at your home?

A It was at my home.

Q A visit arranged by counsel for Control Data?

A It was so arranged.

Q Was that Mr. Kirkpatrick?

A It was.

Q Now, you testified about the preparatory work which you had done in connection with this case during the last, I think you said seventeen or eighteen months. Who initiated that preparatory work?

MR. FALLON: Do you understand the question?

THE WITNESS: Well, I don't know, I think I understand the words of the question but the doubletalk connected with it I cannot fathom, and so I think it should be rephrased.

MR. FALLON: I say that, Mr. Dodds, because I didn't understand the question.

BY MR. DODDS:

Q You had testified earlier about preparatory work

that you had been doing in this case, including preparation for your deposition here. Now, my question was, who initiated that, who started you on that work?

A Well, counsel and I visited together and --

Q Counsel for Honeywell?

A Counsel for Honeywell on this case, yes; counsel for Honeywell and I visited together, and gradually the work to be done was outlined, and, of course, according to my terms of my contract, this work was outlined by Honeywell. I don't know -- by counsel for Honeywell. I don't know that the work was particularly outlined by Honeywell any more than it was outlined by me. It became perfectly clear and apparent to all of us what had to be done, and, of course, a certain fraction of it naturally fell to me.

Q Just what did Mr. Kirkpatrick tell you about the Control Data case?

A He brought out a copy of 827, and he commenced reading the claims therein.

Q What else did he say? He didn't stop with that, I assume?

A Well, he didn't, but this is the only thing that influenced my decision the least bit is reading those claims and seeing what actually happened in the case.

Q Well, I wasn't interested so much in what interested you as what Mr. Kirkpatrick said.

A Well, I am trying to -- all right. Then what he said was that, "We would like to secure your help in the case."

Q And did you arrange to provide help to counsel for Control Data?

A I did.

Q And is that preparatory work being carried on concurrently with your preparatory work in this case?

A It is. It has been; not always concurrently, you understand, but generally concurrently, yes.

Q Are you being compensated for your time in attending this deposition?

A I believe so, yes.

Q And how about for the time in attendance at your deposition in the Control Data case?

A I believe I was uncompensated for that. It was a very short period and I believe I was uncompensated for that. Oh, I am sorry, Mr. Dodds. May I change my answer to that slightly?

Q Yes.

A I was told by counsel, I was told by you that you would compensate me for that, but you never compensated me.

Q If you will send me a statement, we will compensate you for it.

Did Mr. Kirkpatrick tell you -- will you strike that.

What did Mr. Kirkpatrick tell you about the Control -- about the Honeywell case?

A He said, "Here, did you know this?"

MR. FALLON: Wait. Listen to the question.

BY MR. DODDS:

Q The Honeywell case, this case, what did Mr. Kirkpatrick tell you about this case?

A Oh, I am sorry. I am sorry. I am awfully sorry. Strike my previous answer, please. Let's see if I can formulate an answer. At the time he visited me, he said absolutely nothing about this case. At the time of his first visit, he said absolutely nothing about this case.

Q When was that?

A It was in May of 1967, and I believe he had no knowledge of it. It is my impression that he had no knowledge of it. I am not sure.

Q Then it was at a subsequent visit that he told you about this case?

A Mr. Kirkpatrick didn't tell me about this case.

Q I misunderstood your testimony. I thought you said earlier that you learned about this case from Mr. Kirkpatrick?

A Well, of course, you know, I can't be quite sure, Mr. Dodds, because sometimes I slip, but I don't believe I said that, and I believe said at a meeting with counsel for

General Electric Company, and I hope I said that, and we will look in the record and see if I said that.

Q You did say the fact that you had --

A That is where I learned about this case.

Q I had understood -- all right. The record speaks for itself. Anyway, that is when you first learned about this case?

A Yes.

Q In the organization of your document folders, this sequential numbering of the documents, was that your idea?

A The answer is yes.

Q And when did you get that idea?

A Well, I should have got it the very first day, but I didn't get it until about three months ago.

Q You testified on direct of your very earliest recollections that you had. Would you tell me what were the circumstances under which you were asked to recall that earliest recollection?

A I am embarrassed about this, Mr. Dodds. You know, it contains matters which members of my family regard as personal, but if you insist, you will get it.

MR. FALLON: I don't think you understood his question. He wanted to know the circumstances under which you were asked to recall this. I believe that is

the question.

BY MR. DODDS:

Q That's correct.

A Oh, I am sorry. That has no --

Q No personal --

A Again, I am mishearing. All right. Thank you. Thank you. Well, I can't remember the circumstances very well, but I know who did it, and I know that I was asked in the course -- I don't know about you members of your profession and their common habits, so nothing surprises me, Mr. Dodds, but he took some pains --

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Q Who is he?

A The members of the, more than one, all members of counsel for Honeywell took pains to probe my original -- my original memory and see what I remembered, and it became sort of a game with us and then all of a sudden I realized I did have this earliest memory and I made this statement and I believe on this occasion it was in a discussion with Mr. Halladay.

Q Have you brought with you, Doctor, all of your files relating to the Iowa State College machine or to any subsequent discussion, conferences or communications with respect to it?

MR. FALLON: Now, is there a time limit on that, Mr. Dodds?

MR. DODDS: No time limit on my question.

MR. FALLON: This then would include correspondence between Dr. Atanasoff and me, for example?

MR. DODDS: I just asked him whether he brought it all and then we will come to what if any he didn't bring.

THE WITNESS: I have not brought it all Mr. Dodds.

BY MR. DODDS:

Q All right. Then I would like to ask what was the basis of your screening or elimination of the ones you did not bring?

A I attempted to bring all information in my files pursuant to the subject of my development of computing machines prior to the current -- prior to the current era, that means the era in which the suits were current, prior to the instigation of the current suits.

Q That is prior to May of 1967?

A Well, I am a little vague as to that deadline, but I think that the answer is prior to, yes. I don't have any -- have anything that is not prior to May of -- I believe it is prior to May of 1967, yes.

Q That is you brought?

A Yes.

Q There was one folder marked E-1 which you eliminated?

A Yes.

Q By whom, by whom and why was that folder eliminated?

A You know when I originally -- it was eliminated by me, Mr. Dodds, and it was eliminated because it was -- it represented a misclassification of my files in the beginning and the material which was in there. I thought it was separate. My first glance, when I made up those file folders, I thought

it was different than the material contained in E-2, but I found out it was substantially equivalent and the material from file folder E-1 was added to E-2. So the material is here although the folder is not.

Q To what extent, if any, have you discussed the subject matter of your testimony, say, with Mr. Halladay?

A Well, Mr. Halladay asked me what -- he asked me a great many questions and I have answered them all faithfully even as I would do in court.

Q And going a bit further, what discussion has there been, if any, with respect to what testimony you would give as contrasted to answering Mr. Halladay's questions?

A Are you raising a question as to whether anybody attempted to influence my testimony?

Q No. Not at all, Doctor, just a question to the extent --

A I would answer that if you wish, be glad to answer that, but there has been discussion back and forth. The only discussion that I remember, however, was relative to a pertinent document, for instance, if I said something and there might be a document which contravened it and we have to decide whether the document or my memory was correct, and we would discuss it, and I would review my -- I would use the document to refresh my memory and in this way my memory gradually developed in regard to items of this case.

Q To what extent has your own counsel Mr. Fallon participated in or been familiar with these discussions with Mr. Halladay or his associates?

A Oh, to a limited extent, rather limited.

Q Coming back, Doctor, to your conference, I believe in your home, with representatives of the General Electric Company. Do you recall who was there?

A I will try to recall. Mr. Norman Fulmer. There were a few other gentlemen present.

Q Would one of them be Mr. Eltgroth?

A One was Mr. Eltgroth. Another man was a gentleman from Phoenix, Arizona. I can give you that much of a hint if you can help me.

Q I don't believe I can. You don't recall his name?

A I don't.

Q He was patent counsel, was he?

A He was patent counsel, all patent counsel in the field of computing machines for General Electric Company.

Q And just what did they tell you about this case?

A They had somehow gotten ahold, they told me several things. In the first place Mr. Norman Fulmer told me that he had worked on my computing machine and almost immediately my mind began to encompass this fact. So he knew about it pretty well. And they, the Dawn Henry letter was discussed. I think they had a copy of it somewheres, and I previously

stated to you that they said that there was litigation.

Q With Honeywell?

A With Honeywell, yes.

Q Did they tell you what patent was involved?

A Yes.

Q Did they tell you what defenses were being interposed in the action?

A I have no knowledge of such defenses. No.

Q Did they refer to a long, approximately 70-page opinion, of Mr. Allegretti?

A I have never heard of a 70-page opinion by Mr. Allegretti.

Q Doctor, have you had any subsequent meetings with representatives of General Electric Company since the visit in your home that you spoke about?

A Any subsequent meetings?

Q Yes.

A I have not.

Q Have you had correspondence?

A I have.

Q Or conversations with them?

A Yes. I have had telephone conversations and correspondence with Mr. Norman Fulmer and with a gentleman from Phoenix, Arizona.

Q And that I assume, is that limited to correspondence

subsequent to their visit with you?

A It was, yes. And I, of course, had one telephone conversation with Mr. Norman Fulmer about the visit ahead of time, one or possibly two, I don't remember.

Q Well, let's go to a different subject, Doctor. Is my understanding correct that no patent application was filed by you or on your behalf with respect to any of the developments included in the computing machine you developed at Iowa State College?

A That is my best knowledge and belief.

Q Do you know why none was filed?

A I do not know why an application was not filed.

Q Do you have -- can you make an educated guess?

A My educated guess would be that somebody goofed.

Q Do you have any idea who the somebody was?

A I do not know.

Q To the best of your knowledge, was any description of your computing machine at Iowa State College ever published in any technical journal?

A It was never published to the best of my knowledge and belief.

Q Would you know whether it was published in any form, and I mean published in a sense that it would be available to the public?

A To the best of my knowledge and belief there was no

such publication.

Q Do you know why there was no publication?

A I imagine because I did not desire it.

Q Well, as I understood your testimony, I think it was this afternoon, that one of your desires was to have a proper recognition of the facts in the development of the computer art, isn't that right?

A I realize the contradiction, Mr. Dodds. Your feelings and your motivations change with time for various reasons, and I think the reasons here are fairly clear and evident and those caused a change in my opinion.

Q Well, did that change in motivation occur approximately in May of 1967?

A Well, I wouldn't put it that way, no. I wouldn't put it that way. But, of course, it -- there was a period in which I was engaged with other things and which it was not on my mind.

Q Well, the approximate time, when did your motivation change in that respect?

A I desire a time to reflect and maybe two or three days before I can give an answer to that question, if you insist upon an answer to that question.

Q Well, if we are still here in two or three days I will put it this way.

A You ask me some other time. Maybe I will figure

that out, but I do know that there has been a clear regeneration of my attitude on this question a part of which is due to the gentleman named Norman Fulmer.

Q And that regeneration was initiated in May of 1967?

A In the summer of 1967, even later.

Q Summer?

A Yes. Part of it's due to him, I would point out.

Q Now, still referring to the patent problems, would you refer to your folder C-1. Doctor, I will not go over these individually, but if you will look through them, you will notice that there are a number of notes which I think you previously identified as being either in your handwriting or that of Clifford Berry?

A Yes. And I --

Q This represents, as I understand it, the results of some search work which you and Mr. Berry did in late December of 1940?

A That is correct. As far as I know that is the entire or the general subject of this folder.

Q And in these various pages of notes in folder C-1, there are quite a number of patents listed, United States Patents, some British patents and perhaps some other foreign patents, that's correct, is it not?

A It is.

Q Did you or Mr. Berry obtain copies of the patents

listed in this folder C-1?

A Not very systematically. Most of the material we could find out by search did not pertain to us to any, even -- even if the title was, led us to have an interest in a document, we might by a very brief perusal decide it was of no interest to us, and as a matter of fact, most of the material herein, except that it pertains in a general way to computing art, has no relevance to anything in which we were interested. So very few patents were obtained. Some of the patents we actually carried away with us and I cannot enumerate those for you. At the moment I have no immediate recollection of how to enumerate those for you. And some of them I remember we couldn't get.

Q Do you have, or do you know where they are, the copies of the patents which you did get?

A Well, I may have some on hand.

Q Would you be prepared to check your file to see which you have on hand and perhaps supply them to your counsel who then can perhaps in turn supply them to us and to Mr. Halladay?

MR. HALLADAY: Do you want the documents themselves or merely the numbers?

MR. DODDS: Just the numbers of the patents.

MR. HALLADAY: I have no objection to

that process.

MR. FALLON: So we understand exactly what's what, are you interested in those patents which he obtained in 1940 as contrasted to duplicate copies he may have obtained last year?

MR. DODDS: I am interested in any copies of patents listed in this folder C-1 which he may have acquired either then or later.

MR. FALLON: All right.

MR. DODDS: So they are presently in his files to the extent he can identify them.

MR. HALLADAY: Again all you are asking for is not the documents themselves but merely a listing?

MR. DODDS: That's right.

MR. HALLADAY: Of the numbers.

MR. DODDS: Yes.

MR. HALLADAY: I have no objection.

THE WITNESS: This will take a period of time.

MR. DODDS: That's satisfactory.

THE WITNESS: And I believe this will be included in that statement you asked me to send you.

BY MR. DODDS:

Q So you glance through these papers, Dr. Atanasoff, and see if there are any of those listed which ring a bell and which you think probably or with reasonable certainty you do have copies of? If that isn't practical you can ignore it.

A Well, I have just one. You know, in one French patent I translated the French into English and I would record this instance for you because it has pertinence here, and I don't care anyhow, I have no desire to sail under any false colors. And do you know, Mr. Dodds, I thought I had -- I thought that I had invented the use of the base two number system for computation at this period, and in some French patent I found a reference thereto. Mr. Dodds, are you able to hear me, Mr. Dodds?

Q Yes. Oh yes.

A Good.

Q Could that have been a patent to Kaufngle?

A I don't know, Mr. Dodds, and I don't know whether it's in this list.

Q Yes.

A But I remember finding this reference in the office, and you are asking me for my memory relative to these, and I remembered that most of this stuff is utterly irrelevant. Most of this stuff you have in your hands is utterly irrelevant. It's overwhelming irrelevant.

12

MR. DODDS: Off the record.

(Discussion off the record.)

BY MR. DODDS:

Q Did this search in the study of patents which you reviewed change your opinion in any respect as to what inventions you had embodied in your Iowa State College machine?

A I can't think of a single one.

Q All right. I think you just mentioned possibly computation on the base two.

A Now wait a minute. As to the originality of that. Now, the French one spoke about the value of using base two in computation. I thought that was original with me but, of course, he did not use it in connection with electronic digital computing.

Q Yes. Do you recall any other features of computing machines which you discovered in this search which showed you that they may not have been original with you but you had previously thought they were original with you?

A I have no such recollection, Mr. Dodds. And I believe there were none. The complete irrelevance of the material is the only memory and impression I have from that date and we worked very hard.

MR. DODDS: Mr. Halladay, would it be convenient to take a short recess at this point?

MR. HALLADAY: Fine.

(Recess taken.)

W-14-1

BY MR. DODDS:

Q Are we ready to proceed?

A I am.

Q Doctor, harking back to this visit from counsel for General Electric, how was that visit arranged?

A It was arranged by Mr. Norman Fulmer, who knew me. Well, he did know me at the time he worked on the computing machine, and he called me up and he said, "Members of the staff of General Electric and I would like to come down and visit you," and I said, "Fine."

Q What was the purpose of the visit?

A Well, I think the purpose was what they called uncertain patent situation that was developing in computing machines as of the time.

Q And what was the substance of your discussion with these gentlemen?

A I believe I've been over that. Let's see --

Q I think we talked about --

A Will you be more specific? Will you be more specific?

Q Yes.

A Because I am not quite sure how to begin.

Q You previously had indicated what you recall that they told you about this suit?

A Yes, they did.

Q And--

A And they told me that rather large royalties were being imposed on the industry currently by acts of your, of the corporation which you represent, and that these were being imposed in a pretty forthright way, and they said that the industry was in a certain state of turmoil consequent to the imposition of these royalties or the implementation of the collection under this royalty system. I don't exactly understand, so this is as far as I can go. Such words were used to me, Mr. Dodds.

Q Were they enlisting your help or assistance in connection with this problem?

A Well, they came down to discuss it with me. They have made no further effort, so I gather that they have at least they -- Norman Fulmer was more or less, I believe, tacitly elected to keep in communcations with me. I haven't heard from him for some time now, and he -- during the subsequent months there were several telephone conversations between us, always mostly of a pleasant and personal nature, and I am unable to give you more help than this.

Q But insofar as the subsequent telephone conversations were not of a personal nature, what was the substance of them?

A I don't know. Maybe -- I would be of the opinion they were saying, "Has Honeywell contacted you?" Maybe.

Q And you mentioned that the General Electric

representatives had referred to some high royalty which was being asked. Do you recall if they told you what that royalty was?

A How much in percent?

Q Yes.

A They did not tell me how much in percent, no, and I had no desire to find out or I would have asked them.

Q And you said that the industry was confronted with this problem. Did they mention what members of the industry were concerned with this problem?

A They did not. They just made such general statements, and I don't -- I would be glad to inform you if I knew which one because I don't think the gentlemen in question would mind having, being accused of this, but I just got this impression, and that's all I can do for you is give you my impression of the discussion which ensued in my house.

J-14-2

Q My recollection was that you testified that you had inquired of them whether you should call Honeywell or whether they would, and they said they would?

A They said, "Honeywell needs you," and I said, "Well, are you suggesting that I call Honeywell?" They said, "Not at all. We'll call Honeywell," and they did.

Q Did they indicate anything which gave you an interest in calling Honeywell?

A Except the general situation which, in the course of

4

normal conversation would be out on the table between us all, but which here is held under a cloud of obscurity by the law.

Q Well, I assume that if they had not volunteered to call Honeywell, you were prepared to call Honeywell?

A I don't have any idea whether I would have or not. I didn't so call Honeywell, at any rate.

Q As a result of your conversation with counsel for General Electric, did you get the impression that there was any arrangement or understanding of any sort between counsel for General Electric and counsel for Honeywell?

A I got the feeling there was not and would not be any such arrangement.

Q And how soon after this meeting with the representatives of General Electric Company did a representative of Honeywell call you?

A Oh, goodness, I don't know.

Q Was it a week, a month, a day?

A Oh, I would say it was a couple, three weeks, maybe, probably, maybe, I don't know.

Q When they made this comment, "Honeywell needs you," what was your response?

A I am an eager beaver, but not necessarily always inevitably eager, Mr. Dodds, and I, so what, let the cause be explained, was my reaction.

Q What was your response to them when they said --

A I said nothing. As far as I can remember, I said nothing. I don't think I would say anything under such circumstances.

15/1
EA KL

Q Now, let's turn to another subject now. Just one further question, did they indicate what the nature of Honeywell's need was?

A Well, Mr. Dodds, I don't know how to be sufficiently devious in such matters. I can only say that the discussions carried an element of the need, yes, they did. And the need was on the table because this was an ordinary conversation between individuals and not a case at law. And there was a general understanding of what the problem was and that understanding they made clear to me.

Q And just what, to go back, what was the need, in what way did they --

A I saw that coming. I will reply.

Q Pardon?

A I saw that coming, I will reply. I opened my big mouth once too many. I would say that -- I have previously told you that they -- that they had made intimations about the imposition of royalties and further efforts to collect royalties and the formation of a corporation for the purpose of collecting royalties and all of these things were subject, were subject of conversation. Now, if we could just mark this with Exhibit X and every time I have to repeat this we just say Exhibit X and you know it's the same group of answers that I can give you why I will be happy because that was the subject matter that we were referring to as far as I

know.

Q Well, I am sorry. Maybe I don't quite understand. I still don't understand just what it was that they thought that Honeywell needed that you could supply?

A Well, I guess maybe in view of your questions I don't understand it either.

Q You mean they didn't say?

A I am trying to think what they said. I guess I imagined it readily enough but as far as knowing, I did not know at the time.

Q Well, just a minute. I mean what did they say?

A They said, as far as I remember, they said the words which I described to you.

Q And nothing more?

A Oh, I am sure they said other things.

Q I mean on this particular point, Doctor, as to what the nature of the need was that you could supply?

A I suppose this reference was to information as to the development of computing machines. I supposed so at the time and I suppose so now.

Q You mean they did not say anything explicitly as to what they conceived Honeywell's need to be?

A You know, I am probing my memory. Now, the impression that my memory gives me of the subject at present is that if it is not that I don't know what it was.

Q That they did not give you any specific elaboration upon what they --

A I cannot swear they did not but I do not remember such.

Q Did they give you any indication as to why they thought it was Honeywell that particularly needed you rather than General Electric Company themselves or Control Data?

A They said there is a suit imminent or current or something of the kind.

Q A suit involving Honeywell?

A Yes.

Q Doctor, when did you first learn of the ENIAC patent application if ever?

A Now, this is to be separated and differentiated from ENIAC development, is it not?

Q Yes.

MR. FALLON: You said patent application?

BY MR. DODDS:

Q Patent application?

A Oh, goodness, I don't suppose I learned of that until Mr. Kirkpatrick came to my house.

Q Well, just a minute, Doctor. I think you have told me earlier that you have since this suit was started reviewed the ENIAC patent from which you know that it issued in 1964,

so it was not a patent application when Mr. Kirkpatrick visited you?

A That is correct.

Q Well, is it your answer that you never acquired any knowledge of the ENIAC patent application?

A I really don't know. I really don't know. It may have been that, the word ENIAC was mentioned by Mr. Etienne and I do not remember his mentioning the word ENIAC, so you ask me previously if Mr. Etienne mentioned the word ENIAC to me, I have no such memory and this is the state of my knowledge on that matter.

Q You have no present recollection of any prior knowledge of the ENIAC application?

A That's true. And I have had very little knowledge until Mr. Kirkpatrick came to my door with an issued application, that's right.

Q Issued patent?

A With an issued, I am sorry, an issued patent, right.

Q And was that your first knowledge of the ENIAC patent when Mr. Kirkpatrick appeared on your doorstep?

A I believe it was. Yes.

Q And I don't have the transcript back, did you say when that visit of Mr. Kirkpatrick was?

A It was in May of 1967, I believe. I hope I have got these right. I hope I am not getting a year off. I am

sure I am not. Goodness, that has got to be right.

Q Now, when was your first knowledge of the development of the ENIAC computer at the Moore School?

A You see Mauchly told me he was working on a computer and it was classified. Now, would you say that is the knowledge of the ENIAC computer?

Q I wouldn't say that if that was all that Dr. Mauchly said.

A The answer is that that is all, and I did not know it at that time, if that is agreeable to you. Now, I certainly read about it when it came out in the newspapers. I certainly knew about it at that time. Now, you will say when is that, and I am sorry that I will have to reflect or investigate or something to get the date.

Q Well, now, I think you have testified about a computer under development at the Naval Ordnance Laboratory in White Oak?

A I did.

Q Did you or your associates make a point of becoming informed of current development work on computers at that time?

A We certainly did.

e-51-2
E-15-2

Q And do you know whether your associates had any knowledge of or familiarity with the work in the development of the ENIAC computer?

A Whether -- now it runs in my mind that we visited Aberdeen and saw a computer which I believe was an ENIAC at Aberdeen during that period.

Q That's the period '46-'47?

A It's roughly in that period. I can get you more refined dates.

Q And I would like to ask you the same question with respect to the 827 patent, not the patent application, but the 827 patent, when was your first -- when did you first learn of that patent?

A Well, I must give you more or less the same answer. It was certainly, if it was not the subject of conversation with Mr. Etienne, it was in Mr.Etienne's letter so I had that normal notice of it,but as far as having any knowledge of it, I did not receive that at that time. I did not receive that at that time, and that knowledge of that patent and the claims thereof came to my attention with Mr. Kirkpatrick at my door.

Q Doctor, did you ever take any step in the United States Patent Office to assert any rights of joint inventorship or otherwise in the 827 patent?

A In these two patents?

Q 827 patent?

MR. FALLON: I think the question is ambiguous because there is that, "or otherwise."

BY MR. DODDS:

Q I said a step in the United States Patent Office.

MR. FALLON: Let the witness answer if he can understand the question.

THE WITNESS: The answer is no.

BY MR. DODDS:

Q Did you ever take any step in the United States Patent Office to assert any rights of joint inventorship or otherwise in the ENIAC patent?

A I did not.

Q Have you at this time studied the ENIAC patent and the 827 patent disclosures and claims?

A Yes. But a rather brief effort in both cases. I wouldn't say that I am a proficient man in the 827 patent. I would say in connection with the other patent, ENIAC patent, I am less proficient.

Q And when did you make that study?

A Any study which I -- which has been made, was made during the course of these investigations.

Q That is after May, 1967?

A It was.

Q Would you refer to your folder E-2, document 395.

3

I think you identified that as an agreement signed by yourself and which was dated July 5, 1941, and was that an agreement between yourself and the Iowa State College Research Foundation, is that correct?

A Yes.

Q Now, that agreement was replaced by a later agreement, was it not?

A You mean of recent date?

Q Yes.

A It was.

Q I show you a document and ask if you can identify this document?

A I seem to recognize it.

Q You can identify that as your current agreement between yourself and the Iowa State University Research Foundation?

A Yes, sir.

Q And this replaces, does it not, the July 5, 1941 agreement?

A I would say --

MR. FALLON: I think in this case the witness ought to examine the documentagain because it speaks for itself.

MR. DODDS: I am not quarreling with the exact language, if replacement is not the correct word--

it supersedes, shall we say, the July 5, 1941 agreement?

MR. HALLADAY: In any event, for the record, from the plaintiff's side of the counsel table, and I think from the record, I haven't the faintest idea what piece of paper the witness has in his hand and it hasn't been identified. It hasn't been marked, and it hasn't been established and the parties are not stated and I object to the witness being interrogated about a mystical document that has no identity.

BY MR. DODDS:

Q You have identified this agreement?

A You have identified it to me.

Q Yes. You have identified it to me, have you not, as an agreement between yourself and the Iowa State University Research Foundation?

MR. HALLADAY: That's the first time that term has been used, Mr. Dodds.

MR. DODDS: No. It is not. He identified it in the first instance. However, I will give you a copy and ask the reporter to identify it as DPX-2.

(DPX-2 marked for identification.)

MR. HALLADAY: The stamp I have on my copy says Defendant's Exhibit blank, is that the way you are having it marked?

MR. DODDS: DPX-2 to identify it in the

5

blank space.

MR. HALLADAY: Defendant's Exhibit DPX-2?

MR. DODDS: As indicated earlier, using as shorthand for Defendants' Pretrial Exhibit.

THE WITNESS: Yes. This is correct.

MR. DODDS: The question and answer are separated here.

BY MR. DODDS:

Q You do identify this as an agreement presently in force between yourself and the Iowa State University Research Foundation, correct?

A Yes.

Q Will you tell me the circumstances which led to the execution of this agreement DPX-2 to replace the 1941 agreement?

MR. FALLON: I might again request that the word "replace" be explained to the witness, if you would, Mr. Dodds; that you are not using it in a strict legal sense, I take it?

MR. DODDS: Suppose you suggest a term? I am trying to find any one. I don't care.

MR. FALLON: Well, the agreement says on its face that they wish to carry out the 1941 agreement. This is to my way of thinking an additional agreement.

MR. DODDS: Shall we call it a supplemental

6

agreement?

MR. FALLON: All right. Fine.

MR. DODDS: I don't care what you call it.

THE WITNESS: Yes. That is true. That is really true. I am sorry, I wasn't quite sharp enough to catch that.

BY MR. DODDS:

Q Then what were the circumstances which called for the execution of this supplemental agreement?

A Well, having been counselled in regard to the possibilities of the principle of misjoinder and nonjoinder of invention, I consulted with counsel, and learned counsel, and learned counsel endeavored to assist my imagination relative to the subjects, and at the end of this period of consultation I contacted a gentleman by the name of Dan Griffen at the Iowa State College Research, Iowa State University Research Foundation.

Q Was this supplemental agreement initiated by you as a result of discussion with your counsel?

A Well, I am sure that they discussed it with counsel before they acted.

Q No. The question was, was it initiated by you after discussion?

A The whole matter, not the contract, but the

discussions on the subject were initiated by me, is that your question?

Q Yes.

A The discussions on the subject pursuant to this contract were initiated by me as a consequence of consultation between myself and counsel.

Q You say pursuant to the agreement, or do you mean discussions resulting in the agreement? Which came first, the discussions or the agreement?

A Well, gosh, the discussions came first.

Q All right.

A I am sorry if I got that backwards.

Q Now, do you understand that under this supplemental agreement you will receive anything of value over and above what you were entitled to receive under the 1941 agreement?

A Well, it's quite similar to the 1941 agreement. In that respect, I don't know to what counsel refers, could he be more explicit?

EA
15/3/1
KL

Q I think it was suggested, are you to receive anything of value -- I am trying to avoid using the term, legal terms consideration and so forth; is there anything of value that you receive under the supplemental agreement that you were not entitled to receive under the 1941 agreement?

A I believe these documents speak for themselves and if they can't state what that is, I don't know what to say, Mr. Dodds.

Q That isn't the question and I didn't ask you whether you are receiving -- what I asked you was whether in your opinion whether you believe that you were receiving anything of value here over and above what you received by the 1941 agreement?

A I see.

MR. HALLADAY: Maybe, Mr. Dodds, if you could tell me the materiality of this or how it will lead to the discovery of anything that is admissible it would help me. I don't want to interfere with your discovery process here but --

MR. DODDS: I believe it's quite material.

MR. HALLADAY: I don't see what is germane to the issues posed by the lawsuit that we are taking a deposition in at this point.

MR. DODDS: I think it is quite

germane because this agreement for the first time refers to the assignment of Dr. Atanasoff's rights under the patent in suit.

BY MR. DODDS:

Q Now, I want to know if for that grant you consider, you believe that you received under this agreement or were entitled to receive anything of value which you were not entitled to receive under the 1941 agreement?

A This is reorientation of the 1941 agreement, a reorientation of the 1941 agreement in part. It is my opinion, if you want my opinion, my legal opinion, I don't know whether you are requesting that or not; I can give you a legal opinion if it's useful to you, Mr. Dodds.

Q I want any opinion, legal or otherwise, that you may have as to what you believe you received or receive or are entitled to receive under this agreement that you would not have received or been entitled to receive under your 1941 agreement?

A Well, under this agreement, Iowa State College agreed to prosecute.

Q Prosecute what?

A These rights, prosecute and effectuate these rights that are recited herein, and I guess we can all read.

Q Is there anything else that you believe that you received of value under the supplemental agreement that you

would not have received or been entitled to receive under the 1941 agreement?

A Well, at any rate, the agreement of May 1968 refurbishes the previous agreement, brings it up to date. There are some terms therein which are different. I can read them to counsel if that will be of service.

W-16-1

Q No, I just want it in your own words, what you believe that you will receive or will be entitled to receive under this new agreement that you would not have been entitled to receive under the July, 1941, agreement?

A Well, the agreement states that if there is a consequence of the suit which Iowa -- of the action which Iowa State College has taken, and it is a peculiar action, and I do not understand it perfectly, if that is helpful, then, if as a result of that, there are monies received by Iowa State College, I will receive a part of them.

Q Well, I read from paragraph numbered 2 of the 1941 agreement, "The net proceeds from the licensing of any patent or patents" -- I assume those to be patents resulting in the computing machine to which reference is made -- "are to be divided equally between the Research Foundation and the inventor."

A Oh, I consulted counsel, Mr. Dodds, and they believed that for the sake of clarity that the previous agreement should be rewritten.

Q So that --

A I can give you the name of counsel, and you can ask them why they advised this.

Q I assume your counsel was Mr. Fallon or his associates?

A It was not, no, sir.

Q Well, then, may I ask who were the counsel?

A The counsel was Mr. Saunders of Mercier, Saunders & Associates in Washington, D.C.

Q So that the purpose of signing the new agreement was primarily on the advice of counsel that it would be advisable to do so?

A Now I have to divide the advice which counsel gives me from my own imagination. Is this a useful purpose?

Q All right.

A I don't know what percentage of the decision was caused by the advice of counsel and what decision seemed realistic to me, as a matter of fact, Mr. Dodds, I shouldn't admit this, I know I shouldn't, but I penned a good deal of the phraseology in that agreement which is in your hand.

Q Well, the thing that troubles me a little bit, Doctor, is that under Article IV of the supplemental agreement it cites, "That if any income is realized by the RESEARCH FOUNDATION from the assigned inventions, the RESEARCH FOUNDATION and ATANASOFF, as provided in the July 5, 1941 Agreement, will divide the net proceeds equally."

And so I come to the question, what of value did you believe you would be entitled to under this supplemental agreement that you would not have been entitled to?

A I will again recite for counsel the fact that I

will receive legal fees -- the cost of legal action under the present agreement.

Q Anything else?

A Nothing comes to my mind, but there may be, but there also may be more clarity in our interrelations, and this is a desirable state of affairs, and I don't desire additional litigation on this affair.

Q You will notice that under the provisions of Article I of the supplemental agreement, your rights in the 827 patent and the 606 patent, which I believe you will agree is the ENIAC patent, are assigned to Research Foundation?

MR. FALLON: No -- oh, yes. All right.

