Trip Reps.

STRICTLY PRIVATE

SUBJECT: Trip Report - CBS-Hytron, Danvers and Newburyport, Massachusetts

DATE: June 3, 1954

PURPOSE: Discuss possible 19" color tube purchases and production facilities

PERSONS MAKING TRIP: J. D. Walter
J. N. Phillips
B. A. Kafka

PERSONS CONTACTED: C. F. Stromeyer-Exec. V.P.
J. A. Adams-V.P., Sales
A. Harcher-Mgr., Newburypor

The main purpose of this visit was to discuss the possibilities of purchasing some 19" color tubes for the R&TV Department's requirements and to view existing production facilities. Most of the time spent at Hytron was spent with Mr. Stromeyer who generously devoted his whole day to answering our questions and taking us to Newburyport. The report follows:

Status of Production

1. Hytron is currently about two months behind their own schedule for 19" production.

2. They have tentatively set a date of June 15th for a news release on their 19" tri-color tube at which time they expect to announce simultaneously the opening of their Kalamazoo plant. At this time they hope to announce the names of those companies which will use their tube in 1954 and hope that the General Electric Company will be among these. (Mr. Walter advised Mr. Stromeyer that we could not permit this at this time.) This press release and press party have been delayed once and the June 15th date is still tentative, because Mr. Stromeyer will not announce the tube until he actually is in production and is producing under the RTMA type designation, which I believe is the 19WP22.

3. They apparently have operators trained for two shifts but have been making but a handful of tubes since gray glass bulbs have not been available.

4. Their first substantial shipment of 19" gray glass bulbs (less than 100) arrived at Newburyport while we were visiting. If this has been the major bottleneck, it is doubtful if it will continue too long, since once Corning has been able to convert a tank to gray glass for color, they should have no problem supplying Hytron's requirements, which will probably be the only color bulb demand they will have for the summer months. Hytron has placed a non-cancellable order for 10,000 19" bulbs at $35.00 apiece.

5. Mr. Stromeyer anticipates they will make 10,000 tubes per month starting in September with, of course, a gradual build-up starting now that bulbs are available. No vacation shutdown is planned for the color tube activities.

Facilities

1. There did not appear to be any major increase in facilities since our last visit on March 15th, when Hytron was making a very small quantity of 15" tubes. All of the equipment available at that time has been converted to 19" tubes and the only new equipment we saw was about ten power supplies for Heliarc welders which were still in crates.

2. The Hytron people freely admit that dot printing is the limiting item in their production line. They might be prepared to add screening conveyors and exposure devices, although no preparations for any additions are obvious.

3. Work has apparently begun on a 36,000 sq. ft. air conditioned addition to the new Kalamazoo plant which has begun operation and which will be formally opened in June. The purpose of this addition is to facilitate the preparation of color tube faceplates and feed these parts into the existing monochrome facilities. While the construction of this addition has started, no equipment is being planned at this time since Hytron feels that they will have ample lead time to equip the addition some time in 1955, when and if the demand warrants it.

Design and Processing

1. Hytron, in granting permission for the trip, stated that under a new policy they have recently adopted, no technical tube personnel from competing companies, unlicensed by them, would be allowed in their plant. For this reason, the technical portions of this report are brief and must be properly evaluated.

2. The most significant change in the Hytron design, since its early introduction, has been in the fact that the aperture mask material has been changed from 70% copper-30% nickel to 95% copper-5% nickel material. It is felt that this material will make more uniform etching possible and eliminate the early objection of striated screens or the dirty appearance of some areas caused by irregular hole size. Should this not result in reduced life, it is certainly desirable in view of the recurring possibilities of a nickel shortage.

3. One early objection to the Hytron design was the fact that reflected light caused by electrons hitting the faceplate outside of the rim of the aperture mask caused a halo effect and uncontrolled color distribution. Hytron intends to control this in the future by having the metal sealing flange extend further into the bulb, obstructing this electron flow. They are awaiting a tool change by the Corning parts supplier before being able to do this. In the interim, they are overcoming this difficulty by stuffing aluminum foil around the edge of the aperture mask, held in place by the hold-down clips. (Mr. Nonnekens feels that this situation could probably be more easily improved by a closer control of the area aluminized.)

