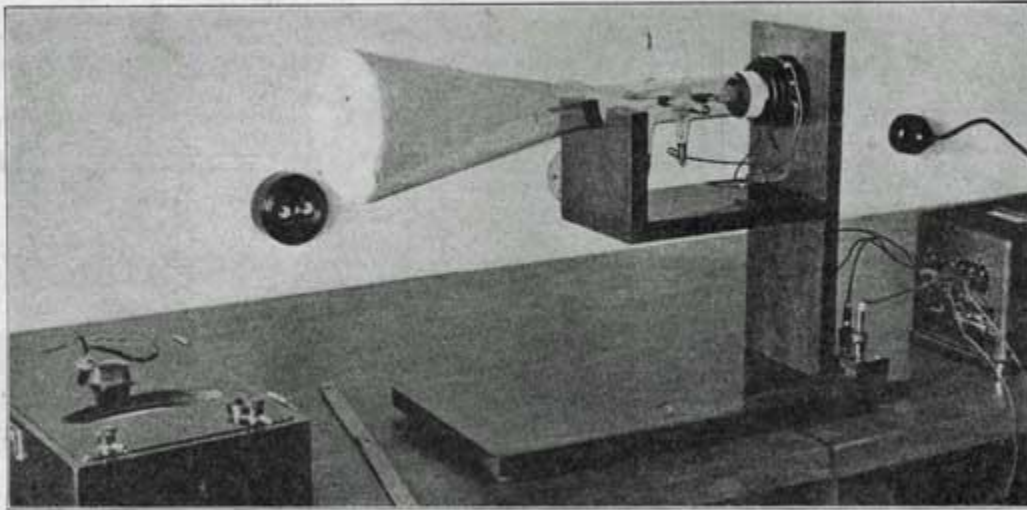


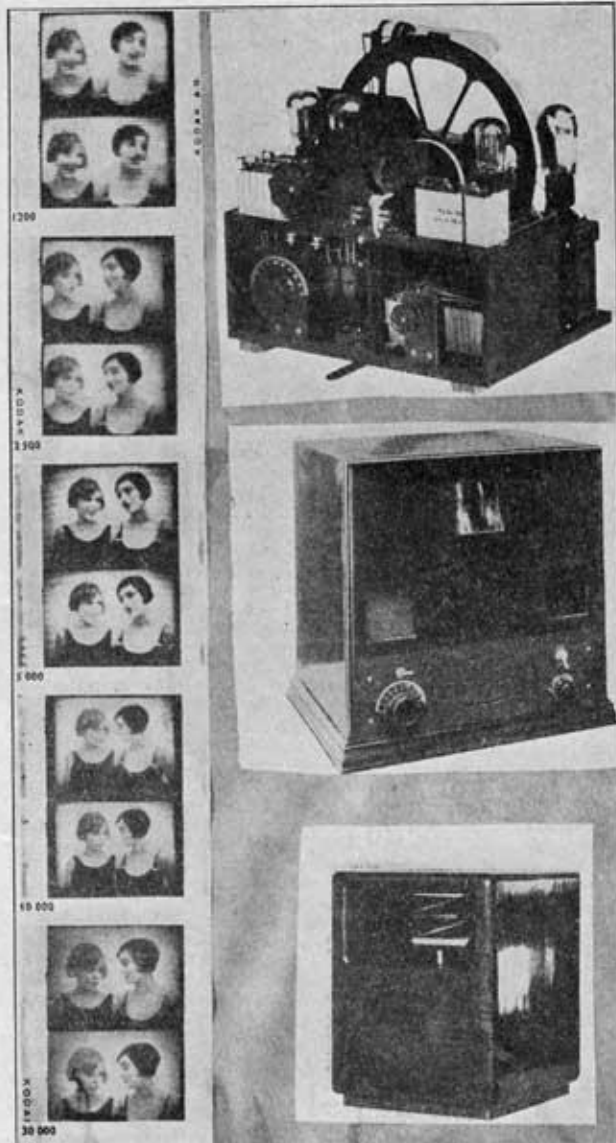
Cathode Ray Scanning Gains Favor



The cathode ray oscillograph arranged for receiving television pictures. The image appears on flat, enlarged end of the tube. See pages 10 and 11.

Germany Favors Ultra Source of Light a Pre Advance—Tes

By Heinrich W



German Post Office's official photographs.

Increase in number of picture points improves the definition (left). The numbers of points used are given. Top right shows a television receiver chassis, center right, the cabinet view. Lower right shows a wheel containing a large number of mirrors set at different angles, used for reassembling the picture points on the screen into a picture. A point source of light is used. D is a diaphragm to confine the light beam.

Berlin, Germany.

DURING the last few years the problem of television has interested not only a few technicians who have been working on its development, but it has also attracted a large part of the public. The popular interest has been enhanced by the different radio expositions where television has been demonstrated so that each visitor could see for himself what has been accomplished up to this time. Also, there are already several regular television transmissions over a few

broadcast stations such as the stations at Berlin-Witzleben, Koenigs Wusterhausen, and the short wave station at Doberitz. Anybody who has a suitable television receiver can pick up these signals. It is therefore of interest to all to know the present state of the development, with what fidelity it is possible to transmit images, what the outlook for further development is, and whether or when television can be made useful to the public. Therefore, in the following we shall give a resume of the present state of the art and speculate on the outlook for the further development.