BY MR. DODDS:

Q Is that correct?

A It seems so, yes.

Q Let me ask you, why were these two particular patents enumerated?

A As compared -- now, you mean as contrasted with some other patents?

Q For example, -- yes, for some other patent, for example, the Eckert and Mauchly patent.

A Perhaps we haven't gotten around to the others.

Q I don't believe I quite understand.

A I don't understand you, so we are equal.

Q Well, my point was, the 1941 agreement, as I

4

understand it, is assigned to the Foundation, all rights under any inventions and patents which might come out of your computing machine, just speaking loosely.

A All right.

Q Now, you have narrowed it down or boiled it down to two specific patents. My question is, why did you pick those patents alone or in preference to or in substitution for other Eckert or Mauchly patents?

MR. HALLADAY: Just a moment, please. For the record, the question is objected to in form as including a capsule version of the provisions of paragraph I, which is inaccurate.

BY MR. DODDS:

Q The question is not intended to represent any deviation from the substance of Article I of the supplemental agreement, and to the extent that it does, will you consider it as formulated in the sense of Article I of that agreement, and again, I ask why were these two particular patents specified and only these two?

A I stated that perhaps there are other patents which should have been stated here that we haven't gotten around to stating yet, and this will mean an additional draft of the agreement. As I understand your question, you mean, why did we choose these and not some others, and I say, I don't know about the others and so I wasn't inclined to state them.

Other people evidently didn't know about them or they would have stated same, and if it comes to our attention and seems important, why, they will be stated in the future, as far as I am concerned. I do not know if Iowa State University would agree with me, so I do not know whether any subsequent agreement will be executed.

Q Did you ever happen to come across a patent numbered 2,624,507 to Phelps owned by IBM?

MR. HALLADAY: What was the number, again?

MR. DODDS: 2,624,507 to Phelps, owned by IBM?

THE WITNESS : I do not have any knowledge of that patent.

BY MR. DODDS:

Q To the best of your recollection, you haven't had any familiarity with that?

A That's the best of my recollection, I haven't.

Q Now, I think you indicated that you first, it first came to your attention that you might have an interest in the 827 patent, the ENIAC patent, at the time of my conference with you, which I believe was in --

A Yes, that's true, Mr. Dodds. That's true, Mr. Dodds.

Q And do you remember the date of that conference?

6

A No, but we can get it all right. It's of record with me, I am sure.

Q I believe it was in December of '67. Does that concur --

A You know, we tried to meet for Thanksgiving, Mr. Dodds, before Thanksgiving, and we couldn't do it, and it seems to me as if that's a logical date. Yes, it was.

Q Now, since that meeting, with whom have you discussed this question of possible rights in the 827 patent and the ENIAC patent other than counsel to which you have just referred? I think you referred to Mr. Saunders and Mr. Fallon and his associates?

A May I ask the advice of my counsel, if I am required to give the name of counsel whom I have previously employed, and who is not --

Q Surely.

A Am I required to give counsel whom I have employed and who is not present?

MR. FALLON: I think that is all right.

THE WITNESS: Would you prefer that I didn't?

MR. FALLON: If it's responsive to his question. He is not asking what the --

THE WITNESS: All right. The counsel with whom I have conferred is the firm of Watson

Cole, Grindle & Watson in Washington, D.C.

BY MR. DODDS:

Q And have you discussed this, the subject matter of your possible rights in these patents with anybody else? Let me refresh your recollection. I assume you have discussed them with counsel or representatives of Control Data, have you not?

A As a matter of fact, before I took any action at all I discussed them with counsel of Control Data and with counsel of Honeywell.

16/2/1
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Q And did you discuss them with counsel for General Electric?

A I have not.

Q Have you discussed them with any counsel or representatives of any other concerns?

A Not to my previous memory -- not to my current memory, I am sorry.

Q Now, you have, have you not, in order to establish your rights which you believe you have in the 827 patent, the Iowa State University Research Foundation brought a motion to intervene in the Control Data case, has it not?

A I haven't made such a motion.

Q No. I say, the Foundation has made such a motion, has it not?

A I believe so, yes. I have papers which purport to have that effect.

Q And do you know who initiated that proceeding, motion to intervene in the Control Data case?

A Why, if Iowa State University with whom I have this contract did not initiate it, I do not know who initiated it.

Q To what extent, if any, did you participate in the filing of this motion to intervene?

A Mr. Dodds, I am by no means running this case. The effect of the contract which you have before you has been carried out, and to the best of my knowledge and belief, it

will continue to be carried out, and I took no such action.

Q No. That wasn't quite the question, Doctor. The question was, to what extent, if any, did you participate in the discussions or the work or the preparation of this motion to intervene?

A Well, of course, my advice and counsel in regard to the affairs of the time have been available to counsel for Iowa State College who are pursuing this matter.

Q And have you participated, have you had discussions and done preparatory work in connection with that motion?

A I would say, in the sense that your words seem to imply, very little.

Q But -- I am sorry.

A But I certainly have participated.

Q You have done some?

A Sure, of course.

Q For example, you signed an affidavit which was filed in that, did you not?

A I did, yes.

Q And have you had conferences with counsel for the Foundation in connection -- with counsel or representatives, Mr. Griffen, in connection with the prosecution of this motion?

A Such conferences as I have had have been of a casual and a visiting nature, They are not work conferences and I do not intend to have work conferences with him, and the

effect of this contract, as I stated before, is being pursued.

Q And where were these conferences?

A Oh, I have been out to Dan Griffen's office a couple of times, been in to see him, say, well, "Hello, Dan," and so forth. I was even out to see Dan before any of this occurred. I mean, I have been by Iowa State College Research Foundation, you know. I used to know Quincy Ayres out there in years past, and so it's a place with whom I have had some degree of contact.

Q Have you had any conferences in the matter of the motion to intervene with others that Mr. Griffen?

A Well, I certainly discussed it with counsel for Iowa State University.

Q Mr. Fallon and his associates?

A Yes, sir.

Q Do you recall -- I think you testified that you had discussed this question of a possibility of your rights in the 827 patent and the ENIAC patent with counsel for Control Data and Honeywell. Do you recall when those discussions were?

A No, but -- I can fix them, but you know this business-

Q Approximately within the last year?

A No, you know, it was somewhat before the date hereof and the date hereof is the sixth day of May, 1968, and I presume it was certainly after your visit, if we can fix it that way, and I suppose it was sometime in the interim between

then and May, and perhaps in February or March or April, or some time along like that, and I will be glad to try to derive better values for you, sir.

Q I am sorry, I don't think you quite understood my question, Doctor. I was referring, I was adverting back not to the motion to intervene but to the discussion of your possible rights under the 827 patent.

A Yes, I realize that you are and --

Q I see.

A I certainly -- the sequence of events was roughly as follows, Mr.. Dodds: In the first place, I got a glimmering from learned counsel, and next, my imagination commenced to pursue that gleam, and next, I read some law, and next I consulted Watson, Cole, Grindle and Watson, a firm of patent attorneys in Washington, D.C., with whom I have had some previous association, and I saw, the first man I saw down there was Mr. Watson.

Then subsequently, I decided all of a sudden that if I was getting serious about this I had to play fair with the people with whom I had contracts. I examined my contracts to see if the assertion of such rights would have any relation to those contracts. I came out and visited with counsel for -- with counsel, and then I, upon visiting with counsel, then I approached Iowa State University, but as to dates thereof, that was the normal course of events, I

suppose, for me to follow, I don't know.

Also, along the way somewheres, Saunders, upon seeing him occasionally in regard to other matters, and I saw him and discussed the matter with him, and the form of this contract has been discussed with him a number of times.

Q Does this account which you have just given also include the matter of consideration of the motion to intervene in the Control Data case?

A You see, the concept of the ideas was what was on my mind, and after the concept of the ideas had been developed, then I approached Iowa State University, and Iowa State University have the records of actions which appertain thereto.

Q Was it then your original idea to initiate this motion to intervene?

A Well, bless me. This is the kind of things that counsel do. I don't believe -- this may not be responsive -- I don't believe it was my original idea, I don't believe so, but, you know, I can't be one hundred persent sure, Mr. Dodds. Maybe I did.

Q Whose original idea do you think it was?

A I think it was the idea of counsel for Iowa State University. To the best of my knowledge and belief, it was their idea.

Q Did that come out, perhaps, of one of these

conferences or meetings you had with Mr. Griffen?

A I don't believe so. I believe this is -- these are learned counsel. These are people who mean business in the field of patent law, and I assure you they can think for themselves. As far as my directing their efforts, that doesn't happen, in spite of my, what should I say, a sort of eager beaver type of man who labors in the vineyard of life on various and sundry occasions, and I also sew, I might add.

Q As well as reap?

A I try to reap.

Q And I think you said you discussed the question of the possibility of your having rights in the 827 patent and the ENIAC patent with counsel for Control Data. When did you have that discussion?

A The date thereof I cannot remember.

Q Approximately? Was it in 1968?

A Well, let's see. 1968. Yes, you know, it was after your visit, and so it must have been --

Q How much after, a month, three months?

A Yes, far enough afterwards so it had to come in 1968, yes, sir.

Q Was it two months or three months?

A I would say two or three months, yes.

Q And when did you have the corresponding -- strike that.

And what was the substance of your conversation with counsel for Control Data on this point?

A I told counsel that I was inclined to assert any rights which I might have.

Q This to Mr. Kirkpatrick, I assume?

A Yes, and Mr. Devine I believe was present. I am not quite certain, but I believe Mr. Devine was present.

Q Did you first raise the subject?

A I believe I did.

Q And what was their reaction?

A They were unhappy. They exhibited a slight degree of unhappiness with this decision.

Q And when did you first discuss it with counsel for Honeywell?

A I believe somewhere previous to the time I discussed it with Control Data, but roughly at the same time.

Q And with whom did you discuss it?

A It was discussed in a single day with the three principal members of the staff of Control Data -- I am sorry, of Honeywell, the two gentlemen present and Mr. Charles Call.

E-17-1

Q What did you tell them?

A I told them the same thing that I told Control Data.

Q Mr. Kirkpatrick?

A Yes. Right.

Q And what was their reaction?

A Well, I believe that they took it rather much in stride and as is customary in such matters.

Q Well, they must have expressed themselves in some way?

A They did not advise me to continue or to desist, they told me they could not advise me on this matter and that was that.

Q Do you recall any other party with whom you discussed the possibility of acquiring rights in the 827 patent and the ENIAC patent?

A After leaving the discussion -- well, wait a minute. I will just put it this way. I discussed this subject with my son.

Q Did you discuss this subject with anyone associated with the Research Foundation other than Mr. Griffen?

A I believe not.

Q Any of the trustees in the Foundation?

A I did not so discuss it.

Q Or any directors of the Foundation?

A I did not. Mr. Griffen carried the discussion. There was a discussion with the, and Mr. Griffen carried that discussion.

Q Now, do you know whether the Research Foundation has given consideration to filing a motion to intervene in this action?

A Will you repeat your question, please?

MR. DODDS: Repeat the question, Mr. Reporter.

(The question was read.)

THE WITNESS: I believe they have so considered.

BY MR. DODDS:

Q Do you know the results of that consideration?

A I do not.

Q Do you know the criteria which they have taken into account in reaching a decision?

A I believe the Research Foundation has been advised by counsel. And the opinion of counsel is a criterion.

Q Do you know what that opinion of counsel is?

A I do not.

Q You don't have any -- put it this way. What is your educated guess as to what the position of the Research Foundation is with respect to filing a motion to intervene in this action?

A Well, I, as far as my legal knowledge goes, and you know, Mr. Dodds, it consists of a limited extent and experience and no formal training whatever, almost no formal training whatever, I can add, I would -- it would seem natural that the course of -- that thecourse of filing of such a motion here would be related to the action and decisions in Baltimore, but that's an opinion, and I am merely expressing an opinion, if you like my opinion why that's it.

Q What I was really interested in, in what you might know about the Research Foundation's views on the matter?

A I have no knowledge of the Research Foundation's views I am not a party to the discussions between Research Foundation and counsel. They always exclude me. They inevitably exclude me from such conference, and I therefore have no knowledge. Sometimes I get a little byword, but it will be a very casual one, sir.

Q Haveyou had any discussions with any other parties about the possibility of intervention in this action to assert your rights in the ENIAC patent?

MR. DODDS: Would you read the question, please?

(The question was read.)

THE WITNESS: Mr. Dodds --

BY MR. DODDS:

Q Speaking of intervention by the Foundation?

A You mean of my forcing the Foundation to do it?

Q No. Not of your forcing them to do it, but have you had any discussion with any party as to whether -- as to the advisability of the Foundation moving or not moving in this action?

A Oh, goodness, I haven't any such knowledge that has any substance or otherwise. I don't think that --

Q Have you had any discussions with anyone with respect to the ENIAC patent since the date of issue in 1964?

A I did not see the ENIAC patent until the current litigation began. I have discussed the ENIAC patent with counsel of Honeywell.

Q Anyone else?

A Almost none. No other discussions of substance, I am sure.

Q What do you mean, of substance? Have you had any discussions?

A Well, of course, my present counsel.

Q Yes.

A And I have said, well, we don't know much about the ENIAC patent, now, that's roughly the substance of the discussion there. We wish we knew more about it because we

rely -- once I had a discussion with you on the ENIAC patent, and you said you didn't know anything about the ENIAC patent as of that date, and I also told you at that date that I didn't have any other discussions of the ENIAC Patent. That's the way it goes, and if you mean am I engaging in any undercurrent of sub rosa activities with regard to ENIAC patent, I am not, and I haven't peeled off my coat and gone to work on ENIAC patent now on the advice of counsel, partly on the advice of counsel, at least, and my natural curiosity hasn't brought me to face the 147 claims or however many there are in that patent.

Q With what counsel did you discuss this ENIAC patent?

A With counsel for Honeywell.

Q Yes. And I want to assure you, Doctor, there has been no implication of any devious or underhand practice.

A I don't know --

Q I am trying to find out what discussions you have had.

A You are right.

Q Looking for information.

A I haven't been up against anything like you, and I don't mean to be obstinate or brief in my answers. I believe I am being quite complete in my answers, but the facts are I am trying to be responsive, trying very, very hard to be responsive but sometimes I am at a loss. Is there a question before me now?

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Q I think not. I think you answered the question. Now, in the supplemental agreement by which you, certain rights in the ENIAC patent are conveyed to the Research Foundation, have you given any consideration to the claims of the ENIAC patent to see which claims you think, to which you believe you have a right to assert a claim?

A I have no such list.

Q Have you reviewed the claims from that viewpoint at all?

A To make myself absolutely lily white, I must say that I have read with knowledge and yet, sufficient, and I have a memory of the, of claim 100, but of no other claim.

Q Only claim 100?

A It just happens that I do have that one and I have read other claims, certainly I have, Mr. Dodds, but at the present moment I have no -- I couldn't repeat the substance of any other claim to you and so I am absolutely lily white in my statement about the ENIAC patent.

Q Have you been asked by your counsel or by counsel for Honeywell not to familiarize yourself with the ENIAC patent prior to this deposition?

A I believe there was a hint that it was not their desire that I do so.

Q Coming back to your conference with Mr. Fulmer and the other General Electric counsel, did they give you any

indication that prior to their visit to you that they had been in contact with counsel for any other members of the computer industry?

A To the best of my knowledge and belief the answer is no.

Q This hint that you received that it might be just as well not to familiarize yourself with the ENIAC patent prior to the deposition, did that come from your counsel or counsel for Honeywell?

A Well, counsel for Honeywell have been paying me and they have been paying me remarkably well, and I don't think they wanted me spending part of that time investigating, investigating -- that's the impression I have. Now, that was not mentioned during the discussion but I gathered that was the substance thereof.

Q The answer to my question then is counsel for Honeywell rather than your own personal counsel?

A That is correct. I am sorry, and I wasn't responsive.

Q Now, I believe that you have previously indicated that in preparation for establishing your rights which you claim in the 827 patent and the ENIAC patent, you were asked to construct a reproduction of the Iowa State College machine, is that correct?

MR. HALLADAY: That's not correct in the course of this deposition, Mr. Dodds. I heard no

such statement made.

MR. DODDS: All right. Then we will come back to -- I would like to have marked as DPX-3 an affidavit executed by the witness on July 26, 1968.

(DPX-3 marked for identification.)

BY MR. DODDS:

Q I show you a copy of this exhibit and ask you if you can identify it? Do you identify it?

A I do identify ithat.

Q And you will notice in the first full paragraph on page two is the statement, "Mid 1967 he," meaning affiant, "was contacted by Allen Kirkpatrick, attorney for defendant, to ascertain the particulars of affiant's 1941 work. Affiant was asked to begin construction of a reproduction of his 1941 machine." That statement under oath, I assume, is a correct statement?

A I believe it is.

Q Now, what were the circumstances under which Mr. Kirkpatrick asked you to begin the construction of the reproduction of your 1941 machine?

A My own hesitancy, it relates to the position that I am in with respect to Mr. Kirkpatrick. Mr. Kirkpatrick is not here to object, and I request permission to ask my counsel relative to this matter.

MR. DODDS: Surely.

THE WITNESS: Do you believe, now, Mr. Kirkpatrick might object to my making statements on this. He is not here to make such objections. I am wondering if, therefore, I am not sure of the conditions under which relations between Mr. Kirkpatrick and I should be disclosed.

MR. FALLON: I quite agree with the witness. You have heard what he said here, Mr. Dodds. I think that this would invade Mr. Kirkpatrick's work product, and I am not familiar with anything more than the fact that has been put down here, and I believe this is quite outside the scope of the direct examination so that if there is going to be any further inquiry on this, in all fairness, it should be done with Mr. Kirkpatrick forewarned.

MR. DODDS: Well, I disagree with that completely. In the first place, as I understand, Mr. Kirkpatrick is not the witness' counsel, and any privilege would be asserted by Mr. Kirkpatrick. Insofar as --

THE WITNESS: I have heard the word -- may I -- and I venture with great trepidity here, sir. I have heard the word, "work product," used, and I would like an affirmation from Mr. Kirkpatrick that this is not part of his work product, and what constitutes his

work product I have only the vaguest of opinions and I raise the question for learned counsel.

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MR. DODDS: Well, I will reserve this question until the conclusion of cross-examination. We may need the aid of the Court in obtaining an answer if the witness' counsel advises him not to answer it.

MR. FALLON: The specific question you want to have answered is what?

MR. DODDS: What were the circumstances under which Mr. Kirkpatrick asked Dr. Atanasoff to construct a reproduction of the 1941 machine?

MR. HALLADAY: That is not a correct statement of the language of the affidavit.

MR. DODDS: I believe it is. I stand on it.

MR. HALLADAY: In any event, the affidavit reads --

MR. DODDS: I read the affidavit into the record previously.

MR. HALLADAY: "Affiant was asked to begin construction of a reproduction of his 1941 machine."

And do I understand the question now is something beyond that?

MR. DODDS: The question is, for the third time, the circumstances under which that request was made.

Do you advise your client not to answer, Mr. Fallon?

MR. FALLON: I prefer to keep this on a friendly basis, Mr. Dodds. You have already stated that you would be willing to defer this to the end of the cross-examination. I will personally call up Mr. Kirkpatrick and see what his feelings are on the matter. I think that this is a courtesy we can extend to him. We are all adversaries here, and I would like to do that, since it apparently will not inconvenience you, I mean, to put this over, say, until tomorrow or the next day. You have indicated that we will be here until Friday anyway, so I would like to do that.

MR. DODDS: That is acceptable. If you are going to contact Mr. Kirkpatrick, then I think it is only fair to advise you that I would like to further inquire as to the status of the work which Dr. Atanasoff has done pursuant to that request.

MR. FALLON: All right.

BY MR. DODDS:

Q Dr. Atanasoff, you demonstrated here yesterday, I believe, Exhibits Y and Y-1, the test unit and what you indicated was a reproduction of the add-subtract mechanism of the 1941 machine. Was that -- were those exhibits constructe on the request of counsel for Honeywell or were those a part

of the work and the reconstruction of the machine for Mr. Kirkpatrick?

MR. FALLON: You may answer.

THE WITNESS: They were constructed at the request of Mr. Kirkpatrick.

BY MR. DODDS:

Q Coming now to another subject, Doctor, am I correct that you have either testified or that you told me that the Iowa State College machine on which you were working, which has been called for the convenience of all the abbreviation, the ISC machine, was constructed to correspond to the manuscript or booklet, Exhibits 455 or 456?

A Mr. Dodds, the machine was -- first, the machine was under construction with notes and the like. Then the manuscript was written and then the machine was finished, and then there was additional writings on the machine.

Now, the manuscript, I feel -- well, I can't tell stories here. Let's see. The machine, as far as I know at this instant is quite, at the time that John W. Mauchly saw it, is quite precisely according to the form of the manuscript.

Q Will you refer to your folder F-2, please, which includes these exhibits 455 and 456 --

MR. FALLON: Is that what you want him to look at?

MR. DODDS: I want him to look at the other, too, please, Mr. Fallon.

MR. FALLON: I thought the manuscripts were in F-4.

MR. SHIMER: F-4 is correct.

MR. DODDS: I am sorry. I have it as F-2. I am sorry. It's F-4.

BY MR. DODDS:

Q Would you glance through that and can you agree that those documents identified by the numbers 458 to 462, inclusive, are preliminary drafts?

A 458 to 462?

Q 458 to 462?

A This material is material incident to the preparation of the bound copies, and hence I suppose it could be called preliminary drafts. It may also contain material which was left over after the copies were completed, but if you call all that -- if you just characterize it as material pursuant to the construction of the draft, you will have the meaning there.

Q Yes. So as a practical matter, I am just trying to shorten this, we can forget about the documents 458 to 462 and confine our consideration to 455, 456 and 457?

A I would think so. I am not quite sure the purposes which you wish to serve, but for the purposes that I can

imagine, this seems to be a true statement.

Q Well, we will put it subject to error so if any point comes up that is inconsistent, we can disregard those.

A Right.

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Q Now, if you will look at 455 and 456, I believe you recalled that 456 was essentially the same as 455 except it had been retyped?

A Yes. I found differences of typing in those two copies when I examined them.

Q Well now, 456 also omits the financial, reference to the financial statement in paragraph one, and the last two pages which were the financial statement, is that correct?

A Yes, I can verify that. I believe that is correct. 456. Yes, 456 has the financial statement -- no, 455 has the financial statement. May I correct myself?

Q 456 omits the financial statement?

A Yes, it does.

Q Now, if you will refer to page 21 of each of the documents, in the penultimate line I believe the spelling of "punch" has been corrected in 456 as compared to 455?

A Yes, there is no "n" in my --

Q The spelling has been corrected in 456?

A Yes. I don't know that that makes 456, I don't know that that assures that 456 was typed afterwards, because sometimes opposite things happen in typing.

Q Well now, that comes to the next question. When was each of these typed?

A They were typed almost at the same time. I would say within the same couple of weeks or so, and there were two

2

typings, to the best of my knowledge and belief, and the two typings embraced, perhaps, oh, I don't know, we had to have pretty good copies and probably we didn't get more than three copies. We didn't have electric typewriters in those days, and probably three or four copies is all we could get, and maybe some other copies in this material were rejected after typing of this.

Q When was that?

A In August of 1940.

Q August of 1940. Well now, were there any later --

A And the preparation may have begun in July, but I know that I started on the preparation of this material and worked on it very hard and it has as many copies of the material which you received, many preliminary copies, including original handwritten hand draft of my own on the subject, and I can't do any better than that for you, Mr. Dodds.

Q But these two typings, 455 and 456 were in August, 1940, you believe?

A Yes, I believe so.

Q And when did each of these come into your possession?

A Each of these?

Q Yes.

A They have been in my possession since that day except for the normal delay in the typists getting the stuff up to me and having it bound. I don't know whether we bound

it there or sent it over to some college institution to have it bound. I can't remember as to that, but except for that, they have been in my possession ever since.

Q Now, can you tell me, were there any later typings of this manuscript?

A To the best of my knowledge and belief, there were none.

Q To the best of your knowledge and belief, were there any earlier typings?

A There were none, except that material which was used preparatory to this, and that doesn't only include the material here, but other material in this file.

Q Yes, but I am speaking of the final bound forms.

A That's right.

Q Now, I think you testified at pages 656 to 658 of the transcript that copies of either 455 or 456 were given to Dr. Stewart, to Mr. Poillon of Research Corporation, to Scientific Aids for Learning, and to Dr. Weaver, is that correct?

A Yes. I believe that list -- that list sounds exactly correct, and I believe it is correct.

Q Subject to error. I checked the transcript and I found those names.

A Yes.

Q Do you have any recollection of a copy of either

455 or 456 being sent to anyone else?

A I do not.

Q Did you send one to, was it Mr. Gross or Dr. Gross?

A Mr. Gross never had a copy, no.

MR. DODDS: Mr. Halladay, would this be a convenient breaking time for the day?

MR. HALLADAY: It is agreeable with me if it is agreeable to everybody else.

MR. DODDS: Is 9:15 in the morning all right?

MR. HALLADAY: That is agreeable.

(Whereupon an adjournment was taken until 9:15 o'clock a.m., December 5, 1968.)

VOLUME VIII

UNITED STATES DISTRICT COURT

DISTRICT OF MINNESOTA

FOURTH DIVISION

Honeywell, Inc.,

Plaintiff,

-vs-

4-67 Civ. 138

Sperry Rand Corporation and Illinois Scientific Developments, Inc.,

Defendants.

Continued deposition of Dr. John V. Atanasoff taken by Plaintiff, before Earl G. Anderson and Ward L. Sutfin, Notaries Public, State of Minnesota, County of Hennepin, at 2515 First National Bank Building, Minneapolis, Minnesota, commencing at 9:25 o'clock A.M., December 5, 1968.

(APPEARANCES AS HERETOFORE NOTED)

Whereupon,

DR. JOHN V. ATANASOFF,

witness having been previously sworn, was examined and testified further as follows:

CROSS-EXAMINATION (CONTINUED)

MR. DODDS: Might I inquire, Mr. Fallon, whether you were able to get in touch with Mr. Kirkpatrick with respect to the questions which were left open yesterday?

MR. FALLON: Yes, you may. And I will tell you what happened. This morning I called Mr. Kirkpatrick's office and learned that he is unreachable, being on trial until Monday in New Orleans, and I have given the matter some further thought, and I have no objection to your question to Dr. Atanasoff and I recommend that he answer it.

MR. DODDS: Thank you. One or two other preliminaries. Is a copy of the contract between Honeywell and Dr. Atanasoff of which we spoke available?

MR. HALLADAY: Yes.

MR. DODDS: Could we see a copy of it?

MR. HALLADAY: Oh, well, availability doesn't mean it's in this room.

MR. DODDS: I am sorry.

MR. HALLADAY: If you wish it

immediately then I suggest we suspend while I go find it.

MR. DODDS: No. I think it would be better perhaps if we could do that at the noon recess.

MR. HALLADAY: Fine.

MR. DODDS: And lastly of the preliminaries, the question of the chronological notes to which Dr. Atanasoff was referring, if we might see those?

MR. HALLADAY: I would like to make the record clear that Dr. Atanasoff was in my observation as referred to the chronological notes only by saying that he was referring to same and as far as I can recall never in fact referred to them in terms of examining them while being in the process of testifying.

MR. DODDS: I don't believe that is a hundred percent accurate.

MR. HALLADAY: Well, then, for clarity, may the record show that I am handing Dr. Atanasoff a bound book on the front of which is his signature. And may I ask you, Dr. Atanasoff, if this is a document to which you have made verbal reference in the course of your testimony here?

THE WITNESS: It is.

NS
EX#2
KL-1

MR. HALLADAY: And in the course of your testimony, have you from time to time had that document before you?

THE WITNESS: I have.

MR. HALLADAY: And in the course of your testimony, have you referred to it in the sense of reading it?

THE WITNESS: I have threatened to refer to it two or three times and reached for it. I have never looked at it once.

MR. HALLADAY: Other than in its condition before you?

THE WITNESS: That's right.

MR. HALLADAY: Have you opened it from time to time?

THE WITNESS: I have opened it, but I have never read one line in it.

MR. HALLADAY: All right. In any event, the document you have before you, I now produce and offer to you, Mr. Dodds, the opportunity to inspect same.

MR. DODDS: Thank you. Just by way of identification, could we have this marked as DPX-4?

(DPX-4 marked for identification.)

MR. DODDS: To complete the record on

the point, I refer to page 180 of the transcript in which I commented that I wanted -- "I would just like to have stated on the record that Dr. Atanasoff is apparently referring to some notes which are not a part of the exhibits D-1, the exhibits to which we have been referring."

MR.HALLADAY: That is your statement.

MR. DODDS: That is right.

MR. HALLADAY: At the time, I think Dr. Atanasoff made some comment in response to it.

MR. DODDS: I find no comment in response except an answer to the question immediately preceding my statement.

MR. HALLADAY: In any event, I don't have the transcript before me, but my memory tells me there was a response made substantially of the kind that Dr. Atanasoff made this morning.

MR. DODDS: There is such an occurrence at page 244 of the transcript later in which I called attention to the notes and Dr. Atanasoff said "That is not" -- wait. I will go back.

Again, I said, "Just a moment. I think the record should show that Dr. Atanasoff referred to his notes in a folder which he has referred to as his chronology as aiding him in fixing that date.

"THE WITNESS: May I comment?

"MR. HALLADAY: That is correct.

"THE WITNESS: That is not correct. I didn't refer to them. I started to and found I didn't need to."

But in the first instance, I believe, as I cited before on page 180, Dr. Atanasoff did refer to the notes.

MR. HALLADAY: I beg your pardon. You made the statement that he had and my position is your statement was and is inaccurate.

MR. DODDS: All right. There was no comment. The witness did not disagree with it at the time.

MR. HALLADAY: He wasn't asked to agree or disagree.

BY MR. DODDS:

Q Dr. Atanasoff, how were these notes prepared?

A What notes?

Q I believe the title is, this copy is not distinct, Chronological something.

A Chronological Events, I guess, List.

Q How was this list prepared?

MR. HALLADAY: If you know.

BY MR. DODDS:

Q If you know.

A In part I know.

Q Well, tell us the part that you know.

A I commenced to collect dates of events within my experience from the records. As far as I know, all of those have reference to records.

Q The actual preparation, physical preparation of this list, was it done by you or someone else?

A It was done by a variety of people, partly by me.

Q The copy I have before me is a reproduction of some sort. Do you have the original or is your own an original? This is obviously a reproduction of some document of a smaller page size.

A Well, there have been other copies and the exact status of that relative to those little copies I cannot inform you, sir.

Q Was this copy you were referring to or is this a different copy that you were referring to the other day?

A This is the copy I was talking about.

Q This is the exact copy?

A Well, it's the copy I had here before me. If that was the exact copy, I am not sure. Are you questioning whether this is the exact copy I had before me before? May I look at it?

Q I was wondering if this is the same one or if you had a different copy? That was all.

A This is the copy I had on the desk previously.

Q The very copy?

A The very copy, and I wrote my name here on it and I identified that signature and I have signed no other documents with my name on the front.

Q So this was, then -- I gather the physical work of actually typing this up and binding it, putting it together was done in these offices, is that correct?

MR. FALLON: Do you know that?

THE WITNESS: Well, I have perhaps enough information to allow me to infer that.

BY MR. DODDS:

Q Then if you will, will you refer back to the question of the construction of a reproduction of the 1941 machine, and I believe it is already of record that you were requested by Mr. Kirkpatrick, counsel for Control Data, to do this. Now, would you tell us the circumstances under which that request was made?

A Yes. Mr. Kirkpatrick and I were together. I am sorry, I cannot remember the place. We were together a great many times and talked about a great many things, but we were together someplace, perhaps at his office or perhaps in my home or perhaps somewhere else, and he said, "Could you prepare

a working model of your computing machine?" and I said I could. And then some weeks elapsed and the subject came up again in a conversation between us, and maybe it came up a third time, I don't remember exactly, but there were some such discussions, and each time this was the subject of conversation. I mean, each time we spoke about it the words were more or less the same, and could I do it, and I said I could. Then he said, "Well do it," and I did.

Q I am sorry. You hadn't finished?

A I think I had finished. That's a good place to put a period. Ask me what you will, sir.

Q What time period was this, these several conversations?

A It's not in the chronology, either, and that won't do me any good. I don't know, but let's see. I believe it was during last summer, not the just past summer, but I believe it was the summer before that we had the conversations.

Q That would be the summer of 1967?

A Yes, so probably, let's see -- no, that is not right. Let's say the fall of 1967 would be better, a better guess.

Q And more specifically, just what did Mr. Kirkpatrick ask you to do?

A He asked me to prepare a model which would demonstrate the regenerative memory and the add-subtract mechanism

and the other appurtenances of the machine.

Q Well, did he ask that the reconstruction of the machine be in accordance with your manuscript, for example, Exhibit 455, or in accordance with the machine as it existed at the time that you left Ames, or some other state?

A His guidance there was that it should be constructed in accordance with the manual 455. However, that isn't exactly right, because he specified that it would only have one circle of condensers on the add -- on the CA and one circle of condensers on the KA, and he specified a rather limited number of digits in the base two system. I believe he said three or four, but in the end, the machine was constructed with twelve digits on the base ten system and with one row of condensers in CA and one row of condensers in KA.

Q Is that work completed?

