Popular Mechanics Magazine
REGISTERED IN U. S. PATENT OFFICE AND CANADA
WRITTEN SO YOU CAN UNDERSTAND IT

Vol. 72 SEPTEMBER, 1939 No. 3

The FUTURE of TELEVISION

By David Sarnoff
President
Radio Corporation of America

LONG confined to the homes and workshops of its scientific guardians, television has just been graduated from this protective environment, and has been thrust out to make its way in the world. What will it offer to mankind, and what response will mankind make to it?

One by one the shackles that chained man to the limited sphere of his own mind and his immediate neighborhood have been struck from him. Today with the aid of modern means of transportation he can move his body about rapidly, easily and at will; he can enlarge the pow-

Bottom, David Sarnoff delivers speech at New York world's fair while television camera and sound instruments pick up scene. Above, the television image received eight miles away

ers of his hands and arms thousands of times with the help of machines; he can extend his voice by radio to other men throughout the world and hear them in return. Now the last shackle is being broken; through television his eyesight promises to become all-embracing and world-wide. And not only is he given the power to see at a distance those things which may be evident within the limited spectrum of the visible rays of light, but also those which heretofore have been invisible because they could only be perceived through the use of waves outside the visible region.

Television will finally bring to people in their homes, for the first time in history, a complete means of instantaneous participation in the sights and sounds of the entire outer world. It will be more realistic than a motion picture, because it will project the present instead of the past. Aural radio already has demonstrated the greatly heightened psychological significance, to the listener, of feeling that he is present at the radio performance, as a member of an audience listening to living performers. The sensation that one is participating in an event actually taking place at the precise moment of hearing it is quite different and much more intense than the sensation one has in witnessing a sound picture or hearing a record of the same event, later on. With the advent of television, the combined emotional results of both seeing and hearing an event or a performance at the instant of its occurrence become new forces to be reckoned with, and they will be much greater forces than those aroused by audition only. The emotional appeal of pictures to the

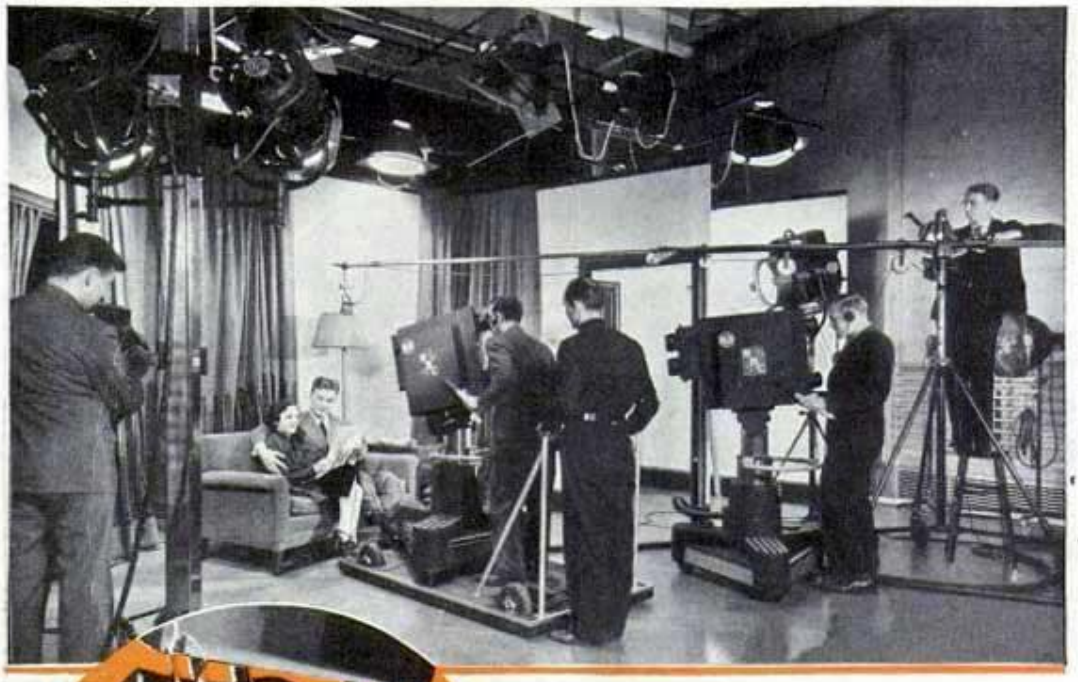
Top, watching television pictures on indirect viewing mirror under lid of receiver, which has twelve-inch kinescope and thirty-six tubes. Center, the kinescope receiving tube and iconoscope, "eye" of transmitter. Below, mobile television station which picks up image and sound in the field