4. The hold-down clips are a changed design from the 15" and do not necessarily represent the ultimate in design in Hytron's opinion. They feel that it is a distinct advantage to be able to ship tubes in sets and that all their work must be in the direction of making a tube structure which will stand this.

5. We were definitely advised that no questions would be answered on photo resist material, exposure time, or construction of the exposure devices. Due to this restriction and the fact that there was only spasmodic operation going on in the screen room, it was very difficult to even observe what the exposure time was. It is apparent that even the operators are alerted not to be obvious about the cycle time when visitors are around. It certainly appeared, however, that the exposure time was somewhat less than the 9 minutes which Mr. Campbell estimated in observing the same indefinite operation on the 15" tube in March.

6. On our last trip we were allowed to see the photo resist application only at a distance. This time we saw the machine in operation and, short of knowing what the photo resist is, the operation is very simple. The machine consists of a multihead turntable on which faceplates are spun at a fairly slow speed. The operator dispenses a controlled amount of photo resist material into the faceplate and this is centrifuged over the screen.

7. Hytron is, of course, making all of their own guns and just about all the parts are now coming from production tools with the balance to be completed shortly.

8. None of the aperture masks which we saw being used in the relatively few tubes on the assembly line were blackened in any way. We were advised that these will be dichromated in production and the only conclusion to be drawn from this is that the tubes we saw being run were possibly for engineering tests or operator education.

9. The problem of aperture mask and faceplate correlation and identification, which some people in the industry feel is a severe drawback, seems to be well controlled by Hytron with a fairly simple 3-part numbered sticker identification and is probably one of their lesser problems.

10. No tubes were noticed on exhaust at the time of our trip. Hytron claims to be running 19" color tubes on a 40/hour basis on machines on which they previously ran 21" monochrome at a rate of 75/hour. The exhaust cycle is probably 1½-2 hours and they state that they have made few moves to speed this up, since they have set aside exhaust facilities which way exceed their limiting operation, which is the screen preparation previously discussed.

General Comments

1. Hytron implies that the 19" tube at present costs in excess of $500.00. They feel that their $175.00 price will, during overall 1954 production, balance out to a satisfactory margin of profit.

2. Mr. Stromeyer stated that if in 1955 it appeared that the aperture mask tube still had a future, Hytron might introduce a rectangular aperture mask tube. This tube, he felt, should have a diagonal measurement of about 22" so that it would provide a useable picture area equivalent to the largest size 21" monochrome bulb, the 90° 21". He further stated that such a tube should not be longer than the present 19". Mr. Stromeyer mentioned that it was quite important that the next color tube size be equivalent to the 21" monochrome so that it would not be possible to down-sell the tube as being smaller than available monochrome tubes. When and if such a tube is introduced, Hytron feels that the art will have been developed to the extent that a $100.00 selling price might be possible.

3. Mr. Stromeyer stated that it would be nice to have this tube a focus mask type but acknowledged that neither Hytron nor any of its competitors knew how to make such a product at the present time. He felt that a combination of increased current, improved phosphor, and improved gun design might permit manufacture of a passable product without the focus mask feature. I interpreted these remarks of Mr. Stromeyer to imply that he recognized that a 21" aperture mask tube based on presently known principles would not be too acceptable a product except that, should there be no new improved types developed and marketable in 1955, it might be passable due to the lack of any better product.

4. Hytron apparently does not consider the Lawrence tube a threat in any way. They consider the Dumont tube to be merely another Hytron tube and pass over the modifications made by Dumont as being items which they have tried and definitely feel are not acceptable or else require considerable further study. An interpretation of some of the statements made would imply that Hytron feels that when and if R.C.A. resumes 19" production it will be with a tube which is interchangeable with the Hytron tube.

5. That there is considerable interest in Hytron as representing probably the main hope for color tubes in 1954, is evidenced by the large number of companies visiting their plants. At least one company was there every day of the week we visited and a very large contingent of Motorola people were in the plant at the same time we were. Apparently no tube manufacturers have signed a licensing agreement but, according to Hytron, at least one is on the verge. When questioned about possible patent infringements in the case of Dumont, no definite statements were made, although in answer we were told that twelve of Hytron's claims had passed the first stages of patent litigation. Mr. Stromeyer, apparently recognizing that at least two sources are required, stated that he had told anybody who wanted to make his tube to go ahead. He said that he had told such interested people that he felt the design was patentable and that patents would be granted, but that probably by the time the question of infringement ever came up, Hytron and the offending parties would have been in and out of production and the question of violation would be academic.