A In the course -- yes, I would say it's completed. yes.

Q Did you keep any record from point to point during the process of its construction, notes or diaries or logs or anything of that sort?

A I have no such logs or diaries.

Q Did you prepare any drawings or circuit diagrams for use in constructing the machine?

A No, there were none prepared, but after the machine was completed or as the machine was completed, why, a

technician made a circuit diagram.

Q Do you have a copy of that circuit diagram available?

A I do not.

Q Where is it?

A Well, there are certainly copies in Mr. Kirkpatrick's possession.

Q Are there any copies in these offices, to your knowledge?

A I don't know where they would be.

Q I say, do you know if there are any in the possession of Mr. Halladay or Mr. Allegretti or his associates?

A You see, the machine has been here and there have been copies here.

Q You don't know whether there are any here now?

A I do not know whether there are any here now.

MR. DODDS: Might I ask, counsel for Honeywell whether copies of the circuit diagram are available in this office or the office of Mr. Allegretti?

MR. ALLEGRETTI: There are none in my office.

MR. HALLADAY: I don't know what we have here.

MR. DODDS: May I ask counsel to inquire as to whether any are available in these offices?

MR. HALLADAY: You may ask me, but whether you get an answer, I don't know.

MR. DODDS: You mean you refuse to answer?

MR. HALLADAY: I am not under examination.

MR. DODDS: I mean, you refuse to comply with my request?

MR. HALLADAY: I don't refuse to do anything.

BY MR. DODDS:

Q Do you have, Dr. Atanasoff, copies in your possession at your home?

A I do. I am not sure these copies that I have in my possession are true representations as of the present condition of the machine, however.

Q Where would, in whose possession would be the circuit diagrams representing the present final condition of the machine?

A Mr. Kirkpatrick has them in his possession. Directly or indirectly, they are in his possession. His agents connected with the organization by whom he is employed must have possession of the machine.

Q You mentioned about the machine being here. Is the machine physically here at this time?

A It is not. I mean, to the best of my knowledge and belief, it is not. I don't really know. You know, I am getting touchy here because I would just use ordinary language and ordinary methods of conversation but I find they don't suffice and that I have to be very critical of the kind of remarks I make. Now, as far as giving evidence, I cannot give evidence that it is not here, no.

Q Is it true that you do not have any personal knowledge where the machine is at the present time?

A Not direct, no evidence that I could swear to.

Q What is your best belief as to where the machine is at the present time?

A My best belief is that it is in Washington, D.C. -- in Rockville, Maryland.

Q At your home?

A No, that is not my home.

Q Well, where in Rockville, Maryland?

A At a Control Data organization in Rockville, Maryland.

Q Now, I believe you have previously testified that exhibits identified as Y and Y-1 which you demonstrated were constructed at the request of Control Data, and were they constructed as an adjunct to that machine?

A Yes. You see, Mr. Dodds, I didn't want to construct the machine without constructing a test set because a test set was needed to test the add-subtract mechanism. This was the procedure employed?

E-3

Q Well, then, from what you say, I gather that the machine itself and the adjunct apparatus exhibits Y and Y-1 were the property of Control Data Corporation, is that correct?

MR. FALLON: If you know.

THE WITNESS: You know, I am not -- I am not informed of relations between the parties here. You know the habit of counsel to keep things to themselves I suppose that they formed these habits from necessity. Whether it is the property of Control Data or someone else I do not really know. I think it is where I stated it is.

BY MR. DODDS:

Q You think it's the property, your best belief is it's the property of Control Data?

A My best belief is that it's in Rockville, Maryland.

Q Well, that didn't quite answer my question. Your best belief is that it's the property --

A All right, perhaps I can say that.

MR. HALLADAY: Just a moment, please. It seems to me the witness is misunderstanding the question. He is not asking you where anything is.

MR. DODDS: I am examining the witness and I want to ask the witness if he understood my last question.

MR. HALLADAY: You can examine him all

you please, but when you get him confused, I am allowed to interrupt.

MR. DODDS: I will ask the witness if he is confused and whether he understands the last question, and I will ask the reporter to read the last question and then I will ask him if he understands it.

(The question was read.)

MR. HALLADAY: And the preceding questions had to do with the test set.

MR. DODDS: The test set and the machine.

MR. HALLADAY: Then it's objected to as a double question.

MR. DODDS: No. I will start all over again. Maybe it's simpler.

BY MR. DODDS:

Q To the best of your belief, Dr. Atanasoff, is the machine a reconstruction of the 1941 machine which you have talked about, is that, to the best of your belief, the property of Control Data?

MR. HALLADAY: Also objected to as an incorrect statement of what the machine is.

BY MR. DODDS:

Q Will you please answer?

THE WITNESS: Will you read the question back so I can see if I can answer it?

3

(The question was read.)

THE WITNESS: It was the property of Control Data. Is that responsive?

BY MR. DODDS:

Q Yes. But the next question is, the same question with respect to the adjunct apparatus, Exhibits Y and Y-1?

A It was the property of Control Data to the best of my knowledge and belief.

Q Do you have --

A I am sure that's correct.

Q Do you have any knowledge of any change in the ownership since the time of which you spoke when it was the property of Control Data?

A I have no knowledge.

Q Where was the machine itself and the adjunct apparatus constructed, or if they were constructed in different places, will you state where each was constructed?

A The apparatus was constructed at my home.

Q And who did the actual construction?

A A mighty lot by me.

Q Pardon?

A A mighty lot by me. And I had an electrician -- I mean an electronic technician assisting me.

Q Anyone else --

A I am sorry, I didn't mean to interrupt you?

4

A And I will get this in usable form here. Then the electronic technician, before the machine was complete, the electronic technician became unable to continue, and I got another electronic technician to help and in this way the machine was finished.

Q Was there anyone else that worked in the construction of the machine and/or the adjunct apparatus?

A Mr. Brown, my man of all help.

Q And these two electronics technicians to whom you referred, by whom were they employed?

A One of them, one of the technicians was employed by Arrow Jet General Corporation, and he was moonlighting on the job, and the other technician was employed by Control Data in some way.

Q Now, in the course of your construction of this machine and the adjunct apparatus at the request of counsel for Control Data, were you acting as a consultant or adviser to Control Data or to his counsel?

THE WITNESS: Will you repeat the question please?

MR. DODDS: The reporter, please?

(The question was read.)

THE WITNESS: I was.

MR. FALLON: I think --

THE WITNESS: Pardon me, I answered it.

5

MR. FALLON: Okay.

MR. DODDS: I am sorry. Did you answer it?

MR. FALLON: He said he was.

BY MR. DODDS:

Q And what were the terms of your arrangement with Control Data or its counsel other than compensation? I am not inquiring as to compensation but what were the terms of your arrangement?

A There were no special terms arranged for this purpose. There were just the normal terms of my arrangements with Control Data.

Q What were those terms?

A I got personal compensation, and I also got expenses, and I just proceeded that way.

Q Then unlike your arrangement -- I am sorry?

A There was no overhead charge or complicating factor like that and I just, I just billed them for the time, for a fraction of the time I put in, in reality, and then billed them for expenses.

Q Then unlike your arrangement with Honeywell there was no formal agreement?

A I did not say that.

Q Well, I am asking you, was there a formal agreement?

A There was a formal agreement.

Q Do you have a copy of that?

A I do not.

Q You mean you do not have it with you?

A I do not have it with me. Yes.

Q But you have it at your home?

A I do not have it in my home.

Q Well, where do you have it?

A I have it in my bank box.

MR. DODDS: I am sorry, Mr. Reporter?

(The answer was read.)

THE WITNESS: Bank box, yes.

BY MR. DODDS:

Q You have said that you billed Control Data for a fraction of the time which you expended in constructing the machine, what about the other fraction?

A Well, I would like to strike that remark, it just complicates things. Nobody else paid me. May I just put it that way. Is that what you wanted to know?

Q That's fine. Thank you. Who paid the salaries of the two electronics technicians to whom you referred?

A I paid the salaries.

Q Under a reimbursement arrangement with Control Data?

A I had explained to counsel that I had an arrangement

7

with Control Data whereby I could bill for my services and bill for expenses. That was just an expense as far as I was concerned.

Q And under this agreement with Control Data, what were the nature of your duties?

A It was a consulting arrangement in which I was to assist them in developing the history of the computing art and render such other services as might be required and I was willing to give. I believe some such terminology in the contract, but I am not -- but that was understood, anyway, if it wasn't in the contract.

Q I just want a general idea, Doctor?

A Yes.

Q What was the duration of this agreement, was it indefinite, open ended, you might say, or was it for a definite period?

A It is an open ended agreement.

Q I am sorry?

A It was an open ended agreement.

Q Is the agreement still in force?

A In my mind it is.

Q All right. Doctor, may we return to a different subject. Yesterday we were talking about the manuscript as represented by booklets 455, 456 and 457. Perhaps you could get those out. Dr. Atanasoff, I believe that the

8

correspondence which has been identified shows that copies of one of your manuscript booklets 455 or 456, I think you said, went to Mr. Poillon of Research Corporation, to Mr. Stewart of Scientific Aids to Learning and to Mr. Weaver, and the dates of the correspondence would indicate that the copy went to Mr. Poillon on November 8, 1940, to Dr. Stewart on August 21, 1940 and to Dr. Weaver on August 22, 1940. You have no occasion to dispute those dates?

A I have no such occasion.

Q Now, I would like to refer you to Davis Deposition Exhibit, I believe the number was 30, though I am not positive of that number, which is, according to Mr. Davis' testimony in his deposition, a copy of the manuscript which was sent to Research Corporation, to Mr. Poillon, he identified it, and this is a photographic reproduction of a Xerox reproduction of their copy which he supplied to counsel in connection with that deposition.

MR. FALLON: Before you ask any question on that, Mr. Dodds, you have referred to a Davis deposition. Now, I don't know whether the witness has had the opportunity of attending that deposition?

THE WITNESS: I did not attend it.

MR. FALLON: Did you see a transcript of that?

THE WITNESS: I did not.

MR. FALLON: You know nothing about the deposition except what you heard?

THE WITNESS: I was about to say this. I was about to say this.

MR. FALLON: All right.

MR. ALLEGRETTI: What case?

MR. DODDS: This is an exhibit marked by plaintiff in this case at that deposition taken by plaintiff, and I just identified where it came from. I am -- I just asked Dr. Atanasoff to compare this with that, that's all.

MR. FALLON: All right.

MR. HALLADAY: My understanding is that was the deposition of Albert --

MR. DODDS: Albert S. Davis, Jr.

MR. HALLADAY: Albert S. Davis, Jr. of Research Corporation taken on behalf of plaintiff in this case, and the document you have in your hand is a Xerox reproduction of what Mr. Davis identified as Exhibit 30?

MR. DODDS: Off the record. May I have off the record, Mr. Halladay?

MR. HALLADAY: All right.

(Discussion off the record.)

MR. HALLADAY: Why don't we go back on the record?

10

BY MR. DODDS:

Q Dr. Atanasoff, would you refer to your letter to Mr. Gross of August 2, 1940 that's in folder B-5, Exhibit 52. I am sorry, I think you also need to refer to folder F-3, a paper, Exhibit No. 451,

MR. FALLON: 451?

MR. DODDS: Yes. It's a letter from --

MR. FALLON: 450, 451, that sort of thing?

MR. DODDS: That's the one, 450. I just want a simple question.

BY MR. DODDS:

Q In the fourth paragraph of Exhibit 52, you ask Dr. Gross to prepare a "resume outlining the developments as you remember them with approximate dates," etcetera. My only question, is the paper, Exhibit 451, the resume which Dr. Gross applied in response to your request?

MR. FALLON: Read the whole thing here to make sure you understand it, if there are any other implications in it. When Dr. Atanasoff is through reading, would you read the question to him so he knows exactly what he is answering?

MR. DODDS: Actually I believe there is no question. There are these exchange of letters, three letters. They don't use the same language. I believe

11

they are connected. I just wanted to make certain of the connection.

THE WITNESS: Will you read the question?

(The question was read.)

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THE WITNESS: 451 --

BY MR. DODDS:

Q It should be 450 and 451 and 452, I believe.

A I would presume so. I have no evidence to the contrary.

Q Then if you will refer in the same folder B to exhibit, I believe it's 56, your letter of August 26, 1940, to Dr. Gross --

MR. FALLON: What was the number again, Mr. Dodds?

MR. DODDS: It's in folder B-5, 56, document 56.

BY MR. DODDS:

Q Now, in the last paragraph, I want to ask you whether or not the last paragraph of that letter refers to this same resume supplied to you by Dr. Gross?

A I believe it does.

Q Now, if you will refer to folder D-1 --

MR. FALLON: Are we through with these now?

MR. DODDS: Yes.

MR. FALLON: D-1, what document?

MR. DODDS: The first is, I believe, a letter dated March 2, 1942. I believe it's 267 or 266, March 2, 1942, from the Research Corporation to

Dr. Atanasoff.

MR. FALLON: 267.

BY MR. DODDS:

Q And then would you refer to the document which I believe is 266, your letter of April 9, 1942, to Research Corporation.

MR. FALLON: What is the question?

BY MR. DODDS:

Q Are you familiar with them? The question, is document 268 the report requested by Research Corporation in the letter of March 2, Exhibit 267?

A Well, doesn't look like it, to tell you the truth. I am not sure. I am unsure.

Q Well, do you know of any other reports that were made to Research Corporation?

A Have you searched my files for other reports?

Q Yes, I have, Doctor.

A I would have to do it myself. This question in the form you put it to me did not occur to me and it doesn't look like -- it may be the report. It may be my only response. It was a very troublesome time, as you know.

Q I am sorry, and --

A And we were under great stress, and I was engaged in this work and engaged in classified work of severe type and it may have been the only response I made, or it may not have, I

really can't be quite sure. I wonder. It doesn't quite look like it, does it? That was a rhetorical question.

Q Let me ask you this. Do you know of any reports rendered to Research Corporation other than those of which copies are found in the files which you produced here?

A I don't know. I do not.

Q And to the best of your knowledge there -- strike that -- To the best of your knowledge, there would be copies of any reports which you made to Research Corporation in your files?

MR. FALLON: Do you want to have that question read back again?

THE WITNESS: I do.

MR. FALLON: Would you read the question back, Mr. Reporter?

(The question was read.)

MR. DODDS: Strike that.

BY MR. DODDS:

Q Do copies of reports which you made to Research corporation appear in your files?

A It's been my purpose in keeping files through the years to keep materials in my files. No effort has been made to exclude any material whatever of this type from my files. As far as I know, these files are complete. I cannot be sure they are complete because many years have elapsed and

these files have on occasion been handled by other people than myself. I believe that the files -- I have no knowledge of omissions from the files.

Q Thank you. Now, I believe it's in the same folder, I don't have the exhibit number, there is a letter from Research Corporation to Dr. Atanasoff dated July 10, 1942.

MR. FALLON: Number 275.

MR. DODDS: Thank you.

BY MR. DODDS:

Q You will note, Dr. Atanasoff, that the last paragraph states, "Insofar as Research Corporation is concerned, et cet. there is no objection to suspending operations until happier times."

Do you know whether operations on the computing machine at Ames were suspended at that time?

A They were not suspended at that time.

Q Now, in folder C-3 --

MR. HALLADAY: May we suspend for a minute while you are conferring?

MR. DODDS: Surely.

(Discussion off the record.)

MR. HALLADAY: All right. I am all set. Mr. Halvorson, who is in charge of these things, is away, his wife has had a baby and she is back in the hospital.

MR. DODDS: Do you want this on the record?

MR. HALLADAY: So that at the moment, I am not able to give you further advice on proper identification of that Davis exhibit, but we are still working on it.

MR. FALLON: Where do we go in Exhibit C-3?

BY MR. DODDS:

Q Exhibit 299, a letter dated December 22, 1942, from Mr. Trexler to Dr. Atanasoff. Just one question. The first sentence refers to "The green covered booklet which I received from you some while ago."

Was that a copy such as Exhibit 455 or 456?

A It was.

Q And do you know, do you recall when this document was given to Mr. Trexler?

A I do not recall. It may be in the record, but if it's not in the record, I don't know.

Q Now, will you refer to folder D-3.

MR. DODDS: Mr. Fallon, while you are there, maybe you will get C-3 again. I need to refer to that.

MR. FALLON: All right.

What documents?

BY MR. DODDS:

Q 331, a letter dated September 5, 1941, from Dr. Atanasoff to Mr. Allen of Remington Rand.

A Yes, sir.

Q My question is, on the first partial paragraph on page two, which reads, "This, however, has not prevented a member" -- excuse me. I will go back. Strike that.

"Your principal competitor in the field of tabulating equipment has a much more elaborate and, if possible, legally tight agreement which it requires those making disclosures to sign." Ellipsis. "This, however, has not prevented a member of their board from writing me at rather regular intervals suggesting that they are ready to investigat the merits of my ideas if I will sign their contract."

Now, my question is, Doctor, which was the principal competitor of Remington Rand to which you were referring in that sentence?

A That's not a hard question. I believe it was International Business Machines.

Q And who was the member of their board who was writing you at rather regular intervals?

A Well, the man there who was writing me and I presume I verified it at the time he's a member of the board, I cannot

verify of knowledge at the present moment, was Mr. Clement Ehret.

Q And I can assume that any, copies of any correspondence between yourself and Mr. Ehret are found in the files which you have produced, that is, any copies that are still in your possession?

A I believe this is true. To the best of my knowledge and belief, it is true.

E-5

Q Then if you will refer to your folder C-3 which are the index that you furnished is indicated as including correspondence with Trexler and others, etcet., and would you review that folder only with respect to your correspondence with Mr. Trexler, and the question is when was the last time that you saw or read the various items of correspondence with Mr. Trexler of which there are copies in that folder?

MR. FALLON: So I understand the question, you are talking about if he has looked at that yesterday or something like that, you want that as the answer?

MR. DODDS: When was the last time that you looked at these documents other than when you merely identified them during this present deposition?

THE WITNESS: Now, you want me to be sure on this occasion I looked at every document in there, or suppose I looked at two documents?

BY MR. DODDS:

Q I would be satisfied with a general --

A Suppose now I said I imagine that within the last -- will you read the question again, please?

(The question was read.)

BY MR. DODDS:

Q I might amplify that by saying we are only interested generally, was it a month ago, a year ago or ten

years ago or more?

A Well, I don't know whether this will satisfy you or not, but I have certainly read it in the last year.

Q Is it to the best of your belief that you read each of those items of correspondence with Mr. Trexler within the last year prior to your deposition?

MR. FALLON: There might be a little bit of ambiguity here, Mr. Dodds, because the witness has already said that he is not sure whether he has looked at all of them or part of them. Reading connotes one thing. It may be that he is confused, or not completely conversant with the use of your term, "reading." Why don't you ask him what he did do in the course of the last year so far as he can recall relative to these, and he will be able to explain it in his own language.

BY MR. DODDS:

Q I adopt your counsel's suggestion. Will you answer that question?

A Well, I have pretty well been through this material. Now, as you go through it, you can't be sure that you verify every statement in every letter. I have no such memory of verifying every statement in every letter. I have had recourse to this file during the last year. I have had recourse to some of it within the last two months.

Q Doctor, I refer you to Exhibit DPX-1 which you

3

identified yesterday, a letter from yourself to Mr. Trexler dated April 23, 1968. The second paragraph refers to the, "other case." What is the other case?

A Will you --

MR. FALLON: Do you know?

THE WITNESS: Well, I know some things to be sure. I know one or two minor things but I was just thinking, I wasn't sure what the case was.

BY MR. DODDS:

Q I am just asking the case which you meant when you used the language in that letter?

A Okay. Then I will have to do reference to be sure which case it was I meant. I do not know at the present moment so I do not know what the other case was.

Q I only have one copy of that. Well, let's back up. The second paragraph starts out, "This matter marches forward." Now, what was, "this matter"?

A Well, now, it refers -- I think I can discover if I can -- if you will show me your letter, your letter to me of April 6. Now, I do not have that easily at hand and if you show me that I believe I can commence to reconstruct the matter of that.

Q I don't have that letter, but I can tell you what was in it. I wrote you asking permission to talk to Mr. Trexler about any -- about his files involving your machine.

4

I don't have a copy of the letter. That was the subject matter.

A In what --

Q That was written in the Control Data case?

A Then the other case was the case being heard here.

Q And, "this matter," refers to the Control Data case?

A I presume this is true. Yes. That would seem logical.

Q Did you discuss the subject matter referred to in this letter with anyone else?

A I don't believe so.

Q One final question. The second paragraph you state, "The date of the first hearing is not settled, but we believe it may be this summer." Who is the "we" to whom you refer?

A I am not sure.

Q Well, what is your best belief?

A This is an editorial "we", I would suggest. I sometimes resort to this, I am sorry. It may not be editorial, I am not sure.

MR. DODDS: Mr. Halladay, I gather it is your preference to defer talking about the Davis Deposition Exhibit until you get a positive identification I believe that number is right but I just can't guarantee

it.

MR. HALLADAY: Well, to avoid any delay or interference with the order that you like to proceed in, if you want to go forward with it now, may it be understood we will provisionally refer to it as Davis Deposition Exhibit 30, and that if it develops that is inaccurate we can agree the reporter may correct the record accordingly because it is merely a matter of numerical identification?

MR. DODDS: That is agreeable. Thank you.

MR. HALLADAY: The Davis transcript hasn't arrived.

MR. DODDS: I didn't think I had mine either.

MR. HALLADAY: I think Mr. Halverson's notes of what transpired at the time would be helpful but he unfortunately is at the hospital so we can't verify it. So let's proceed on the understanding I have stated if that is acceptable.

MR. DODDS: Yes.

MR. HALLADAY: Dr. Atanasoff, so you understand what we are doing between us here, we believe the document was formally marked as Davis Deposition Exhibit three 0, 30. In the event that it appears

6

here it is in error as to that numerical identification, counsel have agreed we may physically correct the transcript to put the proper number in. And if you will have that in mind I assume that's acceptable to you also?

THE WITNESS: That is acceptable.

MR. HALLADAY: Is that all right with you, Mr. Fallon?

MR. FALLON: Correct. Before we do anything I want to hear Mr. Dodds' question.

MR. DODDS: My question was if Dr. Atanasoff would look at that and then I had a few questions with respect to it.

MR. FALLON: I think at this stage Mr. Dodds, perhaps, you might indicate what the questions are. Just examining this, it's 31 pages --

MR. DODDS: I am going to.

MR. FALLON: What is he to look for?

MR. DODDS: That's what I am coming to.

MR. FALLON: All right.

MR. DODDS: I haven't come to it yet. I would like to ask the indulgence of a recess for a few minutes. I am advised there are some items in this Dr. Atanasoff's notebook which reflect on my projected questions on this document.

MR. HALLADAY: All right, it's agreeable with me.

(Recess taken.)

end.

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MR. HALLADAY: All right. I am ready.

MR. DODDS: First, I will state on the record that on closer inspection, I find the reporter's identification of the document which I have previously indicated as Davis Deposition Exhibit 30 is correct.

BY MR. DODDS:

Q Dr. Atanasoff, would you refer to these pages, and maybe you would like to make a note, one, three, four, five, six, ten-sixteen of the green booklet, 455, and referred to corresponding pages in the exhibit 30 and confirm whether or not there is a different lineation on those pages?

MR. FALLON: What do you mean by lineation?

MR. DODDS: That the line numbers don't correspond.

THE WITNESS: Let's see. What was the first page?

BY MR. DODDS:

Q Page one.

A It does not correspond on page one.

Q All right. Is the next one three?

MR. HALLADAY: You are becoming sort of sotto voce here, Dr. Atanasoff, in answering the

2

questions. Please speak up as normally as you can.

THE WITNESS: It does not correspond on three. It does not correspond on four.

BY MR. DODDS:

Q Excuse me a second. Do you want your microphone in operation?

A It probably would help. Thank you. It does not correspond on five. It does not correspond on six. It does not correspond on ten. It does not correspond on eleven. It does not correspond on twelve. It does not correspond on thirteen. It does not correspond on fourteen.

BY MR. DODDS:

Q Now you will have -- I was coming to it in the next question, but at this point the page numbering is changed because in the green booklet the pages with the figured numbers are numbered, while in the Deposition Exhibit 30 the pages with the figured numbers are not numbered, --

A Thank you for your assistance.

Q -- so you will have to correct the pages at that point. Fifteen corresponds -- I am sorry -- page sixteen in the green booklet does not correspond to page fifteen in the copy supplied.

MR. FALLON: Insofar as lineation is concerned?

THE WITNESS: Insofar as lineation

is concerned.

MR. FALLON: That's it.

MR. DODDS: That's it.

MR. FALLON: Yes.

BY MR. DODDS:

Q The next question has been partially anticipated. Will you confirm this in the green booklet the pages following -- page fifteen and following are different than in Exhibit 30 because of the numbering of the pages with the figures on them.

A I observe that, Mr. Dodds. That is correct.

Q Now, will you refer to page six of the green booklet and also of the other?

MR. HALLADAY: In each instance, is the green booklet being referred to Exhibit 455?

MR. DODDS: That is correct. I will refer to it in that respect.

BY MR. DODDS:

Q Now, in the paragraph beginning in the middle of that page, I believe, in Exhibit 455, the words "of course" have been stricken out?

A That seems to be the case.

Q And on page --

MR. FALLON: Well, this assumes that DDX-30 came into existence before --

MR. DODDS: Wait just a minute,

Mr. Fallon. Let's don't talk about when these came into existence. That's a very critical point which I want to discuss later. I just want the difference between the two.

MR. FALLON: All right. There is a difference. Whether they were stricken or added is an assumption.

MR. DODDS: All right. I think that is correct.

BY MR. DODDS:

Q So that in 455 the words in the first line of the first full paragraph "of course" do not appear, while they do appear in Exhibit 30, is that correct?

A That is correct.

Q Now, will you turn to page 14, please?

A All right.

Q In the last paragraph, line three in Exhibit 30, there appear the words "In the direction of motion", which I believe do not appear in Exhibit 455, is that correct?

A That is correct.

Q And coming to page 23 of 455, page 21 in Exhibit 30, in the penultimate line our friendly word "punching" has been corrected, has been correctly spelled in Exhibit 30 and incorrectly spelled in 455, is that correct?

MR. FALLON: Hold it a minute. You

are referring to page 21?

MR. DODDS: Page 21 -- page 23, I believe it is, in -- 21 -- I am sorry --

MR. FALLON: Twenty-one of 455, where is the --

MR. DODDS: I think it's page 19, page 19 of 455 and 21 of --

MR. HALLADAY: Excuse me. I started out with my reference to page 23 or 455, 21 of Exhibit 30. Have we changed the pagination?

MR. DODDS: It is confusing. I think it is page 19 of 455.

MR. FALLON: No . It's page 21 of 455 and page 19 of DDX-30.

MR. DODDS: All right.

BY MR. DODDS:

Q At any rate, the word "punching" is correctly spelled in Exhibit DDX-30 and incorrectly spelled in 455, is that correct?

A That is correct.

Q Now, if you will refer, still on Exhibit 455, page 24 -- I am sorry, there is only one copy. Could I look at that? In the last paragraph, and referring particularly to the last line on the page, I believe you will find the beginning of the line in the two documents is different, is

that correct?

MR. HALLADAY: Are we comparing page 24 of 455 with --

THE WITNESS: With 22 of 30.

MR. HALLADAY: Thank you.

THE WITNESS: It is different.

BY MR. DODDS:

Q Then will you refer to page 25 of 455 and page 23 of Exhibit 30? May I see that a second? Excuse me. Will you strike that.

Refer to page 26 in 455 and 24 in Exhibit 30, and taking, for example, the last line of the first full paragraph, I believe the contents of the lines are different, is that correct?

A That's true. That is true, they are different.

E-7-1

Q Then page 28 of 455 and page 26 of Exhibit 30, there is a certain difference in beginning and ending of lines as represented by the last line, is there not?

A There is a difference.

Q Now, will you refer to Fig. 2 which in 455 is page 17, I believe, and in Exhibit 30 follows page --

A 15.

MR. FALLON: No, 18, probably.

THE WITNESS: Follows 15.

MR. FALLON: Right.

MR. DODDS: Follows page what?

MR. FALLON: 15.

BY MR. DODDS:

Q 15. In the lower right-hand portion of Fig. 2, I find two terminals labeled Cap. A and Cap. C, is that correct?

A Yes.

MR. FALLON: You are speaking with reference to the one in 455?

MR. DODDS: In 455.

BY MR. DODDS:

Q Now, those reference letters are not found in Exhibit 30, are they?

A They are, but faintly.

Q And not inked letters?

2

A Not inked the same. Probably in pencil, probably in pencil, but they are the same letters there.

Q Yes. Probably in pencil?

A Yes.

Q Now, the same applies, also refer to the designation of the supply voltages, plus 120V and minus 120V?

A Right. Right you are.

Q I didn't finish. They appear in 455 but do not appear in DX30, is that correct?

A Well, we have got minus 120 volts out there in the proper position and it is evidently written in pencil.

Q In the margin, is that right?

A In the margin. Right.

Q Do you have any information as to who may have applied those legends in pencil on DX30?

A I do not.

Q All right. Now, Dr. Atanasoff, I believe you testified that Exhibits 455 and 456 were prepared in August, 1940, is that correct?

A That is correct. Yes.

Q Do you know when the version Exhibit 30 was typed and prepared?

A I have no reason to supposed it was not typed and prepared during the same month.

Q Do you have any definite recollection that it was?

3

A Do you mean do I isolate it in the typing from the rest of the documents, is that your question, really?

Q The question is that DX30 has a number of differences which we have just gone through with respect to 455?

A Right.

Q And the question is, do you know when the version represented by Exhibit 30 was typed and prepared?

A I have no knowledge of any preparation of these documents taking place except in the sequence which I have described in August of 1940.

Q But your previous description of the preparation of this manuscript, you referred to Exhibits 455 and 456 and did not refer to the version represented by Exhibit 30, so my question is do you have at this time, do you have any knowledge when the manuscript represented by Exhibit 30 was typed and presumably bound?

A It is clear that the witness cannot state that he remembers the typing of each individual copy of this. He, however, remembers the scenery and the operation during which these documents were prepared, and as far as he has any memory or belief, they were all prepared consecutively during the same period of time which may have begun in July and ended some time in August of 1940.

Q Well, then, Dr. Atanasoff, it has been established, I ask you to accept for the present it's been established

4

by the deposition of Plaintiff's witness, Mr. Davis, that DX30 was the copy which Research Corporation received rather than a copy of 455 or 456. Now, I would like to ask you which of these versions were sent to the other gentlemen, for example, to Mr. Weaver and to Dr. Stewart?

A There are no records in my possession showing which of these versions were sent to the gentlemen in question. Obviously memory will not suffice in a matter of this kind, but I do remember that there was a very active and complete preparation of this document during that period and that no further time was this document modified, changed or otherwise disturbed.

Q And so far as your recollection goes, the copies of the manuscript sent to Mr. Weaver and Dr. Stewart might have been either of the version of 455, Exhibit 455, or the version of Exhibit 30 which went to Research Corporation?

A I believe this is true.

Q And now coming, shifting the scene a moment, I believe you said that you had shown a copy of this manuscript to Mr. Mauchly during his visit. Do you have any basis for saying which one, which version of the manuscript was shown to Mr. Mauchly, allegedly shown to Mr. Mauchly?

A Well, there were only a few copies. These were bound copies. They were in my personal possession, and I suspect, although I cannot prove, that Dr. Mauchly saw one of

the copies that's under my hand at the present moment. That means 455 or 456.

Q Do you have any basis for saying that --

A There was -- I should add for the sake of completeness, I remember that I previously had three copies in my possession and one of these was loaned to an attorney and was not returned although the understanding is that it would be returned.

Q Well, have you any basis for suggesting that particularly one of the booklets was shown to, that you assert was shown to Dr. Mauchly was one version rather than the other if they were all produced at the same time?

A As a matter of fact, I have, my memory is, as I have previously declared, that there were two final typings of this thing and the two final typings, and the two final typings. Now, that does not mean that there were other preliminary copies, there were other preliminary copies, and you have them in your possession and we all agree and know about them, but there were two final typings, and the copies that were intended for distribution were from those sources. Now, as I sit here, of course, I don't know what happened, Mr. Dodds. You can see if the differences in these three copies have significance or not. This is my belief at the moment, that there were two final typings of this , and that there were other preliminary typings and by some machination,

6

a preliminary copy must have been sent to Mr. Davis, if that is a copy which he received.

Now, on the other hand, I cannot certify there were not two copies sent to Mr. Davis. I can't be sure about that because he was considered a very -- I knew that he intended to submit it to other parties, and he was a very principal receiver of this document, and so it may well have been two copies were sent, but this just confuses the issue. I still assert my best memory and belief is as I previously stated.

Q Dr. Atanasoff, at the time that you were seeking a grant to support your work from Research Corporation, does it seem reasonable you would have sent Mr. Poillon in November, three months after these pamphlets were prepared, a preliminary set rather than a final typing?

MR. FALLON: I think the question is argumentative here. Ask the witness what he recalls sending Dr. Poillon. I mean answer the question in that sense rather than the reasonableness of it.

THE WITNESS: May I answer the question as stated?

MR. FALLON: All right.

THE WITNESS: Will you withdraw your objections?

MR. FALLON: Yes.