Number of Points Increased

The transmission of pictures, as is well known, consists of breaking up the scene into a great number of picture points and sending them in rapid succession in a definite manner, each picture point occupying a very small fraction of a second. On the receiving side of the circuit these picture points are assembled in the order in which they are received. The greater the number of picture points per second, the greater the difficulty of transmission and the construction of the necessary apparatus. On the other hand, the greater the number of picture points per second, the clearer is the received image.

At the beginning of development of television apparatus a low number of picture points was selected, because this made the experiments simple. Later the number of picture points was increased as the apparatuses were improved, because the prime object of the development became greater fidelity of pictures.

Improvement at Doberitz

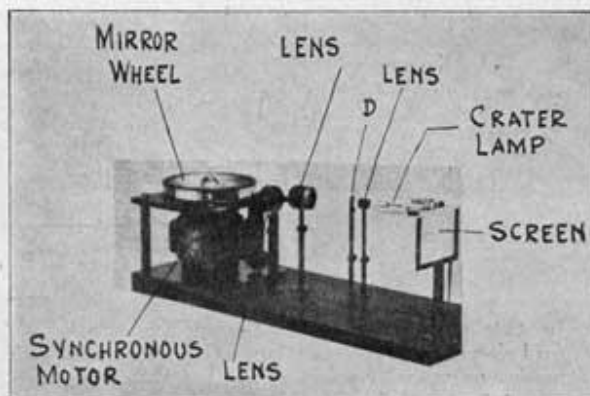
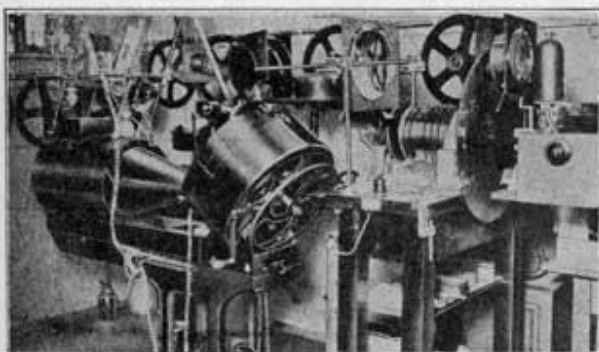
Experimental transmission from the station at Berlin-Witzleben since March 1929 and from Koenigs Wusterhausen since May 1930, conducted by the German Reichpost, have been based on 1,200 picture points per frame, in 30 lines, repeated 12.5 times per second. These gave a frequency band of 7,500 cycles per second, which therefore could be well sent over the regular broadcast channels without interference with neighboring channels. Naturally, with 1,200 picture points per frame it was not possible to reproduce all the detail carried in a normal film, but

Waves for Television

Not an Impediment to Art's

Made on 7 Meters

by *von Koenigsberg*



The television transmitting equipment of the German Post Office at Witzleben. At right is the Nipkow disc and the driving motor. At left foreground is a source of light.

only fairly clear and recognizable pictures of one or two heads of persons.

The reproduction of simple scenes by special films met with great difficulties. The observation of such crude television pictures is tiresome, because only with concentrated attention could the pictures be understood. The radio listener, therefore, would not develop any sustained interest in such transmission if it were introduced into practice. For the radio experimenter, on the other hand, such pictures would be both instructive and highly interesting, especially if he followed the pictures with receivers he himself had built.

The transmission from the short-wave station at Doberitz, which operates on 144 meters, has made use of a higher number

of picture points, namely, 3,000 per frame, with 48 lines per frame, and 25 repetitions per second. This required a frequency band of 38,000 cycles per second. As a consequence the required apparatus is quite complex to build and the necessary receiver for this transmission is correspondingly more difficult to make. The reception is made more difficult because fading and reflection effects enter strongly.

The radio experimenter is hardly able to build for himself suitable apparatus for this reception.

Simple Scenes Practical

The fidelity of the 3,000 picture point images is about three times better than that of 1,200 picture point images. The treatment of simple scenes becomes possible, although these scenes are not to be compared with scenes of movie films. Only by increasing the number of picture points to 4,800 (60 lines per frame, 25 frames per second, and a frequency band of 60,000 cycles per second) does it become possible to reproduce normal moving picture film so as to make the scene recognizable. And even with this number of picture points, much of the detail in the picture is lost. It is necessary, therefore, to strive to increase the number of picture points still further.

Judging by this and by experiments in laboratories, it seems that to transmit satisfactory pictures it would be necessary to divide up the picture into 10,000 picture points, which would require a frequency band of 125,000 cycles. Thus it is out of the question to use broadcast frequencies for sending out the pictures, for the modulation of a wave with such a wide frequency band is possible only in the very short wave region, say in the band between 5 and 9 meters. Since the ultra-short waves spread out in straight lines, like light, only a very small territory could be served by a sender unless the transmitting antenna were raised as high as possible, for example, on a high tower.

Results on 7 Meters

Laboratory trials already made on 7 meters with 10,000 picture points, have resulted in satisfactory pictures. Further experiments must determine whether it is possible to transmit these pictures over considerable distances.

The development of parts for television receivers has not advanced satisfactorily. It is especially the lack of a suitable source of light which is holding up progress in this respect. However, recently there has been good progress in this direction and it is likely that further development of light sources will come, sources which will make it possible to get pictures one half meter square. The cathode ray oscillograph has been tried lately with good success. It has especially the advantages that it can be used with a large number of picture points and that it has no moving parts, except the movable cathode ray.

The problem of television has been solved. But before television can be introduced for general radio distribution, we must await the developments suggested above.