6. Hytron is definitely interested in the "Apple" tube principle but is quite definite in their statement that it is probably not even a development as yet.

7. One of the two working displays we were shown was substantially better than the 19" tube shown to us in March. The other one did not appear to be very acceptable. The extreme care which is taken to keep their two viewing rooms in almost complete darkness certainly emphasizes the fact that a tube with equivalent picture area and at about the same or even higher price, which can be viewed in somewhat more normal viewing circumstances, will quickly obsolete this design.

RTVD Requirements

1. Mr. Walter stated that the RTVD requirements were not firm but that their immediate concern was the procurement of 20 to 30 tubes for a pilot run in July. Mr. Stromeyer stated that he thought that these tubes would be available although he had taken an order for 1500 for July from a customer who could probably get by with somewhat less than this number. He did not at this time wish to ask the customer to reduce the quantity to what he felt would more nearly meet his requirements, since he felt this might be construed to express defeatism, but assured Mr. Walter that he felt the tubes could be available from this order at the very worst.

2. Hytron further stated that they were accepting orders on a first-come-first-served basis and that while there was open capacity still left in the fall, he had indications that it would be filled up. Actual purchase orders received, however, will decide who gets the tubes but Mr. Stromeyer agreed to notify the General Electric Company before final orders were accepted which would use up his last bit of capacity.

3. Hytron has, or will have, about 150 19" tubes made from clear glass bulbs. These, of course, cannot be sold under the RTMA number. They are asking their customers to consider the purchase of these and intimated a price concession. At one time $150.00 was mentioned. (Inquiry subsequent to the trip disclosed that there will be no price differential on these clear types but where purchase is strictly for engineering use, it would probably be good policy to use where possible due to a slightly better availability and future consideration in having helped Hytron dispose of them.

4. Several times in the conversation, Mr. Stromeyer expressed his great concern about the unused monochrome capacity at Kalamazoo. He mentioned that as far as he was concerned, in view of the "crazy prices existing in the television picture tube business", he had started to deviate as of May 10th from any set pricing policy. He did, however, refer to orders for the 17" and 21" which he had turned down since he could not meet what had been stated as being competitive prices. At one time he stated that the aluminized tube differential should be about $1.50 based on increased cost over the non-aluminized.

5. Although not definitely so stated, it is quite apparent that Hytron will make use of their expected availability of tri-color tubes to insure sufficient monochrome business to load their expanded facilities as much as possible. A sort of a bid was made for a portion of RTVD monochrome business, although a formal price quoted on the 21ZP4B appeared to be precisely the price they are currently paying from us. Mr. Walter and Mr. Stromeyer expressed a mutual interest in pursuing the subject further.

Conclusions

1. It seems a certainty that Hytron will be the major supplier of 19" color tubes for 1954.

2. It is very hard to believe that the maximum rates of 10,000 tubes per month in 1954 and the also stated 1954 output of 40,000 tubes will be realized.

3. The actual output of tubes will be largely dependent upon the success that Hytron has with its current program of getting prospective customers to crystallize on standards that they will accept. If the customers on the whole are prepared to recognize that in order to get tubes they will have to accept certain limitations, it means a great deal from a production standpoint.

4. Even if the above is satisfactorily accomplished, I believe that Hytron's figures are very, very optimistic. As a matter of fact, with the late start their glass and other problems have caused, it seems unlikely that they could produce any more than 10,000 to 15,000 tubes in the year 1954. This, incidentally, will be no small achievement, but the fact that the entire Hytron organization has but one aim in color, that being to make a success of this tube, will go a long way towards making it a reality.

5. Should Hytron fulfill its plans, it is quite possible that there would be sufficient tubes to supply demand through early 1955. If the 10,000 to 15,000 estimate should be more nearly correct, tubes will obviously have to be allocated. Thus, definite plans to use their tubes in the fall of 1954 or the spring of 1955 should be passed on to Hytron as soon as possible to insure any share of their allocations.

Brooks Kafka

B. A. Kafka
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cc: D. R. Coffman
D. S. Hunt
L. C. Kunz
R. E. Lee
R. A. Norman
✓ J. C. Nonnekens
J. N. Phillips
L. E. Record
E. F. Schilling
J. D. Walter