7

THE WITNESS: It certainly does not seem reasonable. I agree with counsel, but you have had office help and I have had office help and we know that things like this sometimes happen.

BY MR. DODDS:

Q Well, let me ask you, do you consider this Exhibit 30 not a final typing?

A I would rather before making a firm assertion of that kind, I would rather study the document in detail overnight or something of the kind. I have not had -- I have had no previously access to that document. I knew it existed but I have had no previous access to that document so I -- I haven't had a chance to study it and I am, of course, surprised at the differentials which you have demonstrated which are clear and true. I have no question of, I am turning this over in my mind to see how it relates to my memories. I have described what that relation may be. It may not be valid.

Q This photocopy does notshow it. I represent to you that it was contained in a bound green folder as were the others and I believe the testimony of Mr. Davis brings that out.

A Thank you for that.

Q You have no reason to believe that is what you call a preliminary typing, is that correct?

A I have no reason either to believe or not to believe

8

it was a preliminary copy.

Q To be consistent with your earlier testimony, this Exhibit 30 must have either been a preliminary version or there must have been three final typing versions in August, 1940, is that correct?

A I would agree with that.

7/2/1

Q Still on the green booklet Exhibit 455, you indicated in your earlier testimony that you considered claim 100 of the ENIAC patent to apply to your computing machine. Do you also consider it to apply to Exhibit 455, the disclosure Exhibit 455?

A Well, I would like to have it, my testimony -- I stated yesterday that one claim that was firm in my mind was claim 100 of the ENIAC patent. The contents of that I was aware of. I do not remember any claim that it applied to my work, but I may have so stated because I will now state that I do believe it applies to my work.

Q And do you believe -- I am sorry?

A Now do I believe it applies to 455?

Q That's the question.

A I will take a little reference.

Q All right. You want to look at claim 100?

MR. FALLON: Yes.

THE WITNESS: Yes. It would be all right to do that, but I don't think I need to.

MR. FALLON: No. Let's have it.

THE WITNESS: I will do it without it.

MR. FALLON: I want to see it.

THE WITNESS: You can see it but I won't see it.

2

BY MR. DODDS:

Q Are you ready to answer the question, Dr. Atanasoff?

A Will you repeat the question?

MR. DODDS: Or was there a question?

THE WITNESS: That's what I would like to know. Do you have one in mind, sir?

BY MR. DODDS:

Q I think you did say, did you not, that you considered claim 100 to apply to the disclosures of the Exhibit 455 booklet, is that correct?

A I said it applied to my work.

Q Yes.

A I swore to that.

Q Yes.

A Now, I don't think I said it yesterday, I said it today.

Q Yes.

A So I am glad to say it today. I will now state it applies to the booklet.

Q And would you designate any particular portions of the booklet which you think support this claim 100 of the ENIAC patent?

A The portion of the booklet is on page 30 of Volume -- of booklet number 455. It is in the paragraph at the top of the page.

Q Are there any other portions of the booklet to which you would want to refer?

A For this relationship?

Q In the application of claim 100?

A No..

MR. HALLADAY: Would you read me the last question and answer, please?

(The question and answer were read.)

BY MR. DODDS:

Q I think when we were talking on this subject yesterday, Doctor, you felt present assurrance only with respect to claim 100 of the ENIAC patent, of course, reserving the right to certain other claims?

A I certainly reserve the right, sir.

Q In the meantime, are there any other claims of the ENIAC patent on which you feel assurance?

A The statement I made yesterday was, I believe as follows -- perhaps we should have -- I don't know whether it's easy to do, to have the record read. Is it permissible for me to ask the record be read?

Q We can. The only question is do you have anything to add to it?

A Well, --

MR. FALLON: Not at this time.

THE WITNESS: This places a burden on

me. I can just state the facts and as far as adding additions, of course, would be glad to make use of the records as counsel wants to do in certain circumstances and not attempt to use memory solely for such purposes. However, I will state as follows:

MR. FALLON: Nothing more at this time. That's all.

BY MR. DODDS:

Q We will look that up and we maybe can go on and come back.

A If you will look it up I will make the addition.

Q Dr. Atanasoff, have you ever seen any written analysis or comparison of the claims of the ENIAC patent with respect to either your machine or the disclosure of the manuscripts such as Exhibit 455?

A I have not.

Q I notice in your log book there is a reference to such a comparison. Is this something you have not seen, nonetheless?

A Will you give me the reference and let me look at it so I can see?

Q Yes. I will read it into the record so we are clear. "Since 1966 memorandum from C. G. Call to D. Allegretti comparison of ABC with the ENIAC patent claims." I might ask a preliminary question. ABC means Atanasoff

Berry computer as described in booklet 455, is it not?

A It does.

Q And the question is, does that refresh your recollection as to whether you have seen such a --

A I have not seen such a document.

Q Now, would you refer to Exhibit 455 figure one on page 15 and there is a switch at the upper left-hand corner labeled S-3?

A Yes.

Q Now, I have a fairly involved question so I will read it first and then maybe ask the reporter to read it back to you slowly. Referring to this particular figure to the disclosure of 455, I would like you to describe the intended duty cycle of the switch S-3 during the placing of a number on the abacus KA, placing a number on the abacus CA, adding the contents of abacus CA to the abacus of KA and the regeneration of the information on abacus KA. That's pretty involved, but the duty cycle of the switch, at what portions of the cycle during this operation is the switch opened and closed?

A I request that counsel alter his question in one small regard to make it easier to answer. I request that the counsel instead of saying to add the abacus CA to the abacus KA, and that he reverse the order, add the abacus KA to the abacus CA.

W-8-1

Q I accept it.

A Now would you read the first portion, please, as corrected?

(The question was read.)

MR. DODDS: Then would you read the amendment requested by the witness?

(The amendment was read.)

THE WITNESS: I suppose I am going to have to write that question down before I can answer it in the order in which you asked it. I could ask it in some other order. You spoke of duty cycles and switch S3, did you?

Q Yes.

A Now, S3 is the switch that's operated by the one cycle. It's a switch actuated by one cycle mechanism which previously has been described. Do I need to describe that again?

Q No.

A Now, that means that that is the switch that changes its position during the vacant portion of the cycle and changes back to its original position during the next vacant portion of the cycle.

Will you object too much if I make a mistake in the order in which I answer these questions?

Q No, that's all right.

A Because I can't remember the order that you have them in.

Q Yes.

A Suppose the switch S3 is turned to the right or its uppermost position and is there during the course of the discussion, affixed there during the course of the discussion. During this period, KA will be regenerated by the agency of tubes two two, two three and T one. You will -- if I may interpose, you will have to make the correction in the upper right-hand corner of the diagram that we have discussed previously.

Q Yes.

A And CA is regenerated through the agency of the add-subtract mechanism, period. That is the regeneration portion.

Now, if the switch S3 -- in a way, Mr. Dodds, the way I am answering this, this is not going to be responsive, but please allow me to do it this way.

Q Surely.

A And then criticise the response and I will attempt to correct it to make it responsive.

Q Surely.

A Suppose that the switch S3 is dropped to the left-hand position.

Q Yes.

3

A During the vacant portion of a cycle and it remains there for one cycle and then it's returned to the uppermost position, the results will be as follows: The contents of CA will be transferred to KA. You didn't ask me that question but that's what happens. That is the agency of switch S3.

If you wish me to describe how addition is performed, I will have to go outside of the agency of switch S3.

Q No, that is not necessary. We will just assume that the addition is performed. I am just interested in, during these various phases, various sequence of operations, the position of S3.

A The purpose of that switch S3, it has only one purpose which I have described to you, and that is to drop to its left-hand position, during which the contents of CA are transferred to KA. That is the purpose of switch S3.

Q Otherwise it remains permanently --

A In the uppermost position.

Q In the uppermost position?

A That is correct.

Q Now, that's fully responsive. Thank you.

Now, just one question. Could you point out to me where in 455 that operation is described?

A I don't know. That would take me a long time. I

4

would like to have it overnight to search for that. That's a long thing. Perhaps that isn't described there, I don't know.

Q Okay. We will just --

A You know, it could have been left out, I don't know. I think all I could do is commend counsel for the defense on their assiduous study.

Q One small point I think I neglected. You can identify the folder which is the reporter's mark DPX4, can you not, as the chronological list which has been in your possession?

A I can.

Q Since, Dr. Atanasoff, you said that you had not seen this document which I have previously identified, a memorandum from Mr. Call to Mr. Allegretti comparing the claims of the ENIAC patent to the ABC, that information in this list apparently didn't come from you or your files, then did it?

A It did not.

Q So the list includes, it's really a composite, is it not, of information from your files and information from the files of counsel for plaintiff?

A It's clear -- I forgot about those last pages. There's some recent additions there. As far as I know, the main part came from my files, but the correction certainly stands.

Q Would you refer to folder E-2, document 404? This is a copy , a carbon copy of a letter which I think you previously identified. The date at the top, I assume that is August, 1966, is it?

A That means August of 1966, and I evidently didn't have the day and so I didn't put it down.

Q Yes. Now, it appears from this letter that Mr. Griffen had requested a copy of the booklet, which I assume was Exhibit 455, isn't that correct?

A I would judge so, yes.

Q And you referred him to Mr. Trexler for a copy of that booklet in this letter?

A I don't think so. I don't think that is the interpretation, as I remember it.

Q The first sentence reads, "I approve of your plan to get a copy of the booklet."

A That was his plan. That wasn't my plan.

Q All right. I stand corrected. You didn't at that offer to send Mr. Griffen one of the copies of the booklet which was in your possession?

A I never do that.

Q Nor to send him a copy of one of the booklets in your possession?

A Well, I would not think of sending one of the copies in my possesion. I have on occasion done this, but that is

my plan and fixed plan. Now, he wrote to me and asked me, I believe, and I don't see the letter here, but my memory is that he wrote me and asked me if I would give him permission to get a copy from Mr. Trexler, and I said, "Yes, go ahead," and this is the letter saying yes.

Q Is there any particular reason why you did not offer to supply Mr. Griffen a photocopy of one of your copies of the booklet?

A Well, if you mean that I didn't have those copies in my possession at that time, the answer is, that is not the reason, I assure you. There is some other reason we must search for, and I believe the reason is that I didn't want to be bothered with it.

Q Would you refer to your folder B-3, Document 27. What I am referring to, I think there was a little confusion between Nos. 27 and 28, and I am referring to the one which actually bears both numbers and 8 is crossed out.

A I think that 27 is the correct name for this.

Q And I believe you testified at page 223 of the transcript that this was a diagram of a 9 triode logic circuit devised by Mr. ~~Barry~~ B in the fall of 1941. Have I correctly stated it?

A It's mostly correct. I am trying to verify the fall of 1941. Did I say that at that time?

Q The transcript shows that, page 223. Incidentally,

the date is not significant.

A All right. Just omit that, and I will testify, I will agree.

Q That is subject to correction as to the date.

A Yes.

Q My question was, do you know whether or not the circuit shown on this Exhibit 27 was used in any equipment at any time?

A Yes, I know.

Q And on what equipment was it used?

A It was not used, I am sorry.

8/2/1
WS KL

Q I think, I am sure you testified you left Ames, Iowa, in September of 1942?

A I did.

Q Do you know whether or not any further work was done on the computing machine at ISC after you left?

A Again, I am up against the legalisms of the situation. I believe that --

Q I am just speaking of work in a practical sense. Was anybody working on the machine after you left?

A This is what I am trying to ascertain to be very exact in my statement to you, sir. Mr. Frisell was there at the time and I would not be much surprised if he did some work after I left, but it was a minor, I would say it was probably a minor amount of work, to give this answer a little perspective.

Q You don't have any present recollection of any particular changes in the machine that were made after you left?

A I do not.

Q Now, the title of booklet 455 is, and I quote, "Computing Machine For the Solution of Large Systems of Linear Algebraic Equations," is that correct?

A That is correct.

Q Was the computing machine ever operated to solve any given set of simultaneous linear equations?

A It was not.

Q With whom have you discussed this 1941, I will call it for brevity the ISC computing machine?

A We call it the ABC.

Q All right. I will use your term. With whom have you discussed the ABC computing machine within the last three years?

A Well --

MR. FALLON: That includes even casual references? Is that what you are talking about?

BY MR. DODDS:

Q I am not referring to someone you may have just said, had casual reference to it without any discussion of the substance. I am talking about only any conversations and discussions involving something more than just a mention of the item.

MR. FALLON: Well, I only ask that question for clarification, Mr. Dodds, because it's apparent that at least since May of 1967, Dr. Atanasoff has been highly involved in this on behalf of at least two corporations, and now latterly with Iowa State University Research Foundation. He has had people with whom he has probably discussed this matter outside of those organizations, so with the caveat that the list may be incomplete, do the best you can.

BY MR. DODDS:

Q That's all that is requested.

A I would point out, let the list contain the following groups: Counsel for Control Data, counsel for Honeywell, counsel for Iowa State University, Mr. Trexler, Mr. Bradley, and a patent attorney in Chicago, I think we can get his initials for you; this discussion was rather casual and my discussions with Trexler were also casual. I am not even sure if I should add them. The technical man who assisted me on the machine.

Q Anyone at Iowa State, Dr. Legvold?

A Oh, thank you. I believe that we could dignify my discussions with Legvold as of some substance.

Q Mr. Orr?

A I doubt if they would rise to such classification.

Q Anyone else at Iowa State?

A I am thinking of one man by the name of Robert, in the computing division by the name of -- Bob Stewart

Q Perhaps his name isn't important. It's someone in the computing section at Iowa State University?

A Yes. There is a gentleman there rather on the technical side, and my discussions with him, I am even in doubt as to whether they rise to, if you are talking about the precise, you know, intricacies of the computing nature, I am not even sure I have gone into them with Sam Legvold. You

said during what period?

Q The last three years.

A I am not sure I even did that with Mr. Legvold the last three years.

Q And the question was not, however, confined to the technical details of the machine.

A Yes.

Q How about counsel for General Electric?

A Counsel for General Electric, please add them, and that implies three men.

Q The same three you have mentioned before?

A Yes, it does.

Q And how about Mrs. Berry?

A Well, I have certainly discussed the matter with Mrs. Berry. Thank you, sir.

E-9-1

Q Can you think of any others?

A Well, a man by the name of Bob Mather, oh, what is the University in California -- what is the University?

MR. FALLON: Berkeley?

THE WITNESS: Berkeley. Thank you. And a man by the name of Jim Elder at Berkeley, and a man -- of course, Mr. Frisell.

BY MR. DODDS:

Q At Ann Arbor?

A He is at Michigan, Holland, Michigan. I believe it's Holland, Michigan. And Mr. Gert Weisman of Chicago.

MR. FALLON: Mr. Dodds, if I may suggest, if you have any other categories of people to refresh the witness' recollection --

THE WITNESS: It would be useful.

MR. DODDS: No, I don't. That will probably suffice and we will leave it this way, that if during your deposition other names occur to you, perhaps you will let us know?

THE WITNESS: Yes. I am having a little trouble just getting at these this way.

BY MR. DODDS:

Q Yes. You refer to the ISC machine as the ABC computer. Will you state for the record what that refers to?

A Well, somebody else first used this term and Mr. Berry being dead, I felt I rather liked the idea of including Mr. Berry's name in the machine so I just called it the Atanasoff-Berry Computer. It refers to the machine under -- the last major machine under construction at the Iowa State University.

Q That being, ABC being the acronym for the Atanasoff-Berry computer?

A Right.

Q Do you recall when you first started applying that designation to the computer, ABC?

A Oh, within the last couple of years. Well, let's say since the current litigation has been in question because I never had any necessity of naming it previous to that, but it just kept having to name it over and over again and became clear I'd better separate that from the other entities here.

Q Now, coming back to, briefly to Dr. Mauchly's visit to you in 1941, I wonder if we could see the chart, Exhibit V here, the perspective view of the computer.

A Mr. Dodds, may we go off the record a moment?

MR. DODDS: Surely, if it is agreeable with Mr. Halladay.

MR. HALLADAY: Sure.

(Short recess taken.)

3

MR. FALLON: Exhibit V is on the blackboard.

BY MR. DODDS:

Q One question. Do you notice the panel, I believe you called it panel, the panel called, "Thyratron punching circuit"?

A Yes.

Q Was that on the machine at the time of Dr. Mauchly's visit in 1941?

A I believe it was not.

Q You were naming exceptions the other day of changes --

A I didn't put that one on. I believe I was in error with regard to that. I somehow, as I glanced over the picture, I slipped on that.

Q In this machine, Exhibit V, was it possible to run the motor and drive the drums without having the electronic circuits energized?

A It was.

Q Now, let's come back to the cold night when the flash of genius struck you.

MR. FALLON: Is that a fair characterization of previous record?

MR. DODDS: I believe he used the language.

THE WITNESS: I didn't use flash of genius, I guarantee you, and if you can find that in my statement. There is reason for it too, Mr. Dodds, and that is that I don't really, I don't really much believe in genius. I believe in ditch digging and a lot of hard work.

BY MR. DODDS:

Q You believe with Edison that an invention is 90 percent perspiration and ten percent inspiration?

A Yes. Some inspiration might have occurred on that evening but --

Q At any rate, referring to that evening, I think you know the evening to which I refer?

A I do that, yes.

Q Do you recall at what time you left your office in the Physics Building?

A Oh, not exactly. I would suppose it was in the neighborhood of 7:00 o'clock in the evening.

Q And do you recall at what time you returned home?

A No, I don't. But it was well towards daylight, if not daylight, when I got back. I spent the night at it.

Q When you described your outward drive at a relatively high speed to these locations, I don't recall now, I believe it was to a bar that -- do you recall where that was?

A That was across -- you know, I don't know exactly. It was across the river.

Q Which river?

A The Mississippi River. At the tri-cities there, you know, what are the names of these tri-cities? Someone will have to supplement my memory, but it's Rock Island, isn't Rock Island one of them?

MR. FALLON: Yes.

BY MR. DODDS:

Q Well, that I don't think is material.

A I drove across the river and I remembered that the distance at 189 miles, as a matter of fact.

Q Did you return by the same route that you went?

A As far as I remember I did. Yes.

Q But at somewhat slower speed?

A Yes. Somewhat slower speed. I wouldn't say too much slower because I was -- I have a rather bad reputation in this regard, Mr. Dodds, and I don't intend to drive fast, but it's something about me just drives me fast.

Q Do you consider a binary counter as an important component of a base two computer?

A I would ask counsel to define binary counter?

Q Well, is the term sometimes used synonymously with a scale of two device, is that term familiar to you?

A It certainly is, and it's precise as far as my

own general knowledge of the subject goes, quite precise. Not exactly precise but it's close. Now, will you repeat the question in those terms?

Q Well, in considering the term binary counter as it is frequently used synonymously with scale of two counter, is that an important component of a base two computer?

A I am still a bit of a diehard. I would like to ask if you are referring to the types of circuits which have flip-flops in them which have vacuum tubes so related that they have two stable positions and as a result of the concatenation of these devices they become a scale of two counter, is that the device? I am trying to get --

9/2/1
EA KL

Q I think that is it -- I am sorry?

A I am trying to get it a bit more precisely if you don't mind.

Q My question was more generic than that, that is a species of what I am talking, one type of scale of two counter, I think there are other types, I was thinking only in terms of electronic devices?

A Mr. Dodds, I do not wish to argue with counsel, but I may make one remark, that if you do not mean that or substantially that then we can take any binary computing machine and it is a binary counter, and so all computing machines are binary counters.

Q I limited it to electronic devices?

A All right. Limit it to electronic and the remark is still true as far as electronic computing machines go.

Q Yes. So that in that broad sense, a binary counter is an essential component of any electronic computer?

A Any -- I didn't say exactly that. I said as follows, any computing machine, any scale of two computing machine will function as a binary counter.

Q And any computing machine, of course, comprises a great many components and some of those components must be binary counters, is that correct?

A I didn't say --

Q I know you didn't say that, I am asking you?

A Now, I already told you -- pardon me, I didn't mean to use that language with counsel. May I use a more courteous discourse. That was a professorial remark. I was teaching a bit too hard in that instance. I have already told you -- pardon me. I have already stated that if you take any base two computing machine it will function as a binary counter. So then it is mere tautology to state that any computing machine has a binary counter in it, but this is when you employ the broad concept which you -- I am not sure whether this is what you have in mind or not. You mean, did you mean to question me on mere tautology or did you expect I would give more substance to my answer than that?

Q Well, I was trying to differentiate between a composite computer which is an elaborate affair and has many, many parts to it and is, you say, an over-all binary counter, but it also must have within itself many sub components which are themselves binary counters, isn't that correct?

A That commences to take on a dubious nature, that remark. I cannot answer that yes with certainty.

Q Well, would you answer it with the necessary qualifications you think appropriate?

A Suppose you restrict yourself to the vacuum tube systems which have two states which is a well-known type of binary counter and which --

Q Right.

3

A All right. Then I would say a computing machine does not necessarily have to have these devices within it.

Q I am sorry, does or doesn't?

A Does not have to have these devices within it.

Q Do you recall, Doctor, what make and type of condensers were used in the ABC machine?

A I do.

Q Will you state?

A I just happen to. I can't give you answers on everything but these were manufactured by the John E. Fast and Company of Chicago.

Q What type were they?

A They were paper condensers.

Q Did they have a type number?

A I can't give you that.

Q Would you refer to the documents in folder G-1 on condensers and see if you can identify from that?

MR. FALLON: Any particular document?

MR. DODDS: Frankly no because I didn't know what it was. I didn't know what to look for.

THE WITNESS: Well, here is a quotation from them. I turn to it immediately but no type number is given.

E-9-3

MR. HALLADAY: Number, please?

THE WITNESS: 617 is the reference in question. 618 also applies to the same.

BY MR. DODDS:

Q Well, you don't recall any type designation of these condensers?

A May I remark that if you examine 617, it states facts known to me to be true. We did not buy a finished product. We bought the bare innards, the inner parts of the condenser, and that may be the reason there are no type numbers applied to this item. You notice they were 600 volts DC. You notice that it is stated there that they have internal resistances one to four times ten to twelve ohms.

Q Do you recall what the fall time of these condensers was?

A Well, what we did instead of measure it, you know,--

Q Do you remember what it was?

A Several minutes as tested in our laboratory.

Q Now, would you complete what you started to say when I interrupted, how you measured this fall time?

A Of course, I was about to tell you that, you know. I wanted to be a bit precise before I stated the fall time. It was customary in our laboratory to a sufficient degree of accuracy and we did not need this fall time with any degree of accuracy, and we just measured the time necessary for the

voltage to fall to one-half instead of one over eight of its value. I was about to make that proviso in the statement of fall time.

Q Yes.

A Now, the fall time varied and it varied with a lot of other little things, but it was, as far as I am aware, I don't think that we ever measured a condenser at that period where the fall time was not at least a minute.

10/1
WS KL

Q Well, to be just a little bit more specific, how did you measure this? Did you attach a voltmeter to it and let it stay or did you apply it to it periodically or how did you measure this fall time?

A We had very, we had vacuum tubes operating under very high internal impedance. They were charged on the grids of these vacuum tubes, and the vacuum tubes, we were continually reading the voltage with a very high impedance vacuum tube voltmeter. That distinctly answers your question.

Q That answers my question.

A Yes.

Q So that the value of the voltage on the condenser was continuously observable?

A (Witness nods head affirmatively.) I remember distinctly we went to some difficulty to get that vacuum tube voltmeter. We constructed it ourselves and there was a selection of tubes in getting that to operate satisfactorily.

Q If you will refer to Exhibit 600 in that same folder, you will notice that apparently quite a number of different brands of condensers were measured and the time to fall to half value in some cases was as low as -- is that 250 micro micro seconds?

A I don't observe any 250 micro micro --

Q The fourth one.

A No. Those are, 250 micro mics. is the capacity of

the condenser.

Q Oh. The fall time, I am sorry, is on the left. Is the fall time --

A And those fall times are in seconds, and I remember distinctly, you know, we just picked up condensers around the laboratory to see how the thing is going to go and this is the result of a preliminary experiment which happened to be left in the folder.

Q Thank you.

MR. DODDS: Would this be a convenient time to adjourn for lunch, Mr. Halladay?

MR. HALLADAY: Agreeable with me.

(Whereupon an adjournment was taken until 1:30 o'clock p.m., December 5, 1968.)

E-11

December 5, 1968,
1:40 o'clock P.M.

(Appearances as heretofore noted.)

Whereupon,

DR. JOHN V. ATANASOFF,

a witness having been previously sworn, was examined and testified further as follows:

CROSS-EXAMINATION (CONTINUED)

MR. HALLADAY: Are we ready?

MR. DODDS: Ready.

BY MR. DODDS:

Q Dr. Atanasoff, I believe you testified that you first met Dr. Mauchly at a meeting of the Triple A, S in Philadelphia commencing, I believe, on December 26, 1940?

A I did not testify as to the date, I believe, but it's approximately that date, 1940, right.

Q Would you refer to the folder D-1, document 257?

A Yes, sir.

Q Does that refresh your recollection with respect to this?

A Well, it's quite right, yes.

Q Pardon?

A I say that is quite right, yes. I didn't have this in mind but --

Q It was actually a meeting of the American Physical

Society, is that right?

A No, it was a meeting of the Triple A, S, but it happens at these winter meetings of the Triple A, S, the American Physical Society meets simultaneously, so it's both.

Q I see.

A To be precise.

Q I see.

A But they are called meetings of the Triple A, S, usually. Of course, somebody might specify them otherwise.

MR. HALLADAY: What's the date of 257?

MR. DODDS: December 14, 1940.

THE WITNESS: If you care to look, you can go to the office of Triple A, S and you can find a program of this meeting and you can find Mauchly's name upon the program, I might add, and it's called Triple A, S.

BY MR. DODDS:

Q I believe counsel for the plaintiff asked you with reference to Mauchly Deposition Exhibit A-3. I can represent to you that the figure comprising the two neon tubes which you mentioned on the original is in red ink, but it doesn't show in the reproduction. Does that refresh your recollection at all as to whether you saw that on the occasion of your discussion with Dr. Mauchly, do you remember any such a

red ink drawing?

A No. I do not. I believe that this paper was handed to me and I put my name down. It may have been at the time I put my name down that there was nothing else on the sheet. This is not in my handwriting, I am almost sure. And that, and of course this is not in my handwriting, I am almost sure.

p.m.
12/1
/S KL

Q "This," what are you referring to?

A I am referring to this A sub-one, sine N theta plus B sub-one cosine N theta.

Q Do you recognize anything on the sheets other than your name which is in your handwriting or in your hand, I should say? Some of it isn't writing.

A Well, you see, I testified that the two letters in the square might have been in my handwriting. They are a bit too fragmentary to be quite sure, but, you know, my memories have a warm feeling for that form.

Q Any of the material on the other fold, opposite fold of this Exhibit A-3 in your hand?

A Yes, the "Goetz" seems to be in my handwriting, too, G-o-e-t-z, I guess it is. I don't know what it refers to.

Q Any of the curves or graphs appear to be in your hand?

A I have no belief that they are in my handwriting.

Q If I told you that Dr. Mauchly had identified the circuit including the two neon tubes as a binary counter, would you disagree with his characterization?

MR. HALLADAY: I object to counsel's statement of his belief.

MR. DODDS: I don't recall I said anything about believing. Dr. Mauchly stated that he considered the circuit including the two neon tubes to be

a binary counter circuit in his deposition. I am asking whether you agree or disagree with that characterization?

MR. HALLADAY: My point for the record is that I disagree with what you say Dr. Mauchly said.

MR. DODDS: Well, the record will speak for itself.

MR. FALLON: Well, then, in view of the fact there is a conflict between the attorneys for the parties here, as counsel for the witness, I think I have to request that you unload the question to the extent of saying, would the witness consider this representation to be a binary counter, if that is agreeable to you, and you can ask him that question.

BY MR. DODDS:

Q I will adopt that question. Will you answer that question, Doctor?

A That circuit will count when equipped with components of the proper characteristics.

Q and if it counts, it can only count, it's a stage of two counter?

A It will be a stage of two counter, right.

Q When Dr. Mauchly came to visit you in June, 1941, did you know before he came when he would be arriving?

A Almost exactly, I believe. I believe there is an

element in my letter that corresponds that shows on Friday he would be attending the meetings in Iowa City. It is only a matter of two or three hours drive from Iowa City to Ames, so I expected him to come Friday. I have testified, I believe, he came Friday evening. One reason I believe he came Friday evening is because I know he came in the evening. If he came Saturday, he had diddled around all day Saturday and then came in the evening, and I don't believe that is what happened. I believe he came Friday evening.

Q Did you tell Mrs. Atanasoff that he was expected?

A I did.

Q When did Dr. Mauchly leave Ames?

A I would guess on Thursday of the following week, but my memory is not precise on this matter.

Q Do you remember what time of the day he left?

A He left in the morning.

Q I would like to read one question and answer from the deposition of Mrs. Laura Atanasoff taken in Denver, Colorado, December 5, 1967, in the Control Data case in which, in response to a question from her counsel, and her answer --

MR. HALLADAY: Excuse me. Her counsel?

MR. DODDS: Her counsel and her answer, the question from her counsel and her answer -- I am sorry, counsel for Control Data, not Mrs. Atanasoff's.

MR. HALLADAY: What date?

4

MR. DODDS: December 5, 1967, and this is page 28 of the transcript, line 25:

"Did you know whether or not there had been correspondence or telegrams exchanged between Dr. Atanasoff and Dr. Mauchly before the visit?

"Answer: I can't remember if there was, because when he appeared at our house, I know it was a surprise. I was unprepared."

Does that refresh your recollection in any respect?

THE WITNESS: It does not.

BY MR. DODDS:

Q Now, would you refer to folder B-10, Exhibit 84, 85.

Now, the fourth paragraph of this letter from yourself to Dr. Mauchly, which you have previously identified, reads, and I quote:

"I can think of many things that I would like to talk to you about. This list includes statistical Fourier Analysis, resistance harmonic analyzers, computing machines of all kinds, and I suspect there are plenty of other things."

First of all, do you recall any of the "other things" which you discussed with Dr. Mauchly during his visit?

A I am sure there were some other things, but they

were casual and brief. I suspect we discussed the weather and what we ate for lunch and matters of that kind.

Q Just excuse me, Doctor. I don't believe in your letter where you suggested a discussion of other things, you were referring to possible discussion of the weather, were you?

A Do you wish me to interpret the letter for you? Is that the intent of your question?

Q Well, I want to know what you meant by "other things" in this letter?

A I will -- if you will rephrase that question the right way, I will tell you what I meant by "other things."

Q What do you think is the right way, Doctor?

A I think you should ask me to explain the meaning of that paragraph, and I will be glad to do so for you.

Q All right.

A I will suggest to you that that is a conventional method of speaking, in which I am trying to fill out good will and the basis of a visit.

Q You mean you did not intend to discuss with him the statistics Fourier Analysis?

A I don't mean that at all. I meant that no other things were in my mind at the moment, probably, and that was just a casual nice way of phrasing a letter.

Q But you did discuss with him statistics Fourier Analysis?

A Yes. You know he spoke at the meeting on that.

Q Yes, and did you discuss the subject with him before or after the meeting?

A My memory is very slightly, there are various reasons why my memory tells me that.

Q You say very slightly?

A Very briefly is what I mean by that.

Q And did you discuss resistance harmonic analyzers?

A Yes. His harmonic analyzer was such a device, you know. I imagine he told you.

Q Yes. On what occasions did you discuss that with Dr. Mauchly?

A I really don't know.

Q You don't remember when or where or under what circumstances?

A No, I do not. I know that the discussion of that was also very brief and --

E-13

Q Now, how are you so sure the discussion was brief if you don't remember when or where or under what circumstances it occurred?

A Well, I have a very, very slight idea of what, of what his harmonic analyzer was like, and I am sure if I had given it much time and attention I would have given it a great deal more at this moment, but that is, I am doing the best I can for you. This is my best belief, if you --

Q Now, you said you suggested a discussion of computing machines of all kinds. Now, what kinds of computing machines did you discuss?

A We certainly discussed the analog and digital computing machines. And analog was a word that was current with me at the time but the word digital was not as I have stated previously. But most of the time during his visit was spent on the discussion of digital machines.

Q And when and under what circumstances did you discuss the analog computing machines?

A You mean which day?

Q Which day, day, morning, afternoon, evening?

A I don't know.

Q I think you said that you left Dr. Mauchly with Mr. Berry on certain occasions during your visit where you were called off with other duties. Do you know how many times that occurred?

2

A It occurred.

Q It occurred?

A I certainly don't know how many times. My belief is that it happened two times at least but --

Q Well, --

A This is subject to the --

Q I think that you testified that Dr. Mauchly was working with Mr. Berry on brush holders, wiring harness, a base ten card reader and the punching mechanism. Now, would he have been doing all of that during, say, two --

A Yes. You see we are speaking about my -- I didn't necessarily leave him when he was working on a computing machine, part of the time he was working on the computing machine I was present. I don't see that connection.

Q You said that you believed that Dr. Mauchly left on the Thursday following the Friday of his arrival, but you do not remember the time of day. Do you remember anything about the circumstances of his departure?

MR. HALLADAY: The question is objected to as an incorrect statement of the witness' testimony, therefore objected to.

MR. DODDS: If the question is incorrect would the witness please correct the question insofar as it implies an incorrect statement of his testimony.

MR. HALLADAY: The question included a statement purported to be a question of fact, therefore, objected to as to form, that the facts are incorrect.

BY MR. DODDS:

Q When did --

A May we have the testimony?

Q Let's -- it's easier to start over again. When did Dr. Mauchly leave on a Thursday following the Friday on which he arrived?

A Well, I have stated I believe he left on Thursday. I have not said without qualification that he left on Thursday, but it's my impression. I know he was there a considerable portion of the following week and Thursday seems to me to be about right, and I believe I have stated this in clear English. Now, he left in the morning from my house.

Q Do you remember the circumstances surrounding his departure?

A Now, what circumstances surrounding his departure would you desire me to --

Q Any that you recall?

A I stated he left from the circumstances surrounding my house. My house was at 3439 Woodland.

Q I am not talking about the environment. Were there other people with you when he left?

4

A Yes.

Q Were there family around?

A My family was there. My family was there, yes.

Q Any other people around is all I am interested in?

A My --

Q There may have been --

A There were children about. Now, beyond that, I do not remember any other person being there and I am not sure this is true, but I believe it is.

Q Did he during his visit with you mention going to the Moore School?

A My memory is that he did not, and that I only got this by letter after he left. That's my memory of the circumstances. I have had this through my mind and I believe this is what happened.

Q Do you recall whether Dr. Mauchly left rather suddenly or abruptly in response to a call from his home?

A I remember no such circumstance.

Q Now, I recall that you said that your first contact with Dr. Mauchly after his visit, after he visited with you was at the Naval Ordnance Laboratory when he appeared one day at your desk; is that approximately correct?

A Approximately. Now, I believe I stated it may have been I received a call saying somebody was coming down, but I particularly remember my surprise when it was John

5

Mauchly, and I met him there.

Q And I think you referred also to a later visit by Dr. Mauchly in the company with Mr. Eckert?

A I did.

Q And do you recall what date that was?

A Well, you got my book. I could get it out of the book.

Q I was asking for your recollection?

A You can get it out of the book, so far as that goes, I believe it was in August of '44, but that is just only my memory and would be subject to correction.

Q Well, in Exhibit DPX3, your affidavit in the Control Data case, you indicated a visit by a Dr. Mauchly and Mr. Eckert on August 30, 1944, does that --

A That must be the one. My date is correct, was it? Yes. That seems to be right.

Q Do you know how you fixed that date?

A I believe that -- I believe somewhere in the archives somewhere there is some correspondence that fixes that date.

Q It's your best recollection that you referred to some of your correspondence in fixing that date?

A I don't know. You know, as I sit here, I know that it's fixed by correspondence. I don't know that it's fixed by correspondence in my file or some other file. That is the question that is open to my question.

Q Now, I seem to recall that you indicated that you had had about five visits from Dr. Mauchly at the Naval Ordnance Laboratory before he later was employed there?

A That is subject to correction also.

Q Certainly. Approximate?

A Estimate, approximately.

Q Yes.

A Several visits, shall we say?

Q Yes.

A With a liberality on the several.

Q Over what time period did that extend?

A Well, you see, my memory is that he came along, oh, probably in the middle of '43 and visited me to begin with, and it was certainly '44 or '45 before he came to work. So there is a period of a year or so in there during which these visits -- over which these visits may have occurred.

Q Do you recall when Dr. Mauchly became employed at the Naval Ordnance Laboratory?

A Oh, there is some records around somewheres that show it.

Q You don't recall it though?

A I do not. I remember it was relatively late in the war. I remember that part of it.

Q Could you say whether it was 1944 or 1945 or 1946?

A I would say probably after that August, 1944 event.

I am not positive that is true.

Q And as I understand it, you said he reported to Dr. Ellison?

A Ellingson, H. E. Ellingson, Dr. H. E. Ellingson. He lives in the environs of Washington, the Maryland suburbs of Washington. I can do better for you than that.

Q That's close enough. Thank you. Do you recall what his duties were reporting to Dr. Ellingson?

A Well, I know what Dr. Ellingson is doing, and I know what Dr. Mauchly is supposed to be doing, and Ellingson said Dr. Mauchly wasn't doing it. So there is a little uncertainty in my answer to that question. The general subject of the operation of Dr. Ellingson's group was the analysis of, the analysis of the performance of ships, as far as actuation of mine mechanisms goes.

Q What did Dr. Ellingson say that he was doing?

A I would rather not say unless counsel insists.

Q Well, if it's something that is derogatory we will excuse the witness.

A Thank you, sir.

Q Do you know of any specific projects on which Dr. Mauchly worked?

A I do not. No. This is part of the give and take there between the gentlemen in question.

Q Do you know the circumstances of Dr. Mauchly's

employment at Naval Ordnance Laboratory?

A Well, he ran out of work, apparently, and he needed money and he needed another job in order to make more money. This is the kind of representations, and I, of course, you are always short of, in a war, you always need help, you know.

Q Well, did Dr. Mauchly approach you?

A He did.

Q With reference to obtaining employment?

A Yes, he did.

Q And did you have any hand in his being employed?

A I did. Yes.

Q And do you recall whether it was of any contract or any special arrangement or did he just come to work or what?

A Well, let's see? My memory is that he worked under two circumstances in the course of his stay there, and one of them he worked for the Navy as a contract employee and the other one was that he worked for the Navy indirectly. He worked specifically for Iowa State University.

Q Do you remember which character came first?

A I am a little bit uncertain. Just from the circumstances I would suppose Iowa State came first, but my memory says it's the other way around.

Q Whichever came first, though, you aided Dr. Mauchly in securing employment?

A I did in both of those.

Q Both of them?

A Both of these employments, yes, I did.

Q I think you said yesterday that it was your recollection that he was employed a matter of a few months?

A Yes. I suppose three. Maybe two or three months. I am not sure. And for a few days, maybe a day or two a week or maybe three or four days a month or some such terms of employment as that.

Q Dr. Mauchly --

MR. FALLON: Dr. Atanasoff.

BY MR. DODDS:

Q Dr. Atanasoff, I think you testified that the compensation for your assistance to Honeywell was not contingent upon the outcome of the case in any way, is that correct?

A That certainly is the case, yes.

Q Do you stand to benefit from the outcome of the case in any other way?

A I hear that question, and the answer is no, but I wish you would repeat it and allow me to answer it in earnest.

Q Then maybe I would be a little more explicit and take it in steps.

A Yes.

Q Under your agreement with the Research Foundation

of May 6, '68, you have --

A Are we talking about my relation with Research Foundation now?

Q This is background if you would bear with me.

A I am sorry.

Q You assign your rights or any rights you may have in the ENIAC patent to the foundation, do you not?

A I do.

Q And under that agreement, as I understand it, you would share with the Foundation the proceeds from exploiting such rights?

A Right.

Q And you are aware that the Foundation intervened in the Control Data case or moved to intervene in the Control Data case?

A I am aware.

Q Now, if they were to intervene in this case and be successful on the issue of enjoint invention, then you could expect to benefit very substantially from the outcome of this case, could you not?

MR. FALLON: I think that's objectionable. It's suppositions all the way through. Can you unload it a little bit, take out the very substantially, for one thing?

MR. DODDS: Well, all right.

I will eliminate the very substantially. And I might also make the representation that Mr. Griffen who is general manager of the Foundation in a deposition in the Control Data case indicated that the matter of intervention in this case was under consideration so it is not just a wild guess.

BY MR. DODDS:

Q So the question is if the Foundation moves to intervene in this case and is successful and the outcome of the case is successful, you then would stand to benefit by a favorable outcome of this case, would you not?

MR. FALLON: By favorable outcome you mean favorable to the Foundation, is that correct?

MR. DODDS: Favorable to the Foundation.

THE WITNESS: Oh, yes. If it's an outcome favorable to the Foundation I will benefit from this case.

MR. FALLON: Ipso facto.

BY MR. DODDS:

Q Certain of the documents which you brought with you, I believe it was folder I -- I don't think you need to get them, were brought in a registered mail envelope from Mr. Allegretti's office mailed May 6, '68. What did you receive in that envelope?

A I haven't the remotest idea.

Q Would you refer to folder B-8, Exhibits 74 and 76?
A Thank you.

end

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Q At page 246 and 247 of the transcript, I believe you testified that Exhibit 76 is a typed copy of No. 74? Would you like to recheck that?

A I have checked it.

Q Just to keep the record straight, is Exhibit 76 in fact a typed copy solely of Exhibit 74?

A Not quite. I think part of the last two sentences are missing from 74, I now discover. I didn't discover it at the time.

Q Yes. I just wanted to keep, to avoid confusion in the record.

In folder B-16 --. I think you testified at pages 275 to 277 of the transcript that you received these two items from Dr. Aiken by hand, Dr. Aiken of Harvard University?

MR. FALLON: Which items are these?

MR. DODDS: 139 to 143 is one item and 144-145 is the other item.

THE WITNESS: Yes.

BY MR. DODDS:

Q Did you receive these by hand on the same visit to Harvard?

A I believe I did, yes.

Q Well, did you --

A Now, that may not be true.

2

Q If you look at the footnote at the bottom of page 143 and the one at the bottom of page 145 --

A I have read those footnotes.

Q You have?

A Several times.

Q You still think --

A I believe this is the case, yes. I just think that what happened, that he had these two materials and he probably just had one or two of the last set, but he wanted me to have them and he gave them to me anyway.

Q Thank you. I just wanted to clarify, there seemed to be a little --

A Discrepancy. I wondered about that, but that's what my memory tells me --

Q Yes.

A -- and it's all I can say. I happen to be reasonably certain I only visited Dr. Aiken at one time, incidentally.

Q These various files that you have produced here, Dr. Atanasoff, as I understand, these were originally with you at the Iowa State College in Ames?

A Yes.

Q In the physics building?

A Yes, they were. They were in room 52 of the physics building, to be precise.

Q You left Ames, I believe you testified, in September

of 1942?

A Yes.

Q And moved to Washington?

A Yes.

Q Now, would you tell us just what steps you effected in moving to Washington? Did you --

A Well, the files did not accompany me to Washington immediately, but the files --

Q Just a second. Let me interrupt. Just how did you effect your move, just what steps did you take? I mean you yourself moved physically. I assume you had certain personalties that went with you and I would just like to know the circumstances under which you effected this move to Washington.

A I guess that I can give you, I can certainly talk on the subject. I don't know exactly what it is you are reaching for, so I'm not going to be very helpful, perhaps. I packed some trunks and suitcases and traveled to Washington by train. Is that responsive, as far as you are concerned?

Q I suppose -- did you initially move into a hotel or something?

A Oh, I believe I stayed overnight in some hotel and then afterwards I took quarters in a house that had a couple of rooms to spare near the gun factory.

Q Well, then did you take with you on the train your

4

personalties other than these files?

A I took with me personalties -- I guess you mean suits --

Q Personal effects.

A Well, I took some personal effects. I took suits -- my family were remaining in Ames, as you know, and I took suits and shirts and socks and neckties and toothbrushes and such tings as that. Now, I didn't take the files.

Q Was there, were there things other than the files which you left in Ames and had sent to you later?

A Yes, there were other things, books, for instances. I remember precisely about those because there was no room at the time for books and things in Washington. Conditions in Washington were awfully bad and my living conditions in Washington remained bad for a considerable length of time. yes, books.

Q Do you remember anything else? I mean just categories?

A Well, tools, let's say.

Q I suppose you probably had a workshop in your home in Ames?

A That's right, and, you know, -- of course, no furniture and --

Q When did you have any of these other personalties sent to you, for example, your books?

A Well, my wife left Ames. In due course, my wife left Ames and took the children to Florida because of the health of the family, and at that time the material was shipped to me. I am trying to remember when this was as well as I can. It was a matter of two years or so, though, I imagine, and I can get the date very well for you in the future.

Q That is sufficient. I am not interested in detailed dates.

A Then I commenced to get more stuff and I got some of, I got some of the files and I remember that some of the files were packed by Sam Legvold later and sent to me. One box of files had been left in the physics department. They were shipped by Sam Legvold later, I believe. I believe Sam Legvold also sent me some of these patent drawings which are in these files.

Q Do you recall when the first quantity of these files were shipped to you in Washington?

A Oh, I imagine at the end of a couple of years or so.

Q And do you recall when the shipment of your files, and, of course, I am only talking about files which included the material you produced here.

A Yes.

Q When the final shipment was made to you?

A Well, before the end of the war, at any rate.

Q But it was a matter of several years?

A Yes. There might have been, there may have been items come as late as 1944, I would say.

Q And do you recall to what address in Washington these files were shipped?

A I do not.

Q Well, were they shipped to you while you had these quarters?

A Temporary quarters, yes.

Q Temporary quarters in Washington near the gun factory?

A Near the gun factory, yes, or maybe a mile or two from the gun factory later. Later -- at first I didn't have a car in Washington so I had to have quarters near the gun factory. Later I had a little more choice where I could live because I had a car, and I believe it must have been 18 months to two years before I had a car there. Cars were hard to get. Do you remember that era?

Q Yes, I do. Did you live at several locations during this two-year period commencing in September, 1942?

A I did. Yes, I did. I think three. I think perhaps three.

Q So the files were not with you when you were moving around during that period?

A Well, I think the original shipment of the files was moved during that period, and then, of course, it was moved later. Towards the end of the war, I bought a farm north of

Washington between, well, near a town called Fulton, Maryland, and then I had the files there, and I remember that distinctly. Now, that must have been, that, of course, was initiated by the fact that the laboratory was moving to White Oak and the farm was closer to White Oak than it was to Washington, you see, considerably closer to White Oak, and at the time that I got the farm, why, then I remember distinctly having the files out there in an old file cabinet at the farm.

Q During the period when the files were at Ames before you moved from Ames, who, if anyone, had access to your files?

A Well, I imagine -- they were left in one or two places there, either left in my home, and that would, those files would have to have been, that would have been Laura that had access to them --

Q Excuse me. I said while you were still at Ames.

A Oh, I am sorry. Who would have access to the files while I was still at Ames? Well, I had a secretary. I had a secretary over a period of time and I didn't have one secretary, I had several, one of whom was Mrs. Berry, and the other secretaries I cannot remember their names, but the secretary would have had access to them and to a limited extent, Clifford Berry would have had access to them because Clifford Berry was -- I had a secretary upstairs sitting near the door to my office and, of course, he was up there

conferring with the secretary and seeing to business, and he could have gone into the files.

Q How about Dr. Legvold? Would he have had access?

A Well, you see, Dr. Legvold was one of my associates and there was a period there when Dr. Legvold could have had access to the files.

Q Do you recall anyone else at Ames that might have had access to your files while you were there?

A Not otherwise than surreptitiously.

Q Yes. I mean authorized access.

A Yes, and really, I don't suppose Sam had authorized access, although such things develop casually, as you know.

Q Now, when you moved to Washington and before the files were shipped to you, were they retained in the physics building or were they retained in your home?

A My memory is that part were in the physics building and part were in my home.

Q Of course, those in your home I assume only your family had access to them?

A Yes, that is true.

Q Those in the physics building --

A They were under the jurisdiction of Mr. Sam Legvold at this period.

Q The ones in the physics building?

A Yes, they were, and he was, they were boxed and he

was supposed to maintain them securely. We had an understanding about that, and, ofcourse, as far as I am concerned, I would just as soon have Sam Legvold keep anything of mine as to keep it myself because I feel just as secure. I won't say that there might have been additional items that were picked up and set aside that were not boxed, but the main part of them was boxed, is what I am trying to say.

Q But you don't have any way at this time of distinguishing which were which?

A Not at all, no.

Q When you moved to Washington and when the files were forwarded to you, I think you said about two years later?

A (Witness nods head affirmaatively.)

Q Did anyone there have access to your files?

A No.

Q Again, I assume you mean excepting surreptitiously?

A Yes.

Q I assume they were not locked up?

A They were not secured in a bank vault. They might have been secured in a locked cabinet or they might not have, but I am not sure, really.

Q Now, would you refer to folder B-7, Exhibit 72.

While we are doing that, Doctor, when the files were there in Ames, and you were there, would any of your students have had access to your files, any of your

graduate students that you were supervising?

A Not according to the correct relationship between us. That doesn't mean that a graduate student might not feel a degree of familiarity, that if he knew exactly where a thing was, he might not take it out.

Q You wouldn't include that within surreptitious access?

A I would not, no.

MR. FALLON: 72?

MR. DODDS: Yes.

BY MR. DODDS:

Q Which I believe is the original of a letter from yourself to Dr. Legvold, and I think you indicated before you had some question as to how this happened to be in your file?

A Yes. You see, what must have happened is that I sent it to Sam Legvold and then somehow it got drifted back to my files.

Q During the period, it must be when he had access to your files?

A Right, or, he may have. I don't know how accurate files Sam himself kept, and he may have made use of my secretary at the time. Probably he did, or he may have said, "Here, Jean, read this," and then Jean read it and it went in my files, you see. That may have been the answer.

Q Would you refer to folder C-3, Exhibit 408. I think

there must be -- that can't be the right number.

MR. FALLON: You said C-3, document 408?

MR. DODDS: I think that must be a mistake.

BY MR. DODDS:

Q I don't recall, did you say this was in your handwriting?

A (Witness shakes head negatively.)

Q Do you know if that is in Dr. Legvold's handwriting?

A It might be.

Q You don't know?

A You know, I just don't know his handwriting the way I do my own, and so I would have to get a piece of his handwriting and compare it, and I haven't done that.

Q So you are not, you can't be certain at this time who --

A As far as subject matter goes, it might well have been in Sam Legvold's handwriting.

Q You can't state with assurance who wrote that and put it in your files?

A No, I don't know that.

Q When you would like a break, Doctor, feel free to say so.

17

A I would like to leave about 5:20.

Q Well, I thought if you wanted a break --

A I would like a break too. Would you like a break too?

Q I will leave it to you.

A I will have a break. Thank you.

(Recess taken.)

E-15

BY MR. DODDS:

Q Dr. Atanasoff, at page 13 of the transcript you testified, and I quote: "I have gone systematically through the logic, through the theoretical logic of the computer machine which is about to be described." Where did you go for -- to learn about the logic of the machine?

MR. HALLADAY: The question is objected to as vague, indefinite and confusing and the reference to a part of the transcript which sounds to me as if it were out of context.

MR. DODDS: Let the witness read the context.

MR. FALLON: Before you answer the question I would want a clarification. Have you read the statement?

THE WITNESS: Yes.

MR. FALLON: I would say that the question carries with it an assumption which is not supported by the statement you made. If we eliminate the assumption that he had to go some place, if you want to ask him to further address himself to that statement, I have no objection.

MR. DODDS: I will ask you --

BY MR. DODDS:

Q What was the source of the logic through which you

went?

A Oh, I call my own activities relative to this machine logic.

Q And the logic you were using it in that context was just the -- your own familiarity?

A I mean that I had gone through the add-subtract mechanism and the other elements carefully part by part to insure or that the logical precepts which were supposedly designed into those parts were in effect designed into those parts.

Q Well, my question was, what was the source of this? Was it, say, the booklet, Exhibit 455?

A Sure. And also my own rationale relative to the circuit diagrams.

Q Well, what circuit, what circuit diagrams?

A Well, shall we say Figure 2, Figure 1 and Figure 2?

Q No. That's a part of Exhibit 455 booklet?

A Well, all right, yes, if you wish. That's fine. Put it that way.

Q And the experimental work which you referred to in that same paragraph, I suppose that included your work on the Exhibits Y and Y-1?

A It does. It does, yes. That's put very well. Thank you.

Q Now, this may have been covered but I am not quite

clear. At page 17 of the transcript you referred to obtaining some papers from Mr. Berry's files. Would you like to refresh just what you said?

A Yes.

Q What were the circumstances or the factors which led to your getting this material from Dr. Berry's files or Mr. Berry's files?

A Well, I don't think that anybody told me to go get the material from Mr. Berry's files, but it was clear from my relations with counsel, from the counsel which I had contracts that they would desire that such material be gathered, collated and understood, and it was pursuant to such purposes that I did it.

Q Did any of the counsel with whom you have been working specifically suggest that you search --

A To the best of my knowledge they did not, they might have and they have on some occasions in some special case suggested something to me, to be sure, but in the main, they have not made many suggestions to me, and I have been left free to pursue the matters and gather the material as I saw fit.

Q And I believe the records and some of the correspondence shows that you got some of the documents when you visited Mrs. Berry in California?

A That is literally not correct. Maybe I said that, and the documents may purport -- may seem to show that,

but as a matter of fact, I had planned to go visit Mrs. Berry's house to secure documents, but Mrs. Berry collected the documents, and I met her in Ames, and she delivered the material to me.

Q So you didn't actually physically get any documents while --

A Then later I did go to the house, but at that time I only got photographs, and I don't believe a document, not one document. We did look but I don't think I got one document.

Q So on your first visit you didn't physically bring any documents back with you?

A On my first visit to the house I did not bring any documents back with me to the best of my knowledge and belief.

Q Did you get --

MR. HALLADAY: Excuse me. Are you excluding photos as documents?

THE WITNESS: I am excluding photos as documents. Thank you.

BY MR. DODDS:

Q You explained that. You got those on the second trip --

A Yes -- no, on the first trip to the house, and we will get this, I don't know what the record will show, but --

MR. FALLON: Your answer was right as

the record stands.

BY MR. DODDS:

Q Did you get copies of all of the material in Mr. Berry's files relating to the work on the ABC machine?

A I did.

Q There was no exclusion?

A Well, you know, there might be some little, somebody somewheres that is excluding something that I don't know about, but not to my knowledge.

Q There was no purposeful exclusion?

A On my part?

Q On your part?

A On my part there was not.

Q Now, would you refer to folder B-2. Maybe you don't need to refer to the folder, those are the two articles, I believe, relating, by George Stibitz as related by or as written by another party. I believe that you testified at page 220 that these were given to you by counsel for plaintiff -- I am sorry -- yes, it's at 220?

A Yes, I have them here.

Q Do you recall that testimony?

A I would be glad to recall it.

Q It's the last line of page 220.

A I believe that is right. Do you wish me to verify that?

6

Q No.

A All right. You wish to ask me something else?

Q No. I just wanted to verify your testimony?

A That seems to me to be exactly right at this moment.

Q Now, would you refer to folder C-2, Exhibit 202. Would you review what is numbered paragraph 2 plus the introduction to that paragraph? Did you get these documents from two sources or these are the same documents that are referred to here, are they not, in Mr. Bradley's letter?

A My memory tells me that I remember receiving a pair of those documents from counsel for plaintiff. Now -- all right. I may have two of them somewheres in my files. I don't know. I don't see them here.

Q Well, are you presently inclined to believe that probably you received them from Mr. Bradley?

A No. I am not. I am inclined to believe I received them from plaintiff but now if you want me to say am I inclined to believe that I also received some from Bradley, I suppose that must be the case.

Q Well, if you received them also from Bradley, would they not have been in your files?

A I would think so but maybe not because they might not have even ever got in my files. They are not material pertinent to the case at hand.

Q In this same folder, item 17 is a print of a readout

I believe, from the Bell Laboratories computer.

MR. FALLON: What folder is that?

BY MR.DODDS:

Q I am sorry, in the preceding folder,B-2?

A Yes, sir.

Q When did you first learn about the Bell Laboratories computer of which this exhibit 17 is a copy of a read out?

A Well, I don't know. I imagine that I had known about it for a year or two previous to my visit there in '41. I don't believe I heard about it before 1940, probably.

Q Do you know whether or not there was any contemporaneous publication describing that computer? The two documents referred to starting with Exhibit 18, of course, were published much later, 1967?

A Oh, yes. Those are, looking backward, historical kind of items and I don't consider them pertinent, but, and I don't pay much attention to them, but let's see, were there any publications? I believe there were.

Q Approximately contemporaneously?

A There were certainly informational publications. I don't remember having seen at any time, for instance, a mathematics meetings why they would demonstrate the machine and then it would be recorded in the minutes of the mathematical association or mathematical society, as the case might be. I remember that kind of article, but as to

any article which gives a description of the internal workings of the machineI do not believe I have seen, I have seen any at any time to this very day.

Q But from your observation at these professional meetings of the demonstration you acquired, did you not, a fairly good understanding of the operation of the machine?

A Oh, you knew their functional -- here is a black box, you knew what the black box did, but you didn't know what kind of gears were in the black box, but, of course, most of us could make some sort of guesses about that, too.

Q Now, in folder B-3, documents 4, 5, 6 and 6-B.

MR. FALLON: I think we have a difficulty here. These are just 40's.

MR. DODDS: Maybe I have an error. I am sorry. I am sorry. I believe that's A-3 instead of B-3.

MR. FALLON: Here they are. This is what he had in mind, 4, 5 and 6.

MR. HALLADAY: I didn't catch the reference.

MR. DODDS: Folder A-3, Exhibits 4, 5, 6 and 6-B.

THE WITNESS: Right.

BY MR. DODDS:

Q Which I believe you described at page 205 of the

transcript as a radio broadcast script?

A Right.

Q Which you delivered?

A Right.

Q And on page 6-B there are, at the conclusion, two or three questions which I believe you testified you had no answers prepared in advance. Do you recall whether or not you answered those questions and how you answered them?

A Let's see. Well, you can be sure it was some kind of a -- if it was answered, you can be sure it was answered briefly.

Q You don't have any present recollection?

A I don't. No.

Q Of whether you answered or if you answered, what you answered?

A No. And I think I answered because when people ask me questions they get answers, but that's about my only logic in the matter.

Q Now, would you refer to Folder B-10, Exhibit 93, which you identified as a copy of a letter from yourself to Dr. Mauchly and in the last paragraph, and I quote:

"Progress on the construction of this machine is excellent in spite of the amount of time that defense work is taking," etcetera.

As of that time in May, 1941, what fraction of your time

was being taken by defense work?

A Half.

Q Pardon?

A Half.

Q About half?

A Yes.

Q And how long did that continue, the duration of your stay at Ames?

A It went on until I left Ames. And the date of the beginning, I believe it began early in '41 and went on until the end of my stay there. Now, you realize, Mr. Dodds, when I say half, I mean half of the time that is left over, after I had done a good many other duties, just current there, so it was biting substantially into my progress. I think that was the intent of your question?

Q Yes. Maybe you would refer to Defendants' Exhibit S, and to save time I happen to have two copies if you want to look at one of them.

A All right.

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MR. FALLON: Is that S or 5?

MR. DODDS: S.

THE WITNESS: I'd say that was 5.

MR. DODDS: It's my hand and it is supposed to be an S.

THE WITNESS: It is an S. All right.

MR. HALLADAY: I am still confused.

MR. DODDS: I am sorry, this is Plaintiff's Exhibit S.

MR. FALLON: It is Atanasoff Deposition Exhibit S.

MR. DODDS: Atanasoff Deposition Exhibit S.

MR. FALLON: All right.

BY MR. DODDS:

Q You referred to this list in testifying about the photographs which you may recall I think are 1402 to 1419?

A Right.

Q How long has this document been in your possession?

A This document?

Q The original. That's a copy.

A Yes, a month, but the source material has been carefully kept during this period, and I felt it should be summarized in view of the fact that I was bringing all my files out here in kind of a mess and I needed something to

bring with me, and the source material, I had clipped indications of the source material on the pictures themselves, you see, and so I had them under control since the time I received them.

Now, go ahead. I guess I am running out of steam here. I don't know what you are reaching for.

Q So that this was prepared as, I gather, in preparation for your bringing the documents to this deposition?

A It was, yes, sir.

Q Is there any particular reason that accounts for the fact that some of the numbers are from a numbering machine and some are in longhand?

A They are in longhand if I numbered them in longhand, you know. It's just a matter of convenience, is the only thing that accounts for it.

Q No significance?

A No significance whatever. I will tell you, okay, I can give you a better explanation. Let me try. Now, at first, I was sitting here numbering the photographs with a machine but I was numbering these things by hand, and I said, "You fool," why don't you turn up the three on the machine and start doing it the other way?" And I did so. Then I got down here to 20, and for some reason, I had to go back to hand lettering. I don't know what that was.

Q But in any event, they are of no significance, the

3

numbering?

A I have no knowledge of any significance.

Q And all of the entries on this exhibit S were made --

A By me in my hand.

Q And about the order of a month prior to the deposition?

A That is right. Perhaps in the month before the first session of this deposition.

Q Yes. Yes. Now, you remember Mr. Berry's draft patent application. I don't know whether you want to refer to it or not. I only have a brief question. Where did you get it?

A Where did I get it?

Q Yes.

A Clifford Berry and I wrote it.

Q Well, but did you retain it, has it been in your files since that time?

A Oh, I see what you mean. Oh, yes. Oh, yes. Those patent applications did not come from Trexler. I have his original penciled -- you know, I said, "Clifford, I am awfully busy," and he had more time because he wasn't tied up with the research project, so he wrote it, but I worked with him on it and we put in a lot of time together on it and discussed items therein, and we had, I remember the discussion because he wanted to, he wanted to -- you know my use of the word abaci,

and that he did not like, so that was eliminated from the version, if you care to verify, and I remember one or two other instances of a like nature of give and take between us when we were writing it, and I think you have a copy of the penciled original.

Q Yes. Then, is it my understanding that those papers were put in your files as of about the time they were written?

A They were.

Q In Ames, Iowa, and they have been in your files ever since that time?

A They have been.

Q Now, referring to the ASM test units which you testified were in use in testing your computing machine back in 1941, but as I recall, you said you didn't, were not able to find any circuit diagram of that test equipment extant.

A (Witness nods affirmatively.)

Q Do you remember how many vacuum tubes were in it?

MR. FALLON: Which are we talking about?

MR. DODDS: The 1941 test unit which was used but which there apparently seems to be no documentary evidence.

MR. HALLADAY: I am confused. Are you speaking of vacuum tubes in the test set?

MR. DODDS: Yes.

MR. HALLADAY: Or vacuum tubes on a module that was --

MR. DODDS: No, I am talking about the vacuum tubes in the test unit.

MR. FALLON: That would correspond to Exhibit Y.

BY MR. DODDS:

Q Corresponding to Exhibit Y.

A I will give you a guess.

Q If it's an educated guess, I will accept it.

A I believe there were two, probably, but these vacuum tubes, they are just principally because we didn't have diodes, suitable diodes for rectifying the high, and they were diodes, diode rectifying tubes.

Q Yes, triodesconnected to diodes?

A No, I don't believe so. I believe they are 80 rectifier tubes, but that's my memory of what was in there, but I know they had, they did contain the necessary electronic equipment to rectify the current, but no, there was nothing else in it, nothing else.

Q You do recall, you think there were the two type 80 rectifier tubes?

A I believe there were. I don't believe -- we tried to do it with one and I believe -- you know, it's a shame to

put an extra 80 in when one would do, but I believe we had to use two.

Q You probably made a four-way rectifier, didn't you?

A No, we didn't care so much about that, but --

Q Which is a higher voltage?

A You had to have a positive and negative, don't you see? You remember that. And for that kind of stuff you would regard the way you handle a ziode.

Q Did you have a transformer in it?

A Oh, yes.

Q Do you remember what type it was?

A I don't.

Q What make, or do you remember anything --

A We had Thorgeson. It was a little box.

W-16-2

Q The transformer I am talking about, can you put that in words?

A Well, shall we say four by four, let's say three and a half by three and a half inches or something of that size.

Q And what was the third dimension?

A Perhaps by three inches.

Q Did you have -- I believe you said you had one or two meters?

A Yes. Now, the meters were never installed in the box, I remember that. They were separate, out to one side and they were just the multi-meter type, which is relatively cheap and with relatively high impedence so we could clip them into the lower impedence parts of the circuits, that means the output terminals of the add-subtract mechanism, without affecting adversely the results.

Q What other components did you have in the test unit?

A We certainly had resistors and probably some voltage adjusting potentiometers.

Q Filter condensers

A Surely, yes, and a --

Q A choke?

A And a choke, and I believe we used resistive filtering on the, my memory is we used resistive filtering on the negative because we didn't have very much demand of current, but on the positive we needed a little bit more

current, and then, of course, that had to supply filament current for the tubes in the add-subtract mechanism.

Q Did you have a separate filament transformer?

A My memory is not, that we managed to find one transformer that would do it all, but you can't rely on my memory in a matter like this.

Q It might have been a regular high voltage transformer with a tap for filaments?

A Yes, sir.

MR. DODDS: I wonder if we could have chart V, Exhibit V?

MR. FALLON: We have it.

MR. DODDS: Yes, okay.

BY MR. DODDS:

Q Dr. Atanasoff, who participated in creating this drawing, Exhibit V?

A Myself, but I shouldn't name myself first. I would say, first, Mr. Charles Call who is very familiar with the photographs of this case; and patent draftsman whose name I do not know, I met him but I do not remember his name, and myself.

Q Only you three?

A Well, I am not sure. Maybe when I was gone they had somebody else work on it.

Q No others were working on it or advising with

respect to it while you were working on it?

A I'll tell you -- you don't happen to know Mr. Charles Call, do you? I just might add those words.

Q I don't believe I know the significance of that comment.

A Well, if you knew him, you would realize that when you got Charles Call pumping the pump, pumping a problem like this, why it doesn't need much pumping. He is a powerhouse.

Q Well, during the time that you were, that this drawing was being produced or created, with whom did you discuss it?

A With Mr. Charles Call and with the draftsman also on several occasions.

Q And with other counsel?

A No. Other counsel, well, I will testify to things that I don't know. No other counsel did I discuss it with.

Q And what in this was your contribution and what was Mr. Call's contribution?

A Well, Mr. Call went right ahead with it from the photographs and it looked awfully well the first time I saw it, and then, but I sat down and took time and went over and over it and came up with five or six suggestions, and then the draftsman was called in and he executed these suggestions and then we looked at it again, and, of course, we found three or four more things that needed doing to it, and that's

the way this drawing was perfect. I might add that, you know, I think that it was being perfected a day or two before you got here the first time.

Q I don't have a reference to the transcript, but I have a note to the effect that you said that so far as possible, this drawing, Exhibit V, represented the elements and components in the ABC machine in its final form with the exception of some of the elements were, and I quote, "equivalents" of those in the 1941 machine. I wanted you to explain that a little bit.

A I am unable to.

Q Pardon?

A I am unable to. If those were my words, why, I will have to read the context and try to match them.

MR. DODDS: Will you see if you can find it? We will come back to that.

Now, can we look at Exhibit W? That is up there. All right.

THE WITNESS: You see --

BY MR. DODDS:

Q Now, was it the same team that created Exhibit W?

A How is that?

Q Was it the same team that created Exhibit W that created Exhibit V?

A It was the same draftsman, but he was told to take

the original drawing, Figure 1, and copy it with the errors in it just as it was in equivalent form so it could be photographed and enlarged.

Q Did you take care of that yourself?

A No, I didn't, but after I verified it, I went over every little piece with my own eyes, and you can do the same. It's right here before you. You can do it in five minutes and see that it's just the same.

Q Now, the error in Fig. 1, when was that discovered?

A That was discovered by a gentleman --

Q I didn't say by who, when?

A When, I am sorry. It was discovered after the beginning of these cases.

Q And under what circumstances?

A Well, you know you have esteemed intelligent counsel in the case and one of them by the name of Mr. Kirkpatrick discovered that error.

Q Well, tell me, what do you know about the circuitry which is represented in the original ABC machine?

A Oh, my goodness, you know, after you have used vacuum tubes a little bit, why the answer is almost immediate and you can understand, you know there is no question butwhat the circuitry in the original machine was right. It wouldn't have done a thing if it hadn't been right. And, of course, I went ahead and built this thing according to my revision

and it worked perfectly, and so it was everything in that.

Q According to your revision, you mean after Mr. Kirkpatrick pointed out the error?

A Yes. I didn't see it. I am sorry. I was real proud of Mr. Kirkpatrick on this occasion.

Q Well, maybe you would like to read the first paragraph at page 697 of the transcript, and then in that connotation we can ask you a question.

A Well, I think this is somewhat stiff, but a correct explanation of the process by which this drawing was developed.

Q I just wanted toknow what you meant by equivalent of structures?

MR. HALLADAY: Would it be helpful for people attempting to follow what we are doing here to know what it is he is reading?

MR. DODDS: I said page 697 of the transcript.

MR. HALLADAY: That's fine. But I have no idea, the court reporter has only a reference to the page. The words are a mystery to me.

MR. DODDS: I asked him to read the first paragraph and that includes the language --

THE WITNESS: May I read it aloud?

BY MR. DODDS:

Q Yes, surely.

A "This exhibit was prepared by draftsmen from photographs and from discussions with others, but I had played the following role in the preparation of that. At each stage of the development of this drawing by patent draftsmen, I have marked the structures presented there and have verified that they are the same or the substantial equivalent of structures which are contained in photographs or as have been known to me, known to me to be elements of the structure of the original machine."

Mr. Halladay, at this point in the transcript, we are talking about what?

THE WITNESS: We are talking about Exhibit 5.

BY MR. DODDS:

Q Exhibit V.

A I am sorry, Exhibit V is right.

Q The question was -- may I see that? The question was, what you meant there by the use of the term "substantial equivalent of structures which are contained in photographs"?

A I recommend that I correct that to read, to leave out that terminology, as more accurate without that terminology. I know of no such substantial equivalents.

Q Now, if we can refer to Exhibit X, which is

the next chart there, and again, the initial question, who participated in creating this Exhibit X?

A I believe the Exhibit X, I have attempted to verify, it, I believe it is an exact replica, not a photographic reproduction of the photograph in the original machine, but it's an exact replica drawn by draftsmen to permit enlargement. I believe this is the source of it.

Q Enlargement of what?

A Drawing 2, figure 2 in the manuscript which is, you know, the manuscript, 455.

Q 455?

A Right.

Q Again, who participated in its actual physical creation?

A Well, Mr. Call, the patent draftsman, and I, but the patent draftsman in the main work alone because he had no need for directions. Then after it was through with, I, however, checked it for accuracy, and I hope I am right.

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EA KL

Q Well, now, I notice that Fig. 2 of the manuscript, Exhibit 455 has some operating voltages on it. This doesn't seem to have any?

A That's right.

Q Is there any reason for that?

A There is no reason for that.

Q Is it just an oversight?

A It's just one of those things, yes.

Q Now, I think you described the grid of the triode 9 as 3, that'ssometimes known, called a floating grid, isn't it?

A Called floating grids.

Q And when the grid is floating is tube 9 conductive?

A Sometimes and sometimes not.

Q Well, is it conductive when a suitable anode voltage is applied, anode decathode voltage is applied?

A That is, that tube is conducting and you know, it's a funny thing, I remember that right from the very day when it went in there, and this was Clifford Berry's invention, I can tell you that, and I suppose if you take this to any technical man he would say: What in the heck is that? But I was building the replicas and with the same tubes and I decided

6

A That is true. That is true.

Q Do you have any present knowledge of the values of any or all of those resistors in the original ASM's?

A We -- I could easily describe to an electronics man, and if you want to assume that role I will describe to you the

A That is true. That is true.

Q Do you have any present knowledge of the values of any or all of those resistors in the original ASM's?

A We -- I could easily describe to an electronics man, and if you want to assume that role I will describe to you the methods for derivation of same.

Q I want to know what they were, not how you got them?

A You mean have I got them memorized now?

Q Well --

A Or can I work them out?

Q Can you tell us what they are approximately?

A No. I prefer not to do it. I can begin by telling you that tube works very well with a plate of 50,000 ohms, with a plate resistor of 50,000 ohms.

Q Now you are actually speaking of the resistor in the cathode circuit though, are you not? The plate is connected directly to plus 120 volts?

A No, I don't think so.

Q To plate 9?

A Oh, are you talking about the plate of 9?

Q Yes.

A You are still talking about 9?

Q Yes.

A I am awfully sorry.

Q Yes.

3

A Oh, I thought you wanted a whole array of resistors, and I was just lighting in to tell you those.

Q Oh, you were talking about the plate resistors generally of the other tubes?

A Yes. That's right. I wasn't talking about 9. I was talking about all the rest of them except 9, to tell you the truth.

Q And they were what order of magnitude?

A They were 50,000 ohms, and then I just, and that's mentioned in the manuscript and, however, 50,000 ohms is not one of the standard sizes now so we use 47,000 ohms and that's fine.

Q How about the grid resistors?

A Now, you see you have read the manuscript and you see those two numbers accompanying each?

Q Yes.

A Now, for instance, take this one right here, three, three, there is one, you see there are three of these resistors that go to plates. Now, take this one right here, for instance -- wait a minute, take this one right here. It goes up to a plate.

Q Yes?

A Take this one right here, see if it goes up to a plate?

A Yes, it goes up to that plate above, runs right up there and goes to that plate you see, the plate is a low impedance source.

Q Yes.

A It says there are three, the first number in that parenthesis says that there are about -- I am going to verify one thing just because I might slip on it. I turned to it exactly and I will have it in a second. All right, there are -- it says that there are three resistors in the grid of this tube going to plates.

Q Yes.

A One goes to the negative supply but three of them going to plates.

Q Yes.

A That's the first thing to verify and the first three right there. And the second three says that all three of those will have to be, I just forget, low, which means that the corresponding plates are going to have to be unblocked, the plates and tubes which carry the plates that they go to will have to be unblocked in order to make this tube block and hence have this plate high.

Q Sort of an N circuit?

A Yes, it is. It is exactly that, but it's a peculiar kind, you see, where you have a variable you can have two high

5

or three high and they are all arranged that way. That is exactly what it is.

Q And do you recall what the order of magnitude of the grid resistors was?

A Oh, yes. Sure. The grid resistors run of an order of a half a meg. To a meg and a half and stuff of that kind and they have very little influence on the plates so you don't have to go back and worry about the plates not working substantially as they should, and it's a very simple thing once you set it up to, and you can calculate them, calculate what they need to be in order to make them work.

Q Do you have any recollection as to the order of magnitude of the resistors in the cathode circuit of tube 9?

A Yes. I believe that the cathode circuit there is, I believe it's a couple megs, my memory is it's a couple megs in those units yonder.

Q Right behind, back on Exhibit W, if I might, do you have any idea of what the value of the resistor between the terminal D of the ASM, and going up to the plate of tube T1?

A Now, you see, those resistors don't matter, it's a ratio of the two that matter.

Q That's right.

A That's the only thing, providing they just as well be of the order of meg because that is plenty low enough to feed into the input and you got two megs in that other circuit

and you got to unclamp it from the other circuit, so if you got two or three megs there and you use a couple resistors of a meg and then you are down to a half a meg in that input circuit and then the whole thing is hunky-dory.

Q In your description of this, going back, I am sorry, to the exhibit, in your description of this the other day, Doctor, I don't think you refer to the terminals G and F?

A Right.

Q Would you perhaps indicate what those are?

A Those are the terminals which tell the machine to add or subtract.

Q Do you recall which is which?

A I would like to peak if you don't mind because I could in the course of time, if you like to have me take the time, I will attempt to verify.

Q I think that is probably not necessary.

A I am prepared if you wish to work out the logic of the entire system but it will take me some time as you know.

E-17-2

Q I don't think that's necessary.

A And then the function of F and G would be evident but one is high and one is low and then we reverse that role and that, now how high and how low depends upon how you arrange those grid resistors in there, but in the current machines we have one of them at plus 110 volts, plus 100 volts and the other at minus 100 volts and then the role is just reversed and the thing stops adding and starts subtracting.

Q Now, if we refer to the Exhibit Y which was the test set, the physical test set?

A You want to run it?

Q No.

A All right.

Q The first question is the circumstances under which this test set was constructed, who initiated it and how you went about it?

A It was constructed along the line with the computing machine at the same time for the purposes, I think I told you this morning.

Q Yes.

A For the purpose of testing the add-subtract mechanism and getting them ready to go into the other computing circuit.

Q Now, you just said, I believe, there was no circuit

diagram of the original test unit extant, how did you select the circuit for this test set Exhibit Y?

A Well, look at that circuit there, you know we have the voltages on there and, of course, it doesn't matter exactly what voltages you use, as a matter of fact, this thing is operating in a plus or minus 100 volts or 105 volts or something close to 100, but they operate well up to 150, well, up to 200 volts if you operate them up there. So you just, you just arrange a power supply that supplies the positive 120, negative 120, and then you arrange the power circuit will supply you know how many tubes you got here and you got three-tenths of an ampere per tube, three-tenths times seven is two and one-tenths amperes so you got to get a source in there, and we got, it's extra heavy because we have to put in an extra little filament transformer in order to get the filament current. It happened the little transformer that we happened to find that would give the plate supply wouldn't give the filament supply so we had to add another transformer for that, and that's the things you ordinarily do in patching up electronic circuits, and then the thing is working.

Q What do you use to generate the signals to apply to terminals B, D and E in the test set?

A B, D and E? We use resistor networks.

Q Pardon?

A Resistor networks. On the -- we use resistive networks on the other voltages which we have present.

Q Well, and the switches or relays for keying them?

A Here, see these?

Q Those buttons change the resistive networks?

A They switch, as a matter of fact, we have two resistive networks, one at a suitable voltage we call high voltage, one giving a suitable voltage called low voltage, but the input impedence of all circuits is so high that loading them on doesn't make any difference. So all you have to do is to just switch from one to the other so these are single pull double throw switches here that you have at the top. And then you switch them, switch the lead in question from one to the other.

Q Do you have a circuit diagram of that test unit?

A There is one somewheres, but it is certainly in Mr. Kirkpatrick's possession. I may have one in my possession and I would be glad to look for it, if you please.

Q May I ask --

A You can ask questions about it.

Q I would like to see a copy of it and I would like --

A I haven't got one here.

MR. DODDS: Mr. Fallon, could you make a copy available to us? Or Mr. Halladay?

MR. FALLON: In this respect, I am

counsel for Dr. Atanasoff --

THE WITNESS: If I have one --

MR. FALLON: We can make it available. I have none.

MR. DODDS: I understand that.

THE WITNESS: I am not sure I have one, but I could also take this apart and make up one. That would be another possibility. If I have one it was made by a -- it was made towards the end of the process of producing this and was made by a technician in the employ of Mr. Kirkpatrick, and I am sure you can obtain one from Mr. Kirkpatrick. I think that would be the logical source unless you desire me to supplicate Mr. Kirkpatrick to give you one.

Q Well, actually, counsel for defendant is in sort of an anomolous position because you are the witness at present for the plaintiff Honeywell and I don't know whether you are under subpoena or not, but I don't know whether you have been asked to bring these documents. I don't have any power to require you to bring these documents.

A I was told what was needed here and I brought it as far as I knew, and maybe not successfully in all cases, but I tried to bring the documents.

MR. DODDS: If nobody has any objection I would like to make a request that the witness

supply his counsel, Mr. Fallon, with a copy of this circuit diagram, who then may supply it to both parties.

MR. FALLON: All right.

MR. HALLADAY: That's agreeable.

BY MR. DODDS:

Q Now, Dr. Atanasoff, when you were describing these exhibits Y and Y-1, you referred to the fact that the interconnecting cable and plug had apparently 12 leads while there were 10 on the original as appearing from the photograph?

A I knew that would come back to roost.

Q So what I would like you to do, I don't know that Mr. Halladay has any objection, I was going to suggest that you indicate on Exhibit X where those 12 leads went?

A Well, I can. Suppose we first count the leads on Exhibit X, count the leads on Exhibit X?

Q All right. I did count them and I got, I believe, 10 or 9, but there are no leads shown for the filaments?

A Well, then that means 10, 11, doesn't it? Two leads for filaments?

Q It depends on whether the ground went up --

A We wouldn't mind grounding one -- and I might tell you that in the original set the filament was grounded.

Q And in this set is the filament grounded in one side?

A It is not.

Q It is not?

A No, it is not.

Q That counts one extra terminal?

A Yes. And I don't know about the other one, but my count -- in the course of building this, somebody got loose with one of the leads and I don't know what happened there so I would have to just research that for you, but because he had it because the ones we could buy now happen to have that many leads.

Q Well, could I extend my request to a certain diagram on the test unit plus a circuit diagram of the interconnection of the test unit to the Exhibit Y-1 since it seems to have at least --

A I am resisting slightly because I am a busy man and I can spend a day or two if counsel is willing to pay for it, I would be glad to furnish him with this material.

Q I understand you thought you had a circuit diagram?

A Suppose I don't have? I am only resisting for that reason, otherwise you are certainly welcome to the material. That's the only objection I have.

Q Under the circumstances would you -- I think frankly there might be some conflict if you were working both sides of the street?

A I am not going to work both sides, and I promise you I will not be working for Mr. Halladay when I am working

for you.

Q I think that might be a little problem. I would like to have what you have available. What you don't have available we will jump off that bridge when we get to it.

A All right. Good enough.

MR. DODDS: Is that clear, Mr. Fallon, to the extent there are diagrams of the test unit and interconnection with the ASM unit, they will be supplied --

THE WITNESS: I would think that --

BY MR. DODDS:

Q I am sorry --

A Pardon me --

Q They will be supplied and if not available you will let us know?

MR. FALLON: Fine.

BY MR. DODDS:

Q Now, the next question is with respect to Exhibit Y-1 but I believe, you can assume the questions are the same as to Y, the answers would be the same as to how it was constructed and so forth?

A I counted --

MR. FALLON: I don't know if that's the question. What is the question?

MR. DODDS: I will be more specific if yo

wish.

BY MR. DODDS:

Q Relate the circumstances under which you constructed Exhibit Y-1?

A The same.

Q And where were units Y and Y-1 actually physically constructed?

A In my home.

Q And were they constructed by the same personnel you identified previously that was working on the machine?

A They were.

Q Dr. Atanasoff, before testifying at this deposition, had you read any of the depositions, previous depositions that were taken in this case and/or the Control Data case?

A I have read, let's see, I have read Legvold's deposition, Laura's deposition.

Q Mrs. Atanasoff?

A Yes.

Q Dr. Mauchly's deposition?

A I have read Mauchly's deposition, original deposition there but not the one in this case.

Q Control Data case?

A Right.

Q Butnot in this case?

A Right.

Q Did you read Mr. Trexler's deposition?

A No, I didn't.

Q Mr. Davis' deposition?

A No.

Q Mr. Griffen's deposition?

A I would have to examine my files. I may have seen Mr. Griffen's deposition. As I remember it was very short, wasn' it?

Q It was short. Yes.

A I probably saw that one, yes. I think it would be a fair guess that I think that counsel supplied me with a copy and I read it.

Q Have you happened to read the original complaint in this lawsuit?

A No.

Q Did you ever read the amended complaint in this lawsuit?

A No.

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Q Dr. Atanasoff, in the back of folder No. 1 there were some reproductions of a number of technical publications from technical journals, including some in which you were the author or co-author and some in which your graduate students were authors.

MR. FALLON: Folder 1?

MR. DODDS: Folder I, I am sorry.

Capital I.

BY MR. DODDS:

Q Do you recall whether you have published any other articles in technical journals?

A Well, I don't have any immediate way of telling. I would have to check my entire publication list. I would have to see how it corresponds with that. I don't really remember what got into ithat, Mr. Dodds.

Q Well, maybe you had better look.

A That will help, but --

Q Do you recall any other technical publications of which you may have been the author or co-author?

A Is the one by Brandt and myself in here?

Q Yes.

A It is? I just remembered that because I have been going over it lately. It is not in my set here, but it's in yours, is it? There it is, isn't it?

MR. FALLON: No. That is Research

Foundation.

BY MR. DODDS:

Q That is the Journal of the Optical Society of America?

A Yes, you have got it. I don't really --

MR.HALLADY: Do you have a number on it?

MR. DODDS: 1613.

THE WITNESS: I don't really know. Now, I know that my publications were from the era back there because since that time I have been employed by the government and I have been employed in other places where publications are not current, so I will just have to look and see.

Q Do you remember publishing an article in The Journal of Meteorology?

A Yes, I do seem to remember that. Yes, I do.

Q And do you remember what the subject matter was?

A I imagine it was my Helgoland expedition, wasn't it?

Q Yes, it was. Do you remember who were, if any, were co-authors?

A I don't remember. I know it was my group that did the work.

Q I might -- I think it's fair to say, Dr. Atanasoff,

3

this is only a question of memory test. It is not a question, the subject matter is not relevant. I just want to see how much you remember.

A Yes. Well, you know, I am not doing too well, maybe.

Q Do you remember -- I will give you the title which will give you a clue. The title was "Upper Atmosphere Temperatures From Helgoland, Big Bang." Does that ring a bell?

A Yes, it does.

Q You don't remember who the co-authors were?

A I know there is a man named Daubrin on there probably.

Q And do you remember anything about the substance of the discussion on this article?

A Why sure. I have no trouble on that. It's the other stuff that I am likely to forget.

Q Well, --

A This analyzes the transmission of the sonic waves through the atmosphere from Helgoland to the various receiving points which we had at that time, and analyzes it with a purpose of determining the nature of the atmosphere above the surface of the earth.

Q Do you remember what sort of equipment you used to measure these?

A Well, I built it with my own hands.

Q I am sorry?

A I almost literally built it with my own hands. The design came out of my mind and almost in the main my mind.

Q What did you call it?

A Microbarograph.

Q And do you recall discussing in this article Guttenberg's conception of sound ray paths?

A Yes.

Q And what was your conclusion with respect to Guttenberg's conception?

A I do not remember this. I know GGutenberg pretty well.

Q Do you remember, Doctor, publishing a technical article in an electronics magazine?

A Well, let's see. If I published an article in an electronics magazine, I would say it was on an experimental electronic chassis, is that right?

Q Pardon?

A An experimental electronic chassis. Have I guessed wrong?

Q Well, partly right. Again, I will give you a clue. It was called, the title of it was "Modern Bread Board Chassis."

A That's exactly what I mean.

Q And do you recall who were the co-authors with you

on that?

A Snavely and Brown.

Q Do you recall the general subject matter?

A Sure. I have one of them at home and I had my hands on it in the last month, so I will remember it. Do you want to see it?

Q Well, it's not very much a test of your memory if you have had one in your house and looked at it in the last month.

A That's right.

Q Now, do you recall, I think you referred in g i your testimony, and I refer particularly to page 109 of the record about a PhD. thesis of one Robert Willson?

A I do.

Q And I believe you instructed the reporter very carefully that it was spelled with two "l's"?

A I believe that's right. Am I right or wrong?

Q Well, we will have to check that. If you will refer to the exhibit, I believe it is in folder A-2, documents 3, 2 and 3, which were the Christmas letters that went out at Ames, and I gather that these Christmas letters went out to present and ex-faculty and graduate students, and so forth?

A Well, I see I was wrong.

Q It was spelled with one "l" is that correct?

A Yes. I see that Professor Willson in the department

there was spelled with two "l's".

Q Yes. Will you just for context state briefly again the subject matter of the thesis of Mr. Willson?

A Well, he commenced an investigation of the dynamics of quartz crystal. I don't know whether I can give you a title that will be representative of his, but it's a question of determining the frequencies of vibration of a block of quartz, and he commenced that work, which was carried on by several other people in my laboratory at the time, subsequently by Hart.

Q Do you recall when Mr. Willson commenced his work on this thesis?

A I would think it was '34 or '35, maybe '36. I just foreget the year.

Q Do you recall when he completed the work?

A Well, he got a doctor's degree. He must have been on the work for a year or a year and a half or two.

Q You don't remember the year in which he received the doctor's degree?

A No, I don't remember that. I haven't attempted to memorize it or anything of the kind.

Q Now, I would like, if I might, refer back again to the chart which you drew, Exhibit N, Plaintiff's Exhibit N. If it will be convenient, you may refer to my copy.

A All right. I drew a chart purporting to show the

connections and arrangements of the work for Mr. Willson's thesis, and this method was also used by subsequent people.

Q Now, as I understand, this chart represents roughly the apparatus which Mr. Willson used in conducting the experiments on his thesis and that equipment illustrated on chart, Exhibit N, what part if any did you contribute and what part if any did Mr. Willson contribute?

A Well, it was a cooperative effort between us. I don't know what I should say to you under these circumstances.

Q Just the truth.

A Oh, that's not so simple, as you well realize, because the truth comes in many cloaks. I -- for instance, the idea of approaching quartz crystals this way was mine.

Q I am talking about particularly the equipment by which you --

A You mean -- of course, a graduate instructor does not in the main build equipment but he plans it for graduate students to build or he assists graduate students in planning to build it. Now, I am not hedging, but that's just simply the way it has to be in this particular case.

W-18-2

Q I was just asking as to this particular case.

A All right. I am going to try --

Q I am sorry.

A I am going to try to tell you. Now, I remember that I designed for Mr. Willson a precision condenser which is employed on the oscillator here, which I can give you -- if you have any source, I haven't looked up Mr. Willson's thesis, but I can make you a sketch of that oscillator, for instance. I haven't seen Mr. Willson's thesis, I haven't bothered to go look it up, but I can give you an almost precise description of that condenser at the present moment.

Q You say precision condenser. Was it a variable condenser?

A It was a variable condenser and it was a home made variable condenser, and it would be an interesting thing for you to have it. Perhaps you would like to have me draw you one and then you can take it and go back out to Iowa State College and look up the thesis and compare it, and it will help your confidence there.

Now, I would say that the general idea of how this apparatus was to work was my conception, and at times I helped Mr. Willson build the apparatus, but not in the main, no. He in the main did the work.

Q You referred in describing this and have indicated

on Exhibit N a box called Miller effect?

A Yes.

Q Can you just tell us briefly what a Miller effect device is?

A I bet I can. A Miller effect tube is a tube whose input impedence -- it is a tube arranged to vary the capacity of a circuit according to a voltage applied thereto. That's what a Miller effect tube is. That's the purpose of a Miller effect tube, to vary the capacity by a voltage applied thereto. Now, I guess I'd better have some paper.

Q Now, instead of using those charts, would you mind sketching -- I have some letter sized white bond paper here, which is easier for me, at least, to handle.

A Yes, I will be glad to. Now, the Miller effect tubes are made with pentodes and they are made with triodes but I am going to give you one made with a triode. Now, I want this to go in the record --

Q I will have it marked after you finish, yes, Doctor.

A All right. I am being a little bit careless, but otherwise than that, why -- I should get a --

MR. HALLADAY: Mr. Dodds --

MR. DODDS: I am sorry.

MR. HALLADAY: It is obvious that from time to time as the witness works on this drawing,

3

he will be more or less thinking aloud. I would be agreeable, if you are, to going off the record until he has completed the drawing rather than confuse it by thinking aloud that may or may not be meaningful when it has no question to respond to and no object to refer to.

MR. DODDS: That is agreeable.

(Discussion off the record.)

MR. FALLON: May we go back on the record, Mr. Sutfin?

BY MR. DODDS:

Q Dr. Atanasoff, would you, perhaps, apply some reference numerals to the various elements to aid in identifying them and then describe briefly that circuit?

A And how it operates?

Q And how it operates.

A Yes. This is a triode. Do you want an effective triode? Do you want me to enumerate a triode that might be used in there?

Q No, that's not necessary.

A Well, I could if you wished.

MR. FALLON: Like numeral 10, numeral 12.

BY MR. DODDS:

Q Numeral 10, 11, 12, that is all it needs.

A Okay. Do you want me to dictate a modus operandi of this device?

19/1
EA

Q Whichever is most convenient. If you want to apply the numerals first or dictate or apply them as you dictate, either way?

A The Miller effect tube, the purpose -- let's start off this way: The purpose of a Miller effect tube is to develop a variable capacity which can be controlled by a variable voltage. This is accomplished as follows:

The variable voltage controls the amplification or gain of the vacuum tube. This tube may be either a triode or a pentode. It could be a four electrode tube also. Usually the variable input voltage employed on the grid is impressed on the grid. The variable capacity is also takenoff between the grid and the ground. This necessitates filtering to separate these two effects. In the drawing which I have constructed, a choke of suitable size, of suitable inductance -- will you correct that to inductance -- prevents the input circuit from unduly affecting the capacity at the operation frequencIes.

On the other hand, a condenser prevents the variable input voltage from reaching the variable capacity terminals. There is a capacity connecting the plate.

Q Excuse me, I was going to say -- could I interrupt --

A And the grid.

Q If you would put some reference like one, two, three or ten, eleven, twelve as you go along it would help I would

think.

A All right. All right.

Q You started out with a choke?

A All right. The choke is called number one. You want to make a list? There is a capacity C1 between the plate and the grid. The plate has a normal resistive load although any reluctance type load, any suitable reluctance could be used as load.

The capacity C2 prevents the variable input voltage from reaching the variable capacity terminals.

I believe that's good enough. That ought to do all right.

MR. HALLADAY: Did you use the term capacity C2? Capacity C2?

THE WITNESS: The capacitor C2, if you don't mind.

MR. DODDS: May I ask the reporter to mark this as Defendants' Exhibit DPX-5.

(DPX-5 marked for identification.)

BY MR. DODDS:

Q Now, still referring --

A May I make one change in that. It occurs to me that I can advantageously make one change. The capacity C3 is between the grid and the ground connection.

MR. HALLADAY: Again did you say

capacity deliberately?

THE WITNESS: The capacitor C3. And the capacity is also all right. I don't know, that doesn't make any difference.

BY MR. DODDS:

Referring back now to Exhibit N, the schematic or block diagram of the Willson arrangement, do you recall what sort of an oscillator was used, a Heising or Colpitts, what have you?

A We used Colpitts a good deal but any kind of feedback capacitor.

Q Do you recall what was used in that equipment?

A I do not particularly recall.

Q The same question with respect to the detector. Do you recall what type of a detector was used?

A It was an amplitude detector. I believe that the record shows it was an amplitude detector.

Q That's correct.

A And what was used there was a vacuum tube used as a diode in this device.

Q Do you recall when you last saw the documents containing a description of the apparatus in Exhibit N?

A Well, not since approximately the date which they were written. I haven't refreshed myself in regard to this for deposition in the slightest. You have got it, have you?

I will tell you what you let me do, you let me draw you a picture -- is there a picture in there of a condenser?

Q No. I don't believe so. I don't know.

A Well, look closely, and if there is I will draw you a picture of the condenser. I happen to remember that with great precision because I designed it myself.

Q I think not. Well, now, I believe you said, Doctor, that it was a later thesis by another one of your graduate students --

A There is work by Mr. Hart and Mr. Kammer in a similar -- oh, in the same subject.

Q Do you know whether -- Did they do theses, graduate theses?

A They -- each of these three obtained PhDs. in this subject.

Q Do you recall whether or not their theses were published?

MR. FALLON: What do you mean by published?

MR. DODDS: In a technical journal?

THE WITNESS: I understand it clearly. I am sure that there was publications came out of the two of them and I don't remember exactly. Well, let's see. I don't -- I know that either Hart or Kammer published their work and very possibly both of them.

BY MR. DODDS:

Q You don't have any distinct recollection of whether either or both did publish them?

A I believe there is a publication by one of them in company with me.

Q You don't recall though specifically what the publications were, if there were any, between -- of these men?

A You mean the titles?

Q Either titles or when they were published or where they were published or anything about them?

A They were published in those years and those years are between thirty -- let's see, they were between '36 and '42, and they are published in -- I believe they are published in the Physical Review.

Q Have you -- I didn't find copies of them in these --

A No. They were not there. I did not intend to put my publications in there and somebody got ahold of them and they brought a group of them up here and handed them to me, and I added them to them at the instance of counsel.

Q I would like to correct myself. There is a publication of the paper by yourself and Mr. Hart.

A Right.

Q In the Physical Review of January 1, 1941, included in your documents.

A All right. All right.

Q Now, and I think you mentioned that Mr. Kammer was one of the men that carried on work in the same general field?

A That's right, Irwin Kammer and Phillip Hart.

Q Now, do you recall just in what respect his work differed from that which Mr. Willson had done?

A Well, what happened was roughly this, and in that line of three theses, what happened was roughly as follows: Mr. Willson began by building the apparatus which I have outlined in that picture and which was used in the case of Mr. Willson by examining the spectra of quartz crystals. Then the other two men carried on a series of work. We developed theory and commenced to measure the elastic constants out of the quartz crystal and I can't tell you how many elastic constants there are, but in an isotropic media there are three elastic constants and in the quartz crystal there are, I believe, six or eight elastic constants, and I believe the number is six, but I am not quite sure. We commenced to measure these elastic constants and to measure the temperature coefficients of these elastic constants, and our work was first in this field and it was of considerable import.

E-19-2

Q You say we, you mean you and your --

A And my graduate students.

Q And your graduate students?

A That's right.

Q Now, do you have any recollection -- you have a very vivid recollection of the circuit arrangement which Mr. Willson used in his work, can you remember the circuit arrangement which Mr. Kammer used in his work?

A You see, Mr. Willson's was first and it was simpler. We refined the circuit in some respects, I am sure, of that, and I do not have any particular memory of the difference.

Q You wouldn't be able to draw --

A No --

Q A chart similar to this for Mr. Kammer's?

A I am not sure I couldn't if I sat down and thought over exactly what Mr. Kammer's problem was and attempt to design a circuit for that, but that wouldn't be quite fair, it's just not simply a matter of memory for me from that day.

Q Was there work of Mr. Kammer's which later appeared and perhaps this is a good time to have this marked, a copy of this marked as DPX-6, marked for identification, and the title is, "A Determination of the Elastic Constants of Beta-Quartz," by E. W. Kammer and J. V. Atanasoff, appeared in the Physical Review, October 1 and 15, 1942, pages

395 to 400 inclusive.

(DPX Exhibit 6 marked for identification.)

BY MR. DODDS:

Q Would you look briefly at the figure, the circuit diagram at the top of page 396?

MR. FALLON: The schematic diagram Fig. 1?

BY MR. DODDS:

Q I was going to say both Fig. 1 and Fig. 2, and can you state briefly in what respect this equipment differed from the equipment which Mr. Willson was using?

A Not much. Not much.

Q Can you be a little more specific?

A Well, not much. There were only minor refinements and you see in Figure 2 there we have the 60 cycle input current used to swing the Miller effect tube which is at the left of the bottom of the picture, and on the Figure 1 it's called the frequency modulator there. Now, this feeds into the, directly into the -- I am sorry. I have got this wrong.

The first tube on the lower line, I mean the right-hand tube on the lower line is the Miller effect tube. The left one is the oscillator. Then this feeds through the furnace and through the crystal to the -- through

3

to the buffer amplifier and then to the detector, and in this case we are using a triode detector and not a diode detector.

Q Now, I would like to read into the record the first few sentences of the introduction to this article by yourself and Mr. Kammer. It says, "A new technique is described for quickly locating and measuring weak resonance points of a plate of piezoelectric material. The method involves driving the resonator with a frequency modulated carrier and demodulating and amplifying a voltage related to the motion of the resonator. The output of the amplifier is placed on one set of plates of an oscilloscope and the other plates are charged with the modulating voltage. The resulting pattern on the oscilloscope screen permits easy location and measure of resonant frequencies."

Would you tell me in what respect what I have just read differs from the arrangement of Exhibit N?

A Not very much.

Q Well, not very much --

A Is there any difference?

Q Is there any difference ?

A I recognize none. We used a pattern here and we used it to -- of course, we will have to find some way of measuring it, of localizing the frequency of the oscillator, but this is an ordinary frequency measuring apparatus.

Q Just a minute. I am just talking now about the

4

language I read from the introduction which is in fairly general terms?

A I don't pick up any difference. There may be a difference but I don't pick it up.

Q Do you know any reason why --

A Will you let me read it myself instead of you?

Q I am sorry. Yes. Certainly.

A I would say this is exactly the same method as Mr. Willson.

Q Do you know any reason why Mr. Willson wasn't given any credit in this paper? There is a bibliography referring to work of -- excuse me, I only find one -- no, there are several prior articles referred to but not Willson's?

A Not from Mr. Willson?

Q No.

A I am not sure. I am not sure.

Q You don't know why?

A Well, probably inadvertence. I would say inadvertence. Well, "Edge effects were eliminated by the use of high harmonics as described by Atanasoff and Hart." Of course, that was done in the Kammer paper. Now, I should have told you --

Q Excuse me, I don't believe there is any question before you at the moment.

A All right.

Q And we come to a different subject, Doctor. I refer you to your chronological list Exhibit DPX-4 and if you will look at page 36 of that list you will find a reference to sending copies of the manuscript 455 or 456 to Mr. Warren Weaver and to CSAL?

A Right.

Q On the respective dates of -- I can't read it from here?

A 21 and 22 of August, 1940.

Q Now, in the list I find no reference to sending a copy of the manuscript to Mr. Poillon of Research Corporation which I believe was in November of 1940. Do you know of any reason for that omission?

A I know of none.

Q Well, I understood that this was prepared by -- as a collection of dates which you supplied from your documents and dates which were supplied by counsel?

A Yes. But if the date is missing it just means that somebody goofed and that may well have been me that goofed, I am not sure.

Q Yes?

A But somebody goofed.

Q On page 64, I believe at the bottom, there is a reference under the date of 1953 to a Sperry Rand report issued. Do you know what that refers to?

A I do not.

end

W-20-1
6

Q Would you look at page 42 of the notes?

A 42?

Q 42. There is a reference at the bottom, "Late 1940." Would you read it? I can't read it.

A "JVASA: 'Computing Machine for the Solution of Large Systems of Linear Equasions'", and I suppose this refers to the manuscript.

Q Well, would you continue with what it says?

A "(Unpublished) plus financial statement; 31 pages plus 2-page financial statement."

Q Do you have any idea what the meaning of that entry is?

A Of what entry?

Q That you just read?

A I thought that exactly described one of these two green booklets which you have here.

Q Well, but you told us those were typed in August of 1940?

A Oh, I see. Well, it just happened they were typed in August.

Q Did you have any knowledge of what that entry means?

A The entry just meant August, that's all, as far as I am concerned.

Q In late 1940?

A Yes. Somebody said late '40, and then later the date was determined as August.

Q Well, is it your impression that that entry refers to the issuance of the manuscript as represented in Exhibits 455 and 456 in August, 1940?

A I believe it does.

Q You may recall, Dr. Atanasoff, that earlier in your deposition there was some exchange about your reference to these notes and I think that --

A My what?

Q There was some reference, there was an exchange between counsel or you and I with respect to your reference to these notes, and I think the last time you indicated thatyou had not referred to it and I think you had not referred to it during yourdeposition.

My questinn was, have you referred to these notes during recesses in the depositions?

A That's a good question. I believe almost not. I might have looked up a record, but I would say for all practical purposes, I haven't stayed at home nights and memorized these notes or anything of the kind, no, sir. I won't say that there hasn't been something that occurred to me that I might have looked up in this document.

Q Yes.

A While we were probably right in this room in your

presence or during the lunch period or something of the kind. This book has been here.

Q Yes. Now, I think there's one final question. I want to refer you to two places, to pages 31 and 66.

A In this book?

Q In that book, yes.

A 31 first?

Q Yes, and, well, 66, I think you can maybe sort of put your finger in there and look at both of them.

A Yes, I will. Okay.

Q In each, it looks as though there is some material at the extreme right-hand edge which was, which indicates that the reproduction is from some different sheet and that some portion of it was blocked out. Do you know what that represented? Do these notes come from a pamphlet used by your counsel, Mr. Halladay?

A I believe they came from some such source, yes.

Q Would you look at folder F-1-A which are the photographs 1402 to 1419, I believe.

A These photographs?

Q Yes. My question is, you may recall that you had put on the reverse of these, certain notes as to their dates--just a minute.

A I am sorry. I am sorry.

Q Dates and sources. Can you identify the sources and

dates of those photographs without reference to the notes on the back?

A I see what you mean. Yes, I can, because the dates are on the front.

Q Someone has moved them to the front. I guess the sources are not identified. Somebody has moved the dates to the front.

A Yes. Now I can tell you quite closely the sources. The dates would give me a little bit more trouble, but I will be glad to try it with a set that's different. You take my set.

Q All right.

A The first two --

Q And if you will describe them. Then I will give or maybe your counsel can then give the number to the reporter which I think is on the back.

A The first two --

MR. HALLADAY: The number, please?

MR. FALLON: 2 and 3.

MR. DODDS: 1402 and 1403.

THE WITNESS: The first two were found by me as prints in an envelope.

BY MR. DODDS:

Q Where?

A In my files, and they have come from the very day.

MR. FALLON: The legend on the reverse of 02 is "From print in JVA files," and the same legend is on 1403, reverse side.

BY MR. DODDS:

Q You had, I believe, three there.

A I am sorry. I didn't mean to have three. I just had three by accident.

Q Just turn them to keep them in order.

A Now, they were rather early in the construction of the machine, and some time in 1940, say in the middle of 1940. These photographs here --

MR. FALLON: This would be 1405, 1406, 1407 and 1408.

THE WITNESS: These are from the manuscript and they were taken specificallyfrom the manuscript and their date is August of '40, maybe slightly before that.

BY MR. DODDS:

Q You mean these are reproductions of photographs actually --

A They came to me in the manuscript.

MR.FALLON: The reverse side of 1405, 1406, 1407 and 1408 each bears the legend, "From booklet JVA files, 8-7-40."

THE WITNESS: Now, these three were in Clifford Berry's thesis and they were taken for that purpose.

MR. FALLON: 1417, 1418 and 1416 in that order.

THE WITNESS: And Clifford Berry's thesis was done, oh, in July of '41

MR. FALLON: The reverse side of each one of these has the legend "From CEB, M.S., thesis, I.S.U."

THE WITNESS: Now, the last one was from a negative found in my files.

MR. FALLON: This is 1419.

THE WITNESS: And the date is perhaps May of '42. I don't know.

MR. FALLON: The legend on the reverse side reads, "From JVA file, 18 May, 1942."

THE WITNESS: And I purposely gave you that one first. Now, these other items are from -- there's one of them, and I believe this is the one. I believe this one is from Norman Fulmer.

MR. FALLON: This is 1415 and the reverse side says, "From N. Fulmer."

THE WITNESS: Now, the rest of these were obtained from Clifford Berry as prints, either -- and

negatives were made from the prints and they are in interim, well, they do not have dates. We do not have the original dates of any of these materials here but I can make guesses as to the dates for you, if you wish.

20-2 -1
WS KL

BY MR. DODDS:

Q No, I don't wish that.

MR. HALLADAY: Would you identify the numbers?

MR. FALLON: I will right now. These were in order, 1409, 1414, 1410, 1413 and 1412. On the reverse side we have --

MR. HALLADAY: Respectively.

MR. FALLON: Yes. "From CEB files" for 1409. For 1414, "From CEB album." For 1410, "From CEB files," for 1413, "From CEB album," and for 1412, "From CEB files."

MR. DODDS: Is there a final one?

MR. FALLON: Well, this is the 1415 previously marked over here from N. Fulmer.

MR. DODDS: I am sorry.

BY MR. DODDS:

Q Dr. Atanasoff, in what time period did you put these legends on the reverse of these photographs as to their dates and sources of them?

A You mean on the front?

Q The information, the notes here on the back.

A Oh, yes. How long ago?

Q Yes.

A I didn't actually put it, but I did it the same

time that I assembled this list of photographs.

Q Within the last two months?

A Yes, sir.

Q You referred to the thesis of a gentleman by the name of Gross, Cook and Thorne that did work under your supervision at Ames?

A Yes.

Q Were these theses published, do you know?

A Well, I believe there were publications resulting from those theses. I don't remember which one. I imagine that at least one of Gross' theses was published -- no, I believe Gross' wasn't by some strange -- it depended largely on the effort of the man who got the thesis whether the thing got published or not, and sometimes they got published and sometimes they didn't. I believe Gross' didn't, but I believe that maybe one of Thorne's theses got published. That's the way I remember it, but I am not sure.

Q How about Mr. Cook? Do you have any recollection about that?

A He may have got a thesis published, too.

Q You don't remember?

A I don't remember, no.

Q You testified that during your recollections of your earlier life about a slide rule which I believe your

father owned which was in a red case, I think it was a Dietzgen slide rule. Do you remember how that case was closed or fastened?

A It was a slip-type case like this, the parts slipped together.

Q Telescoping type?

A Telescoping type, yes, and that particular Dietzgen had another feature which I remember clearly that will interest you. It had a spring type instead of having screws at the back, it had a spring type adjustment so it was supposed to automatically apply the right tension. It didn't work very well but that was the design. On the other hand, the K and E that I mentioned at that time had screws in the back which are used for adjustment of the tension.

Q And roughly, as I recall about this same period, you referred to two booklets on radio telegraphy, which apparently were British?

A There was one on radio telegraphy and one on radio telephony. I can tell you that they were British. I can tell you that they had a very light green cover. I can't tell you the name of the publisher, however.

Q You said, I think, that they were priced in shillings and pence. Do you know, do you remember how many shillings and pence?

A Oh, I remember once thinking that they probably

were worth, oh, I imagine it would be a couple of shillings or something of the kind.

Q You don't really recall? You are imagining?

A Well, yes, I remember asking how much money it was, and then I have some kind of a transmission that it was of that order of magnitude.

Q You don't remember the figures?

A No, I don't remember the figures.

Q Do you remember the title page or the contents on the title page of either of the pamphlets?

A No, I do not, but I can tell you that the one on radio telegraphy dealt with a co-hearer and the one on radio telephony dealt with a detector which involved a platinum wire dipped into acid.

EA # 21/1
KL

Q I refer you to Atanasoff Deposition Exhibit T, you can use this copy if you like for convenience. Would you tell me just how this chart was prepared and by whom?

A I made some rough sketches of this chart. They were worked over by Mr. Call and the draftsman and they turned to me and I made additional suggestions and that's the way this chart was prepared.

Q And what was the source of information for the preparation of this chart?

A My memory, solely.

Q So the accuracy of the chart depends on the accuracy of your memory?

A I think that's a fair assumption.

Q Now, referring to this same prototype, I believe this is a representation of the prototype machine, is it not?

A Yes. This is not the -- Well, I guess this is -- all right, good enough.

Q I think that you testified that there were no circuit diagrams of that extant of the original prototype?

A Yes. You mean complete circuit diagrams?

Q Well, I didn't -- you correct me.

A There is in the files an add-subtract mechanism which I believe is this add-subtract mechanism. As a matter of fact, my memory is that it is this one. It's the only add-subtract mechanism of this character that I know.

Q But so far as you know, there is no circuit diagram of the complete machine?

A There is not. No.

Q Now, would you refer to Folder F2, documents 442 and 443. To the best of your recollection -- I am sorry -- have you finished looking at this?

A Do you mean this particular page 442?

Q 442 and 443?

A And 443. Yes. I believe 443 is the add-subtract mechanism which is used in the prototype.

Q Are you sure of that or are you just thinking that it may be?

A Mr. Dodds, I will state that this was the circuit used in the prototype.

Q Off the record I think you're safe. Let me check it.

A No. It's certainly not mine. I just had to wait and I don't like it either and I shouldn't use it in dealing with you people.

THE REPORTER: Are we off the record?

MR. HALLADAY: Did you go off the record?

MR. DODDS: I suggested it but I don't care.

MR. HALLADAY: Well, when counsel makes a concession, it seems to me I am entitled to have it on the record, and I think the witness is entitled to it.

MR. DODDS: If he wants it on the record certainly it can be on the record.

MR. HALLADAY: Well, is it on the record?

THE REPORTER: Yes.

MR. HALLADAY: Thank you.

BY MR. DODDS:

Q What was it you wanted to say, Doctor?

A I am sorry that I have the method of speech of a scientist in which you always express deference and never express assurance and it's gotten me into trouble before.

MR. DODDS: Mr. Halladay, the reporter asked if we could adjourn at 4:30 and it's a little beyond that. I don't know what your wishes are. I don't know whether it's possible to make any plans as to how much longer this deposition is to go, whether we can finish up tomorrow or not. Could you give any indication of the estimate of the amount of redirect you may have?

MR. HALLADAY: I have none at the moment that will consume any time.

MR. DODDS: Then it is agreeable that we adjourn until tomorrow and we probably can finish up easily. I don't have too much more but I expect perhaps another hour.

MR. HALLADAY: Very good.

(Whereupon an adjournment was taken until 9:15 o'clock A.M., December 6, 1968.)

EA#1
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VOLUME IX

UNITED STATES DISTRICT COURT

DISTRICT OF MINNESOTA

FOURTH DIVISION

Honeywell, Inc., Plaintiff,	:	
-vs-	:	4-67 Civ. 138
Sperry Rand Corporation and Illinois Scientific Developments, Inc., Defendants.	:	

Continued deposition of Dr. John V. Atanasoff taken by Plaintiff, before Earl G. Anderson and Ward L. Sutfin, Notaries Public, State of Minnesota, County of Hennepin, at 2515 First National Bank Building, Minneapolis, Minnesota, commencing at 9:25 o'clock a.m., December 6, 1968.

(APPEARANCES AS HERETOFORE NOTED)

Whereupon,

DR. JOHN V. ATANASOFF,

a witness having been previously sworn, was examined and testified further as follows:

CROSS-EXAMINATION (Continued)

MR. HALLADAY: All right, I guess you wanted to say something, Dr. Atanasoff, about Mr. Fallon?

THE WITNESS: I have two statements to make. Mr. Fallon was called to Chicago last night by pressing business and will not be here today. I explained to him I thought we could make out without him, and I have the following additional names to read into the record for the counsel for defense.

MR. HALLADAY: Is this in response to that earlier question about persons with whom you have discussed something or other within the past three years, is that it?

THE WITNESS: I would like to have the exact question restated and I couldn't be quite sure that I read it. Can counsel for defense state the question or rephrase it to his satisfaction so it will be before us, and I can respond to it further?

MR. HALLADAY: I have it in my notes

that it came right after a reference to Atanasoff Deposition Exhibit B-3, Exhibit No. 27. You made a reference to the prior transcript page 253, then followed the sequence of questions about having left Ames in September of 1942 and the condition of the machine and what it did or didn't do.

Then my notes say the question was: With whom have you discussed ABC in the last three years? Now I am not sure that's correct.

MR. DODDS: I believe that is correct. I was referring back to my notes so I would ask the question in the same manner and that is approximately what I had in mind.

THE WITNESS: Will you restate the question and let me further respond on that basis?

MR. DODDS: Yes.

BY MR. DODDS:

Q Dr. Atanasoff, with whom during the last three years have you discussed ABC --

MR. DODDS: Will you strike that. I will repeat the question. We have found the original question and then there won't be any doubt about it.

MR. HALLADAY: Give me the page?

MR. DODDS: Page 1066.

W-2

BY MR. DODDS:

Q "With whom have you discussed the ABC computing machine within the last three years?"

A I gave some names at the time you asked that question originally. I will not repeat those names. They are in that record. I now give you some further names: Mr. David Beecher, Mr. Robert Ellbourne --

Q Excuse me. With these names would you indicate their present whereabouts so far as known to you?

A Sure. Mr. Davis Beecher of Rockville, Maryland. Mr. Bob Ellbourne of Washington, D.C. Mr. Ernest Kolsrud of Frederick, Maryland. Mr. Calvin Mooers of the Boston vicinity, I don't know exactly. I guess I have it at home, but I don't have it here. The Berry children in addition to Mrs. Berry. Mr. R. G. Vail of Palo Alto, California. My children. I think that runs me down again.

Q Thank you.

MR. DODDS: Initially, Mr. Halladay, I think it was after the close of the record yesterday, I asked for a copy of the document identified as DPX-4 a chronological list of notes. I would like to ask whether or not we may have a copy of that?

MR. HALLADAY: Mr. Dodds, my present view is that that document reflects a considerable effort in establishing a chronology, and while we have

freely consented to your referring to it in connection with your cross-examination of Dr. Atanasoff, even though his reference to it during direct examination was as stated by him, it isnot suitable to give it to you for purposes of reproduction and retention, and I therefore respectfully decline to give you a copy.

MR. DODDS: I understand that on the basis that it is a part of counsel's work product in connection with this case, or what other basis of refusal?

MR. HALLADAY: No, I think I have stated my basis.

MR. DODDS: Well, then, I would like to make a statement. The witness appears to be in a somewhat anomolous position in that he has been subpoenaed, been called here, I presume, as a fact witness, but from the testimony, it also appears that he has been retained as an expert consultant by counsel for the plaintiff, and therefore, understandably has been aiding in generating work product papers.

The problem presented is, however, that the witness testifying as a fact witness and not as an expert witness has made reference to these notes, and as such, I believe in order for the record to be complete and understandable, the notes to which he has

made reference in his testimony be a partof the record, and, of course, if it is a part of the record, then counsel are entitled to copies.

There is the further problem that insofar as there may at one time have been a right of exclusion of this document on the basis of work product, it is defendants' position that any such right of exclusion has been waived by showing the document to the fact witness and to counsel for defendant who at least on one occasion and we think others, referred to it in connection with his testimony.

Therefore, we believe that counsel for defendant are entitled to copies of the document and that it should be made a part of the record.

I assume that does not change your decision, Mr. Halladay?

MR. HALLADAY: No, it does not.

MR. DODDS: Then I will just have the record show that the defendants reserve the right to call upon the Court for the production of the document at a suitable time.

MR. HALLADAY: I understand, and you do also understand that I had had Dr. Atanasoff write his own handwritten signature on the face of this so there could be no question about what it was

we were talking about in the event it did not get marked as a defendants' or plaintiff's exhibit.

MR. DODDS: And, of course, as understood, I am sure that the document will be preserved.

MR. HALLADAY: Oh, definitely, you have my personal assurance of that and it will be preserved in my possession so there could be no possibility that it gets outside the jurisdiction of this court.

MR. DODDS: Thank you.

BY MR. DODDS:

Q Now, Dr. Atanasoff, I think late yesterday --

MR. HALLADAY: Excuse me. Just for the record, DPX-5 has been Xeroxed and we have kept a copy of same and given a copy to counsel for defendants and the original is being tendered to the reporter for custody.

MR. DODDS: Thank you.

BY MR. DODDS:

Q Yesterday afternoon you referred to a thesis of Robert G. Willson which was done or prepared under your supervision, and I think you referred particularly to a figure in that thesis. I would just like to ask you to identify this, state whether you can identify this as a copy of Mr. Willson's thesis, the cover sheet bearing your

signature?

A Should I examine this?

Q To the extent that you wish. Can you identify it as a copy --

A I so identify it.

MR. DODDS: I would like to have marked as Exhibit DPX-7 the thesis identified by the witness and I would like to have permission to withdraw it to make copies for counsel for plaintiff because that's the only copy I have.

(DPX-7 marked for identification.)

MR. DODDS: I might also state for the record that on the face is a stamp. It states, "Received November 27, 1968, patent department, St. Paul," put on by a representative of the defendant inadvertently. That obviously has been added to the document.

MR. HALLADAY: I have no objection to the process employed and suggested here, and while I haven't checked, I assume there is no problem of authenticity. It appears to be a Xerox copy of a manuscript withdrawn from the Iowa State College or University library and I assume you can supply whatever is necessary to validate that, and I don't insist on that.

MR. DODDS: Thank you.

#3
EA
pg.1

BY MR. DODDS:

Q Now, Dr. Atanasoff, you may recall that we were talking about the manuscript Exhibit 455 and particularly the duty cycle of the switch S3, and one of the questions I believe was to identify the portion or portions of the manuscript which described the duty cycle of the switch S3, and I believe the record shows that you asked for some time to reflect upon that matter?

A I have not done this. I forgot to do this and I have not done it. I don't know what course should be followed here. Would you like me to take time off now and search the manuscript in order to find same?

Q Why don't we, if we can, perhaps, conclude the main questions and leave that as the final item.

A I don't know whether it's in there or not. I am amazed that everything I can think of is in there but we have spent long periods of time looking for things and then finally it's in there and it's amazing how much is in there, and I am dumbfounded by that. I don't know how counsel for the plaintiff feels.

Q Well, if it's agreeable --

A Counsel for the defendant.

Q If it is agreeable we can pass that at the moment and perhaps at the conclusion --

A I will spend the night tonight working with you on

that.

Q Let's leave this to the conclusion and see what we can come to.

MR. DODDS: I am sorry. Excuse me. We seem to have lost a document at the moment.

BY MR. DODDS:

Q In connection with this same subject matter of your discussions about the ABC machine with others, at page 1067 of the transcript I asked if there was anyone else at Iowa State and you answered, "I am thinking of one man by the name of Robert in the computing division by the name of -- " and I interrupted and said, "Perhaps his name isn't important. It's someone in the computing section at Iowa State University?" And you said, "Yes." My question is could that have been Mr. R. K. Richards?

A No. It is not.

Q It is not?

A No. Mr. Richards is a freelance writer and has no connection as far as I am aware with Iowa State University, for your information. I am trying to think of the boy's name. That would be the simplest thing. I will think of it.

Q Still on Mr. Richards, at page 236 there is a reference to a document No. 49 which I, for convenience, you can look at my copy if you wish. It was a letter received by Mr. Richards from Mr. Berry, and I asked you a question:

"From what source," the record says course, but, "From what source did you obtain No. 49?

"Answer: I received this copy directly or indirectly from Mr. R. K. Richards." I notice that that document in the lower left-hand corner includes the initials J.B. which I presume identify documents you obtained from Mr. Berry's files, is that correct?

A I am positive that I have received a copy from Mr. Richards. Now, I may have also received one from Jean Berry and by some accident this may be that copy. Remember this letter was also written by Mr. Berry and her initials may have been placed on there at the time that it was written. I don't know why they should be, but that is an alternative possibility. Let's see --

Q Did you find --

A Let's see if this one is a signed -- well, it is not the signed copy so it must have come from Mrs. Berry obviously. I say that is the correct answer. I have a copy that came from Mr. Richards for certain in my files somewhere.

Q For convenience I show you my copy of Exhibit 107 from folder B-13, a letter to you from Mr. Richards and it is addressed to you as President of Cybernetics, Inc., would you tell us what sort of -- what is the organization Cybernetics, Inc.?

A Cybernetics, Inc. is a corporation that was closely

held, a Maryland corporation which was closely held by, at various times, by myself, by Mr. Robert Gathers and currently by my son. At the moment and for some period it has been inactive. It did some -- I don't know, say a hundred thousand dollars worth of business, perhaps, just for the sake of discussion.

Q What -- I am sorry?

A During the early sixties. Go ahead, inquire.

Q What is or was the nature of its business?

A It was a consulting firm.

Q Consulting engineering, I assume?

A It did consulting engineering in automation.

Q Were you the president of that concern during its existence?

A Yes, I was.

Q Are you still president of it?

A Yes. The firm is inactive currently, has been for some years.

Q Now, coming back to Mr. Richards, would you relate briefly the history of your contacts with him so far as you can recall them from their inception?

A Well, my contacts with him have not been extensive. I have received one or two letters from him. I have received, I believe, one telephone call from him. I have seen him once and I have written him one letter and received a reply.

Q And over what period of time did these contacts extend?

A Oh, goodness, it's a period longer than this litigation. I guess it goes back to '65, perhaps. The date in his book would give us a clue because he called me when he was working on his book.

Q Perhaps the exhibit 104 from folder -- 104 and 105 from folder B-12 would refresh your recollection? This appears to be a letter, copy of a letter from yourself to Mr. Orr at Iowa State?

A That's right.

Q And if you will refer to the first paragraph perhaps that will refresh your recollection?

A Yes. Well, that's as far back as '63. Good.

Q And could you tell us anything of the substance of the conversation with Mr. Richards at the time of the call referred to in this letter?

A Well, Mr. Richards -- I might just respond fully on this and then you can ask me additional questions. I haven't any reticence about it. Mr. Richards has a history, he is son of a judge, he is a -- he has worked in the computing machine field and I believe with IBM. He is currently a free-lancer in IBM publications and makes his living thereby, and he come upon -- he come upon the conclusion that, gathered by himself from sources which are at least in part unknown to me,

6

that there was a story about the origin of the computing machine and he was digging it out. And he had been to see Mr. Berry. That's as far as I know his source of information besides myself, and he called me and asked for help as I stated in that letter to Mr. Orr. I didn't respond very well to his request for help. I don't know whether I gave him any. I may not have given him any. At any rate I gave him only cursory help over the telephone, I expect, and that's the beginning on the story anyway. You want to further inquire?

Q Did he indicate during this conversation what prompted him to make the call or why he wanted the information?

A He wanted me to help him confirm that the origin of the computing machine did not rest with current credited people, persons.

Q And why was he trying to establish that, do you know?

A That's his business, I presume. I don't know. If that's not it I don't know why -- he was trying to do it as a publisher of books, and you have, well -- again inquire.

Q Dr. Atanasoff, yesterday you may recall that there was some discussion about the absence of any publication of your work at Iowa State, and I think you indicated later that your motivation with respect to recognition of that work had undergone a change, and I asked you when that change came about, and you said you desired some time to reflect on the

7

matter, and so I come back to the question, do you recall when the, your motivation for seeking recognition of your work at Iowa State on the ABC computer changed?

A There have been a number of factors, of course, For a number of years there was no particular thoughts on the subject on my part. With the presentation of the claims in the two patents in current litigation, I commenced to feel that the record needed changing.

Q Well, then, is it correct that up until the commencement of the present litigation and the Control Data litigation it had not occurred to you that it would be desirable to seek any public recognition of your work at Iowa state on the ABC computer?

A I didn't say that.

E-3-2

Q Then correct me?

A This was a factor, this is your deduction, sir, it is a factor. It certainly is a factor. I would say it's a substantial factor in what happened. Of course, there are other events through the years that have moved me. I was somewhat moved by the IBM approach but in view of the IBM's failure to follow through on that approach I came to the conclusion and decided that their statements to me were erroneous, and I therefore felt at east about that information, but now I -- but when I read the patents and had counsel explain what the meanings of the claims therein was, then there was a refreshing of this feeling on my part.

Q Of course that was after the commencement of this litigation?

A Yes, that was. Yes.

Q Now, were there any other events prior to the commencement of this litigatinn which caused you to change your point of view with respect to publication?

A Yes. There was a discussion or two on the subject with Clifford Berry in his late years.

Q Approximately when would that be?

A That would be in early 60's.

Q Did you discuss with Mr. Berry the question of obtaining publication of the work at Iowa State?

A Well, there was nothing fixed like obtaining

publication. The question was securing recognition and not obtaining publication, and the discussion was relative to that.

Q What was Mr. Berry's attitude with respect to obtaining recognition?

A His attitude was a very strenuous one.

Q I am sorry?

A His attitude was a very strenuous one.

Q In which direction?

A Towards aggressive action in favor of the ABC in all directions and on all hands.

Q Well, in -- by what means or what means for obtaining recognition other than by publications were discussed or considered?

A There was discussion of litigation.

Q What kind of litigation, against whom?

A I cannot furnish definite information. I don't remember any particular type of litigation. I don't know what form it would take or anything of that kind. I can't furnish you details on that. I think that this was an exploratory discussion.

Q Do you recall any other events prior to the commencement of this litigation in which -- which caused you to feel that steps should be taken to obtain recognition of the ABC work -- ABC computer work?

A Of course, I hadn't -- I had at this time -- at the time I was talking to Clifford Berry, I had no information of whe e the thing stood so I couldn't respond to Mr. Clifford Berry in any way. I want to put that in the record. I had no knowledge as to the actual character of the two patents in the current litigation.

E-4-1

Q Well, do you recall any other events of which you yourself have personal knowledge other than your conversations with Mr.Berry and the contacts from IBM which caused you to change your attitude towards --

A You see, a man's mind doesn't work like a computer machine and I can't go in there and tell the factors which actually gave vent to this, and you are asking me to do that. I have enumerated some, and I believe there are others. For instance, I can name one other that certainly was an influencing factor and that was Mr. Richards' book, a little, just a little bit there. He had -- now I am through.

I mean, I can't think of anything other substantial that I can add to that.

Q Thank you. Now, still on this ABC computer, you have given a number of names with whom you have discussed this subject during the last three years. Can you recall any individuals with whom you discussed it prior to this three-year period, and I am meaning in recent years, not the 1941-42 period.

A Well, I discussed it with Clifford Berry and with R. K. Richards, as you know, over the telephone, not in the last three years. Now, I discussed it with Mr. Etienne. You have got my whole file. Everything is there. I didn't withhold anything.

Q You do not recall any, for example, oral discussions or telephone discussions with others other than reflected by the documents in your files?

A I do not recall such.

Q Now, Dr. Atanasoff, in going through your files and identifying a number of the documents, there were quite a few which I think you said appeared to be carbon copies of letters written by you, and I believe you testified as to the signing and mailing of these letters to the addressees on or about the times indicated.

Now, was that identification based on your customary practices or was it based upon specific recollection of each of the individual documents?

A You will remember, Mr. Dodds, that I asked current counsel their advice on this matter and I followed such advice, and they told me it was customary in such case where you had a practice, to follow it, and I have done this.

Q So the answer is, was on the basis of your practice?

A It would be absurd to imagine anything else.

Q I appreciate that.

A Anything else would be absolutely absurd.

Q I appreciate that. I just wanted the record to show that, Doctor.

Now, withrespect to other documents than these carbon copies of letters written by you, other

3

documents from your files which you identified, again, did you identify them primarily because they had been in your files for years and did you recall that there may have been correspondence on the same general subject or did you identify them from a recollection of the documents or their contents individually?

A Will counsel please rephrase that question?

Q How would you like it rephrased?

A Well, I beg your pardon, restate the question. I wasn't exact in the language.

MR. DODDS: Will you read the question?

(The question was read.)

THE WITNESS: I would like to correct my statement of the last identification. Of course, I identified these things on advice of counsel in the way that I stated, and, of course, in some cases I remembered the sending of the letter very well and that is clear to me and the same remarks apply to all the documents in my file. There are all manners of identification of the documents in my files and any actual identification, and so we will have to go through the documents one by one and I will attempt to state in regard to each one how it was identified at the time it was identified.

Q The record shows, I believe, that in many

4

instances you did identify the documents individually by either specific recollection of the document or by association with some other event.

A I don't want a blanket statement by me at this time to change the facts in regard to my identification. I want to have a right to identify it now or in the future at any time by actual memory.

Q Is it correct that the same general rules or guidelines apply with respect to your testimony as to the contents of some of the documents, the subject matter as against just identifying the documents as such?

MR. HALLADAY: The question is objected to as confusing.

BY MR. DODDS:

Q Does the witness understand the question?

A I believe counsel for defense should restate the question in its entirety and not with reference to some previous question.

Q All right.

A And that should be recorded and read back to me and I will attempt to answer it.

Q Dr. Atanasoff, when testifying with respect to the contents of documents written or authored by you or received by you, have you testified from your recollection of the contents of these documents, independent of the documents,

or have you testified as to their contents primarily from an inspection of the documents or in some other way?

MR. HALLADAY: The question is objected to as too general.

BY MR. DODDS:

Q You may answer, Doctor.

MR. HALLADAY: If you can.

BY MR. DODDS:

Q If you can.

A My difficulty -- will the reporter read the question again?

(The question was read.)

THE WITNESS: I suppose there's a little of each in many acts of identification and it is impossible for me to make a general statement about it. Counsel has a right to examine on each individual document.

BY MR. DODDS:

Q Now, there is just one other question that I have that is open, and that was the one some time back about the reference to the portions of Exhibit 455 describing the duty cycle of switch S-3. Now, we can discuss it now or if you prefer, we can put this over until after the conclusion of any redirect examination Mr. Halladay may have or subsequent recross. In other words, until the

conclusion of the questioning.

A If we will take a recess at this time I will sit here and examine the exhibit and attempt to find, if I can locate a reference to that item.

MR. HALLADAY: Why dont we do that?

MR. DODDS: Okay. Fine.

(Recess taken.)

BY MR. DODDS:

Q Perhaps for continuity of the record, I will restate the question. Dr. Atanasoff, with reference to Exhibit 455, the green booklet, the green-covered booklet, will you indicate what portions of that document you believe describes the duty cycle of switch S-3 of figure 1 appearing on page 15 of that document?

A I have searched for such description and do not find it. It is evidently the case of an item that appears in the drawings but not in the specifications.

MR. DODDS: I have no further questions at this time.

REDIRECT EXAMINATION

BY MR. HALLADAY:

Q I have some specific redirect, Dr. Atanasoff, and this may be somewhat disconnected for rather obvious reasons, and I may find myself in the questions going back in time and forth in time, and if I by this confuse you,

why, tell me so and I will try to straighten it out. It's sort of like a patchwork proposition and the painter using the spackle may go from one crack to another crack.

You have referred to a book by a Mr. Richards, and do you recall the title of that book?

A He has written three books and the titles all concern themselves with computing machines and I don't remember the exact title of the book in question.

Q Which of the three books were you referring to?

A I remember that at the time he told me he had written two before, so this must be the third of his books, and I had a copy, but I no longer have it in my possession, having loaned it to a friend and he has absconded with it and I don't have any immediate mode of reference thereto.

Q All right.

A But it is a matter of public knowledge and it's been recognized by the Association of Computing Machine Manufacturers and other things, so I believe the book cannot escape these diligent counsel.

EA#5/1/1/11

Q Then reference was made in the course of the cross-examination to DPX-7, a thesis written by one Robert G. Willson and filed with the Iowa State college authorities in, I think, 1936. Do you have that available, Mr. Dodds, so the witness can have it before him?

MR. DODDS: I do.

BY MR. HALLADAY:

Q Reference was also made in the course of the cross-examination to subsequent theses by a Hart, and I believe a Mr. Kammer. In connection with those latter two theses, reference was also made to publications therefrom that appeared in issues of the Physical Review and copies of which I think were exhibited to you in one way or another in the course of the cross-examination. A question was expressed to you about the apparent fact that in the publication from the Kammer thesis there appeared to be no specific citation of or reference to the earlier Willson work, and you were asked some questions in that frame of reference. Now, I have made this preliminary statement only to have your mind focus on the subject. And as I understood the question, it related to the lack of specific citation to the earlier Willson work in the publication in the Physical Review?

A I believe that's right.

Q Do you have any further statement to make with respect to that matter?

2/12

A Yes.

Q Will you make it, please?

A The answer which I gave to the question that was asked: Why was Willson not given credit in a publication of the Kammer thesis, and I, of course, was the one that should have been able to supply counsel with adequate answers, but you know it was the end of a hard day, and I have had several days of inquiry, and that came to my direction and my mind wasn't working too well, perhaps. The answer I gave at that time was the following: I don't know, perhaps inadvertence. However, the inadvertence is a lame excuse because in regard to such things there is not much inadvertence, and I felt that I should probably re-examine, re-evaluate for you and attempt to correct any false impressions that may have been created by my remark.

I have also thought over the history of these events and I remember that the questioning began with a very stern inquiry from counsel for the defense as to exactly which parts of the apparatus there were built by your hand and which parts were built by Robert G. Willson's hand. I perhaps didn't give quite complete and accurate answer to that and I would like to repeat my remarks at that time and perhaps correct them.

In regard to the last question first. This was a concept which was mine as regards to a piece of

3/13

apparatus for measuring the responses of piezoelectric crystals, the frequencies of vibrations of piezoelectric crystals, if you will; and I remember a remark I made at the time which will surprise you and raise the reason for such an invention is the following; and that is that we found that the spectra of piezoelectric crystals were fully as complex as those of molecular and atomic compounds.

Now, that, this apparatus which I designed for that purpose led to that result.

Now, Mr. Willson built that apparatus, and he did certain theoretical studies in connection with that apparatus which became very clear to me the moment I glanced at the thesis this morning and, of course, I haven't glanced at that thesis since the approximate date thereof. Then I remember more precisely the theses, the theses of Hart and Kammer. And these people had further problems in connection with the elastic constants and the work of those various theses were related as follows:

In the first place, Willson worked out a problem and it's only a question as to whether the problem worked out by Mr. Willson was of special significance in the problem of Mr. Kammer. Now, I could make this further remark and that is that, of course, when you publish things in the Physical Review, why you just got to chop out every item you can, so as far as publishing bibliographies you, in general,

4/14

you cannot do that.

That concludes my remarks on these subjects. I am pointing out that these are the facts which led to the decision as to the credit which is given.

E-5-2

Q Also in the course of the cross-examination, Dr. Atanasoff, reference was made to a discussion, I think at your residence, by some representatives from General Electric Company which had been arranged by Mr. Norman Fulmer and at which certain conversations or discussions occurred, and I am directing your mind now to that event. Would you again state your best recollection of who was present at that time?

A Mr. Eltgroth, Mr. Norman Fulmer and another gentleman from Phoenix, Arizona, oh, I can feel his name right near the edge of my consciousness, but I can't quite get it out.

Q All right, sir.

A He is a member of the patent staff, he is a member of the patent staff of General Electric Company relating to computing machines. I can tell you that much about the man.

Q And did you fix the approximate time of that visit?

A I did, yes. I only could guess because -- but it's a matter of record, I believe, somewheres. It was perhaps in June or July of 1967.

Q Do you have a recollection of any statements made by any of the named persons there whom you can attribute to a particular person?

A I have -- I have one specific statement which is -- which I have been able to remember which I did not make at the time that I was -- that inquiry was made by counsel for defense.

Q Will you give that statement and identify the person who stated it?

A There had been a discussion of the general state of computing machine and the Dawn Henry letter had been examined, but statements have been made by the others as a result of their individual, individual investigations, and Mr. Eltgroth spoke as follows:

"My God, I have never heard any of this. If I had know I could have protected them." I wanted to get that statement in the record.

Q In the course of that statement did Mr. Eltgroth identify the "them"?

A He stated that he had -- he stated either before or after this remark that he had been patent counsel for Mauchly and Eckert at a certain period. And the "them" was, by me, inferred to be these two gentlemen.

Q Also you had said in response to some questions by Mr. Dodds something about having attended or what sounded to me as if you said you had attended joint meetings of representatives of Honeywell and Control Data Corporation. Will you describe any such events that you were referring

to in answering his questions in this regard?

A Well, I will try. I made a casual statement and there have been such events. I remember an occasion in which Mr. Charles Call, Mr. James -- I need a name -- what's your boy's name?

Q Halverson?

A Halverson, Mr. James Halverson and I went to a conference at a laboratory owned by the Control Data Company in which was present also representatives of Control Data.

Q As you go along, would you identify, to the extent you can, the name of or names of the person or persons ?

A Well, there were, the persons connected with Control Data that I should name was Mr. Allen Kirkpatrick and two persons, in particular, two persons from the laboratory of Control Data Company whose name, one of them is called Andy somebody and the other one was Sidney. Well, it might be Sidney Greenfield, but I am not sure. I called Sid. Andy and Sid were the two representatives of the Control Data Company, besides Mr. Kirkpatrick who were there. I believe that there were other such occasions. I am having a little difficulty finding them and perhaps I unduly enlarged upon this association yesterday. I believe that there was an occasion, yes, I am sure there is an occasion when Mr. Kirkpatrick and Mr. Call were both at my house simultaneously.

They were the only two there. And I believe that Mr. Call had come to -- and was spending the day, and Mr. Kirkpatrick visited us for an hour or so during that period, and the date thereof I cannot give you.

I believe that there may have been one or two more such occasions but I don't know.

Q At your house, you mean?

A At my house or otherwise, I don't know. I have a vague -- I haven't attempted to reconstruct this over a period of time, and this isn't any prepared testimony on my part, and I perhaps could do better if I sat down and commenced to reconstruct every item, but I haven't attempted to do this.

Q Did you ever participate in interviewing any potential witness in company with counsel for either Control Data and Honeywell?

A I did. Thank you.

Q Do you remember that?

A Yes. I took a trip -- I took a trip with Mr. Kirkpatrick and Mr. Hall in which we interviewed a number of persons. One of the persons interviewed was a Mr. R. K. Richards. Another one was Mr. Mather. Another one was Mr. James Elder, both of whom gentlemen worked on my machine at one time. And we also interviewed certain other parties at the, at the -- we also interviewed certain other parties at the Iowa State University including Mr. Orr, I remember, Mr. I. A. Coleman. There may have been somebody else

I don't know. Thank you for that.

Q Do you recall any other instances of similar activities involving any lawyers or other representatives of Honeywell and Control Data in which they were in your presence together?

A I do not at this moment.

Q Now, some questions were asked of you by Mr. Dodds concerning the intervention by Iowa State University Research Foundation in a certain lawsuit now pending in the District Court, in the Federal District Court in Baltimore, Maryland?

A Yes.

Q And certain questions were asked ofyou, the general purport of which had to do with your disclosure to or discussion of that fact with any representative of Honeywell?

A There was.

Q Did you -- tell us to whom you made such disclosure, approximately when, and the character of the disclosure?

A As far as the disclosures to the Honeywell Corporation, they were made in Chicago. Present either simultaneously or in the next room were Mr. Dmiti Allegretti, Mr. Henry Halladay, and Mr. Charles Call, and I am not sure all were in the room at one time, I believe they were at one time, but at any rate, they were in adjacent rooms and disclosure was made and there were discussions among

the parties there at that time. And at that time I explained my conception of a right and intention to act thereon. That was the extent of the discussion at that time, and we did not -- I had taken no legal steps at that time, and I, subsequent to that, I did take legal steps. And at the time I took the legal steps, the legal steps which I took, the contract with Iowa State University was not discussed with counsel for Honeywell or with counsel for Control Data. These acts were taken on my part absolutely independently, and as far as intervention goes, this was advice of my counsel -- no, not correct -- the advice of Iowa State University and its counsel, and I was aware of it only briefly before it happened. I did participate, however, in drawing of a contract between Iowa State University and myself.

6/1/1/15
WS KL

Q Did you advise counsel for Honeywell of the fact of intervention before it occurred, that you can recall?

A I advised -- no, I did not. No, I did not. I did not advise counsel for Honeywell of the fact of interference before it occurred. I advised them of an interest to pursue my rights and that was the extent of my disclosure to counsel for Honeywell.

Q And were you advised in that respect by counsel for Honeywell as to what course you should or should not follow?

A I was advised that they would not advise me, which was an act that I considered proper and discreet.

MR. HALLADAY: I am addressing these comments both to the witness and to counsel. On Wednesday, December 4, 1968, by activities of some gremlin it appears that the last ten minutes of reel number 22 and the first 40 minutes of reel 23, or about 50 minutes in time on that morning, we by spot-checking have discovered a very faithful video representation of the witness on our device, but no audio. The transcript of that morning's proceedings had to do, among other things, with the witness' exposition of the process of subtraction in the binary mode, and of division therein, particularly with reference to Plaintiff's Exhibit BB.

An examination of the transcript of his testimony in that respect has left at least certain

2/16

of plaintiff's counsel in doubt as to the understandability of the transcript, particularly without the potential for any reference to his testimony and movements on the video tape.

Therefore, with this apology and with the frank admission that it is repetitious, but in the hope that it will clarify the witness' testimony as recorded, I want to re-examine him briefly on Exhibit BB.

MR. DODDS: That is satisfactory with this exception, that defendants would like the opportunity to review the testimony he gives now with the testimony which he gave before with respect to any possible inconsistencies.

MR. HALLADAY: Surely.

MR. DODDS: A suggestion, which seems like a good one, could not the questions from the transcript be asked and ask the witness in the course of answering those questions to point to the appropriate point, part of the chart?

MR. HALLADAY: A part of the difficulty is that I sat here that morning listening to him and attempting to see whether there was a correlation between what he was saying and what the court reporter was taking down and I didn't do what I had done with respect to other exhibits by way of insisting that he state the

3/17

digits that he was writing as he wrote them or to identify them after he wrote them. So that without reference to the chart, the particular digits to which the witness referred do not flow into the transcript. So that I am saying that even without the problem created by the tape, I would have wanted to do this, and I am perfectly willing to back refer to the transcript, but I am afraid that would get us even more confused.

So I am suggesting that I do it as if it were entirely new and then if it appears there is a discrepancy, inconsistency or if he has changed in any way, that we will obviously participate in having this brought out. I would be glad, however, to read the same questions.

MR. DODDS: I understand this is a new examination covering the same subject.

MR. HALLADAY: Yes.

MR. DODDS: You are not going to use the same questions?

MR. HALLADAY: No, but I said I would be glad in addition to read the same questions but I would like to try to get it in sequence with reference to the chart, Exhibit BB on the board and hope that it is explanatory.

4/18

MR. DODDS: That is acceptable.

BY MR. HALLADAY:

Q Now, Dr. Atanasoff, as I have been talking, I assume you have been listening. Whether what I have been saying is capable of being followed, I don't know.

A I believe it is. I am not sure I can satisfy you, but I will do my best, sir.

part 2

Q All right, sir. I would like to direct your attention to Atanasoff Deposition Exhibit BB which Mr. Allegretti has put back up on our easel here and which is titled at the top "Subtraction with Exhibits Y and Y-1." My first approach to this is for the present, at least to eliminate reference to Y and Y-1 in the course of your testimony, just in the hope that we can get an explanation that will be meaningful in the typewritten transcript about what is shown on Exhibit BB.

Are you with me?

A Yes. I may, however, state that I believe that -- Did you say Exhibits Y and Y-1?

Q Yes. That is the test set.

A I understand. As a matter of fact, the test set was not used in this demonstration and no remark was made relative to the test set in this demonstration, if my memory is correct, so I don't believe you are eliminating anything.

Q Well, I think at one time or another you did.

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A Up above.

Q I am talking about both parts of Exhibit BB.

A The upper part was done with the test set, however.

Q All right. At this point, I am not going to put the test set back before you because it tends to lend an element, at least in my mind of confusion in respect to the purposes I am now trying to accomplish.

A All right.

Q On Exhibit BB at the top is written "Subtraction With Exhibits Y and Y-1," and I am now going to ask you to describe the subtraction as reflected by Exhibit BB without referring to or using the test set, Exhibit Y and Y-1, and what I am asking you to do, in effect, is to say what is there, describe the digits and describe the processes that were performed in producing those digits, first with respect to those which are in the binary mode, as I have called it, and those which are on the decimal basis, and that limits your attention with respect to this question to the top part of Exhibit BB which is above the wavy line drawn across it. And again, I suggest that as you do this, you think in terms of drafting a paper describing this activity, which paper includes a chart but which you hope will not necessarily require reference to the chart to understand the text of what you are saying.

Now, have I presented you with an impossible undertaking?

6/6/20

A No, not at all.

Q All right.

A I will attempt to state as I go over this problem of subtraction -- as I go over this problem of subtraction, I will attempt to state what I would do if I were using the test set and what result the test set would give, but I will not use the test set to save the complication of its use.

This is a problem in subtraction. We had two four-digit numbers, one one zero one and one zero one one, and I am to subtract the latter from the former. We start -- I might say one one zero one is represented by the base ten number thirteen and one zero one one is represented by the base ten number eleven, and the subtraction gives the result two, but we are going to be a little tedious and examine this in the base two system.

Now, to do this with a test set, and the reason for this is to realize quite concisely exactly what the computing machine does in making this calculation, We point out that originally CA, the CA drum contains the one one zero one and the KA drum contains the one zero one one number and that the CA number gains access to the module under test through the terminal B given in figure one here, which I can set right here and you can refer to.

Q Figure one of Exhibit W?

A Of Exhibit W. Figure one also called it Exhibit W.

6/7/21

CA gains access to the test set through terminal B and K obtains access to this through the terminal D.

Now, these terminals are also marked on the test set with the same letters so that when you press those letters on the test set you will get the same results as if a one was coming in from the respective CA or KA. So this will illustrate the operation of the machine, but it will simultaneously illustrate the operation of the test set.

Now, at this point we press on the test set a B and we press D and the test set gives us zero on one light which is called -- I would like to see that test set for one second just to tell you what letter is there, which is called K and which corresponds to output terminal A which leads back into CA, you notice. A is zero, but also C is zero, so A goes here and C goes up there.

Q Again I interrupt because when you say "A goes here and C goes there" --

A A goes at the foot of the first column -- I am sorry of the right-hand column. May I change this, or don't you want it changed?

Q I would rather you didn't change it.

A Well, I wanted to add something. Now, I could add just verbally that this result is a new result which will appear in CA.

Q When you say "this" --

6/8/22

A The results below the line of subtraction which is here written as zero zero one zero, is a result which will appear in CA after the operation of CA is added to KA, but this is a new CA that appears here below the subtraction line.

Q I assume that what you were thinking of writing was a CA prime or CA star to identify --

A It was.

Q -- the results of the addition.

A You define my purpose exactly.

Q All right.

A Now, -- so as a result of the operation of the test set, there will appear in the right-hand column of figures a zero underneath the line and up at the carry position there will appear a zero. Then we press -- then we have three digits in the second column to face. There is a zero at the top in E. There is in B, to go into B a zero and to go into D there is a one. You push only the D because the others are zeroes, and there appears in the light marked A a one, but in the light -- we are subtracting, remember, so you also, when you are subtracting one from zero, of course, you get a one left, but you also get a one carried. Of course, it is a minus one that is carried, also. That is a minus one carried up there at the top, so in the carry position which is marked E, we get a one. This will be in the third column now because it's carried from the second column into the

6/9/23

third column.

We now examine the third column. You have in B a one. You have in D a zero. You have in E a one, and when you subtract you get a zero in the, below the line in the third column and you get a zero in the carry position in the fourth column.

Now, we have in the fourth column a zero in E, a one in B and a one in D.

Perhaps this is a good point to be a little more specific. You notice the one in B is positive. The one in D is negative and the one in E, if there had been one there, would be negative because you don't carry a negative number.

Q Well, all right. You subtract the one from the one and you get a zero, and so there appears at the foot of the fourth column a zero and the final results of the subtraction is the binary number one zero, and one zero is equal to two and this is verified as the two of the other subtraction.

Q Then directing your attention to the portion of Atanasoff Deposition Exhibit BB below the wavy line, what does that illustrate, if anything?

A That illustrates division according to a modified process which is contemplated in the booklet and which was being designed into the ABC. It is of particular interest, too, because it is described in the booklet in the position

6/10/24

where I pointed out that there is an interference where claim one hundred of a certain patent reads upon the booklet, and this process is the one as far as, according to my best knowledge andbelief, is carried in claim 100, and it was explained here by me, and I am not even sure that counsel for plaintiff knew why this, the details were given here but it was explained by me in detail because it illustrates that process. If counsel will permit, I will make a short estimate of the advantages of this process.

Q First, I would rather that you would state it in words, as briefly as you can, what process is illustrated by the numbers which you have written on the lower portion of Atanasoff Deposition Exhibit BB.

MR. DODDS: I want to make a statement on the record here that the witness' reference to the claim 100 of the ENIAC patent and its relation to what he is about to describe or has described is a departure from his earlier testimony with reference to Exhibit BB.

E-7-1

THE WITNESS: It is such a departure. Let the witness record that it is such a departure, and it's given here for fullness and for exactness. I don't know how to be exactly responsive, Mr. Halladay. Will you restate your question once more, please, and I will try to listen carefully and be responsive to it.

BY MR. HALLADAY:

Q All right. I will try. I am attempting to shorten this as much as I possibly can, and it may notbe possible. I had hoped that I could ask you this question. Can you describe what is illustrated by the figuring that you did on the lower half of the Exhibit BB in words?

A I can.

Q Would you do so?

A I will sit down for this process to avoid the tendency to point to the board. Below the wavy line on Exhibit, Atanasoff Exhibit --

MR. DODDS: BB.

THE WITNESS: -- BB. I am not quite that blind, but -- there is illustrated a process of division which, which was planned for the Atanasoff-Berry computer, which is described not exactly as division but as an elimination process equivalent to division in Exhibit 455 and which has the following properties:

It is normal for computing machines to divide as follows: The divisor is subtracted from the -- I will begin again.

The divisor is shifted into a suitable position and is subtracted from the dividend successively until the results carries to the left through the counters as an excess amount of subtraction. In normal computing machines, it is usual at this point to add the divisor into the difference previously obtained which causes the carry through to clear. A shift is then made to the next position and subtraction begins again. It will be noted that there are two additional steps in this process. The divisor has to be subtracted one more time so that the results will carry through, but then it has to be re-added which is a totally new and unneeded step as conceived by the process which we will later describe.

The difference in mechanical cost of this process is not great as applied to the base ten numbers. I can make a calculation, you see, you might say you need to subtract roughly five times, a rough calculation, you need to subtract in an average position perhaps five times. You subtract until carry through is obtained. Let's just say not five times, let's say N times until carry through is obtained. Then you add one so you have an

amount of labor in this position and an N plus one appearing instead of an N. But N in the base ten system will be comparatively large, maybe two or three or five so that addition of one to it does not amount to much, but in the case of base ten numbers --

BY MR. HALLADAY:

Q Base ten?

A Pardon me, I am sorry. Correction, in the case of base two numbers, carry through obtains in either the first or the second subtraction. So an appreciable fraction of the work of division is added by the subsequent step to restore the number. The process to be described obviates this additional step. The new process proceeds as follows:

After the divisor is subtracted from the dividend, the divisor being suitably situate below the dividend, by a shifting process, until carry through is obtained, the shift to the next position is immediate, but in the next position subtraction does not occur but addition instead. Addition is, takes place in this new shifted position until carry through is removed whereupon another shift occurs and the process is repeated.

By proper interpretation a count of the number of subtractions and additions permits the quotient to be obtained.

That is a description in words of what was done there.

Q On Exhibit BB, on the portion appearing below the wavy line, you have written on the left-hand side thereof the legend, "First, second, third, fourth," beneath which you have put in certain signs or symbols. Will you state what those are?

A Well, that means that on the first subtraction we subtracted twice before carry through was obtained. In the second we had to add twice. Now, we had bad luck here. You have to either add -- we have to subtract either once or twice, but we had to subtract twice there. Again on addition you either have to add once or twice, but we had to add twice before carry through obtained -- I mean before carry through was removed. In the third position we had to subtract twice again before carry through was obtained, and the fourth position we had to add twice before carry through was removed.

We have noted previously that the exact dividend and divisor have created a continuing decimal in the base two number system. This is easily verified because we easily verify one number is 27 and the other is 20, when you divide them the result is one point thirty-five, but one point thirty-five when expressed -- one point thirty-five is in the base ten number system but when

the quotient one point thirty-five is expressed in the binary system, why it results in a continuing decimal. I can give you a demonstration of that if you wish.

Q No, thank you.

MR. HALLADAY: I have no further questions.

RECROSS-EXAMINATION

BY MR. DODDS:

Q Just a few questions. You stated a few moments ago, I believe, that you had glanced at the Willson thesis Exhibit DPX-7 this morning. Was that done in the course of your identification here during your examination?

A The only time I have seen this thesis in the last thirty years has been in the course of the, of my deposition. Thirty years? Well, approximately thirty years, just say that. Maybe I looked at it some time during, between, before 1942 again, but let's say since '42, that would be 26 years, except in the course of the deposition here.

Q Do I understand you correctly then that the only copy of the Willson thesis which you have seen in recent years is this physical copy I put before you?

A It is, sir.

Q Do you recall approximately how much time you spent in glancing through this Willson thesis to identify it?

A I would say perhaps ten or fifteen seconds.

Q You referred to two persons whom you identified by the name of Andy and Sid, I believe who were connected with Control Data Corporation. Were they engineers or what was their --

A Andy is a technician and Andy's last name I cannot remember, but I believe Sid, now it comes to me a little better, I believe Sid's last name is Greenwald, if you care to put it down, Greenwald. I probably said something else.

Q What is his capacity?

A He is an engineer with the Control Data Corporation.

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Q Dr. Atanasoff, since the adjournment of this deposition yesterday afternoon and before its resumption this morning, have you discussed the substance of your previous testimony with your own counsel Mr. Fallon?

A Oh, for -- he was -- he was putting the call through immediately last evening and maybe he and I were together for 20 minutes, but the subject -- he said -- well, I could tell you what he said to me. I -- suppose I quote what he said and then it will give you an idea as to how extensive his remarks were.

Q I think that is probably privileged information.

A It is privileged. It is privileged. Exactly what is it you seek? I would consider it privileged and perhaps I shouldn't give up that privilege.

Q No. The question was, I didn't --

A I have discussed it.

Q Not the substance of what your discussion was, but have you discussed the subject matter of your previous testimony with your own counsel, and again I am not asking the substance of the discussions, was there a discussion of the substance of your previous testimony?

A The additional testimony that I gave on my testimony yesterday except as that has been elicited from me by this gentleman is at my own instance, and I myself ask that the question in regard to this thesis be reopened because I felt

/2/2/26

I made kind of a sloppy statement yesterday.

Now, he didn't advise me to reopen anything, may I say that. Is this exposing privilege communication? I guess it is, but that is the truth.

Q I gather --

A I make this without promise to disclose any further communication between the parties.

Q I gather the answer to my question is yes, that you did discuss with your own counsel the substance of your previous testimony?

A Yes. He said -- well, damn it.

Q The second question, since the adjournment of this deposition yesterday afternoon and its resumption this morning, did you discuss the substance of your previous testimony with counsel for plaintiff?

A Yes, I did.

MR. DODDS: I have no further questions at this time. Excuse me one minute. No further questions at this time.

REDIRECT EXAMINATION

BY MR. HALLADAY:

Q Describe the nature of your discussion with me about your testimony to be given today?

A I said, "Please, Mr. Halladay, reopen the subject

7/2/3/27

of the thesis." Let's see if I can get any other point that was discussed with you. You said, You told me about the -- you told me about the lack of good reproduction of the material that is in Exhibit BB and stated that you wished me to repeat it.

Q Anything more?

A You also said you would like to reopen the subject of exactly how much time I had witnessed people from Honeywell and people from Control Data spending together, and I had -- I had refreshed my mind on this overnight at my own instance and was able to give slightly more succinct testimony.

In addition, I had mentioned to you, not since the conclusion of the day yesterday, but previously, that I wished you to reopen the subject of the visit of the General Electric people so I could give -- so I could place an additional item therein which I did.

MR. HALLADAY: I have nothing further.

MR. DODDS: Just one -- nothing further. Thank you.

THE WITNESS: Thank you.

MR. HALLADAY: For the record, my understanding is that you desire to read, have an opportunity to suggest corrections and to sign your deposition, you do not wish to waive those rights?

7/2/4/28

THE WITNESS: That is correct.

MR. HALLADAY: With that understanding the deposition is adjourned sine die.

MR. DODDS: Can we have an understanding with respect to corrections to the record? I am speaking now more in the nature of formal corrections rather than any corrections the witness wishes to make. We had a little problem in connection with the deposition of Dr. Dietrich some time ago in which procedures were adopted which, apparently, were not satisfactory to one or both parties. What is your usual practice in obtaining formal corrections to the transcript?

MR. ALLEGRETTI: I can state a practice of my own which is one, perhaps, not your own, and was at the root of our difficulty with the Dietrich deposition. That is, I do not send to the witness a transcript marked in any way with my suggestions for changes, be they typographical or any other. I ask the witness to read the transcript and give me his changes, if any. If I have others or additional ones I discuss them only with opposing counsel.

MR. HALLADAY: In my case, I have no intention of discussing with Dr. Atanasoff the transcript

7/2/5/29

in any way before he has read it and made corrections that he thinks appropriate entirely on his own initiative, and my own practice has been if I find as a result that that technique that the witness suggested corrections with which I do not agree, then I make a record of that. If I find additional corrections that I think are suitable then I make a record of that without communicating with the witness with respect to that.

In no event have I ever suggested corrections in a question made by me or by other counsel without consulting with other counsel as to what his recollection and notes show as to the question and then by conferring jointly with the court reporter to determine whether or not the reporter's stenotype or stenographic or shorthand recordation conforms with one or the other or neither.

MR. DODDS: What do you do with this record you have made of the deletions or additions to the transcript after it has been reviewed by the witness?

MR. HALLADAY: If the parties cannot agree with the witness nor the witness cannot agree with the parties then the only resolution I am aware of is to be accomplished by the court reporter and the Court.

MR. DODDS: I am willing to abide

7/2/6/30

by that. I would like to put on the record though there seems to be an inference the procedure which was followed in the Dietrich deposition was improper. I will say that I have done that in a number of instances merely to ease the load on the witness in going through and making typographical corrections because sometimes in, that record, particularly, was not good, and it was only done to ease the burden, but if that is your practice, I am perfectly willing to follow it in this case.

MR. HALLADAY: Thank you.

MR. DODDS: And as I say, I don't know whether this is on the record or not, but I would like to compliment the reporters, I think they did an exceptionally good job of reporting.

MR. HALLADAY: Me too.

THE REPORTERS: Thank you.

W-8

THE WITNESS: I have one further point.

MR. HALLADAY: Yes, sir.

THE WITNESS: I ask counsel, is it within my province to waive my relation with counsel and disclose the information disclosed in the discussion between myself and counsel as of last evening after this meeting closed?

MR. HALLADAY: Well, I would agree that that disclosure would not constitute an opening of the door to the disclosure of any other confidential communication.

THE WITNESS: That's the only point I am asking.

MR. HALLADAY: Before you say anything, we should hear from Mr. Dodds.

MR. DODDS: I would prefer not to hear any --

THE WITNESS: Well, I would prefer that you do hear it, Mr. Dodds.

MR. DODDS: Well, I would not want to hear it without Mr. Fallon being present or without his consent.

THE WITNESS: I will, if allowed by counsel, I will make a statement in regard to that.

MR. DODDS: Well, I object to its being included on the record.

MR. HALLADAY: Well, I think under those circumstances, Dr. Atanasoff, that Mr. Dodds is saying you should not say anything without having had your own lawyer's advice as to the propriety of so saying. In other words, you have the right to waive the privilege.

THE WITNESS: I will so waive.

MR. HALLADAY: But my point is, that he is suggesting to you that you should not waive the privilege without advice from your lawyer as to the potential consequences of having done so.

THE WITNESS: I will accept the estimate made by counsel for the plaintiff in regard to the consequences thereof.

MR. HALLADAY: No, but my point is, that I said I would make no contention that a waiver as to last evening's conversation would constitute a waiver as to any other confidential communication between you and Mr. Fallon. I asked Mr. Dodds, would he agree with you to that effect, and I have heard no answer from him.

MR. DODDS: I would agree to that as far as that goes, but I object to hearing any

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THE WITNESS: The witness will proceed to make his statement.

MR. DODDS: I object to including on the record the witness volunteering subject matter. There is no question before the witness.

MR. HALLADAY: Well, the witness, I think, has some prerogative as to what is on and what is off the record in this respect.

MR.DODDS: I say, there is no question before the witness and the witness is here to answer questions.

MR. HALLADAY: Do you have some statement which you would insist being on the record?

MR. DODDS: I understand the deposition has been closed.

MR. HALLADAY: Well, it has been closed in this respect. The witness has stated that he has a statement he desires to make, and I now ask him, do you or do you not have a statement you desire to make?

THE WITNESS: I do have a statement to make.

MR. DODDS: I object to the receipt of the statement. The deposition has been closed and the witness has no right to make a voluntary statement after

4

the closing of the deposition. I object to its inclusion in the record, and if it is put on the record I reserve the right to move to strike; and furthermore, under these circumstances, I withdraw our agreement to a waiver of privilege with respect to any communications between the witness and his counsel.

MR. HALLADAY: Well, I understand now, Dr. Atanasoff, that Mr. Dodds -- he should speak for himself --but if I understood what he just said, he now will take the position that if you say anything about a communication with Mr. Fallon as of yesterday, he is at liberty to inquire of you as to any other communications between you.

THE WITNESS: That is exactly the point. I will not speak under these conditions. I will, however, state that I would like very much to place this on the record if immunity, if other communications between counsel and myself were left inviolate, if there were an agreement that other communications between Mr. Fallon and myself were left inviolate, period.

MR. HALLADAY: I would so agree.

MR. DODDS: I guess that's it.

MR. HALLADAY: That's it.

(Whereupon the deposition came to a close

Subscribed and sworn to before me this _____ day of _____, 19__

_____
John V. Atanasoff

STATE OF MINNESOTA)
) ss.
COUNTY OF HENNEPIN)

We, Earl G. Anderson and Ward L. Sutfin, notaries public in and for the County of Hennepin and State of Minnesota, do hereby certify that the deposition of Dr. John V. Atanasoff was taken on behalf of the plaintiff in a certain cause now pending and undetermined in the United States District Court, District of Minnesota, Fourth Division, before me at 2515 First National Bank Building, Minneapolis, Minnesota, on December 3, 4, 5 and 6, 1968.

That said witness was duly sworn by us; that said deposition was taken down in stenotypy and afterwards transcribed into typewriting under our supervision; and that the foregoing is a true and complete transcript of said testimony.

We further certify that we are not related to any of the parties or counsel before named, and that we are not interested in this matter directly or indirectly.

IN WITNESS WHEREOF we have hereunto set our hands and seals this 6th day of December, 1968.

Earl G. Anderson

Earl G. Anderson, Notary Public,
Hennepin County, Minnesota
My commission expires Apr. 6, 1973

Ward L. Sutfin

Ward L. Sutfin, Notary Public
Hennepin County, Minnesota
My commission expires Nov. 6, 1975.