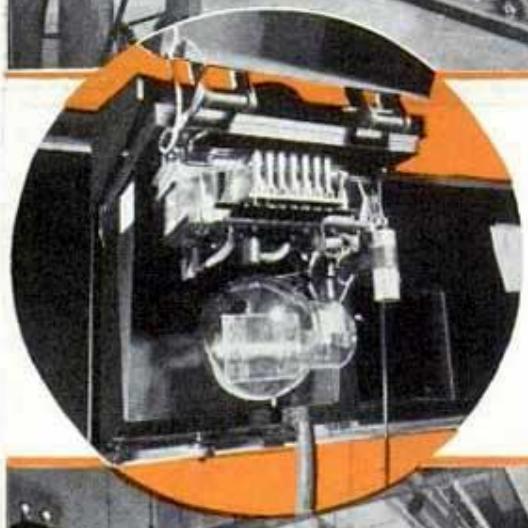
Top, drawing of television studio. Upper right, control room where engineers monitor broadcasts. Below, receiving and transmitting antennas

mass of people is everywhere apparent. We have only to regard the success of motion pictures, tabloid newspapers, and picture magazines, to be convinced of this.

Let us consider next what sort of program material television may present to its audience. Radio programs today cover almost every conceivable type of material that may be of value as entertainment, instruction and news. But while the scope of television programs will be equally broad, it is clear that the relative emphasis on the various types of subject matter can be changed to advantage. In aural radio we tend to emphasize program material that may be enjoyed without the use of vision; hence music forms a major part of aural radio programs. In television it will be natural to emphasize types of program material where the addition of visibility will enhance the emotional effect—such as drama, news, or sporting events.

Radio already has made significant contributions to novel dramatic forms and materials. Experimentation is constantly going on, under the daily pressure of providing ever-changing programs. Famous dramatists, actors, and producers are turning in increasing numbers to radio as a new and important medium, and the intellectual standard of much radio drama is





Top, studio scene during actual television broadcast; notice twin cameras and "mike boom." Center, inside the iconoscope camera. Bottom, audio and video units in transmitting room

in the best tradition of the legitimate theater. With the advent of television, a new impetus will be given to this form of art, and we may expect it gradually to replace some other types of programs which now occupy a large part of radio time.

While some television dramas may be recorded on film, for convenience or for network distribution, it is not certain that the standards, methods or artistic ideas of the present-day motion-picture industry will control the material presented. Radio has always been an independent force, and has broken new ground in what it has done. A first-class radio program is like no theatrical or motion-picture presentation that ever was. It is a new thing in the world. Similarly, it is quite likely that television drama will be a new development, using the best of the theater and motion pictures, and building a new art-form based upon these.

It is probable that television drama of high caliber and produced by first-rate artists, will materially raise the level of dramatic taste of the nation, just as aural broadcasting has raised the level of musical appreciation.

The Future of Television

(Continued from page 325)

An outstanding contribution of television will be its ability to bring news and sporting events to the listener while they are occurring. The widespread public participation in events such as those which occurred during the European war crisis in the summer of 1938, and the intensity of the mass emotions aroused thereby, have given us a glimpse of the possibilities of this phase of radio. It readily may be imagined what will be the results when television adds to the effect of reality of projecting the vision as well as the hearing of the audience to the scene of action.

Educational institutions are gradually adopting mechanical inventions as aids to teaching, and radio receivers as well as phonographs are becoming increasingly familiar sights in schoolrooms. With television we may find the educational uses of radio increasing; for while children may be restless when merely listening to a speaker without seeing him, living pictures may capture and hold their interest.

There is another aspect of television which is important, and this is the nature and effects of its by-products. New instrumentalities have been developed, specifically for the purpose of transmitting visual intelligence by radio. These include iconoscopes, or devices for converting a light image into electric currents, amplifiers of wide frequency range, high-powered ultra-short wave transmitters and kinescopes which reproduce the original image by converting electric currents into light. All these devices are beginning to find applications in fields remote from television, and, as familiarity with them grows, their fields of application will be extended.

The whole subject of electron optics, or the control of electron beams by electric and magnetic fields, has received great attention because of its importance in television devices. This has led to a whole new range of possibilities in optical devices which heretofore have been limited because of their dependence on the wave lengths of light. With the wave length of electrons of moderate velocity thousands of times shorter than that of light, it is obvious that by the use of electrons and electron optics we can design magnifying devices of much finer resolution than heretofore; and this has already resulted in a

(Continued to page 142A)

new type of microscope having many times the useful magnification of the best types of optical microscopes. The application of this in biological research is now being undertaken by workers in this field, and it may lead to a series of new medical discoveries in connection with heretofore invisible sources of disease.

By converting the image of a source of light into an electronic image we gain another advantage, namely, the possibility of producing an image having more energy or intensity than the original. Heretofore, the brilliancy of a light image could not be increased above that of the original source, and since all optical devices absorbed a certain amount of light, only a decrease in energy could result. But by accelerating an electron image more energy can be imparted to it than was present in the original light image. In this way the old problem of a "light amplifier" has in a sense been solved. Furthermore, since photoelectric devices are sensitive to the ultravisible rays as well as the visible, we include in our original source of energy a much wider portion of the spectrum than can be utilized in optical devices. Applications of this to astronomy, and in other fields where weak or distant sources of radiation must be dealt with, are future possibilities.

Some of the fields in which these television devices may bring about important advances are in marine or aerial navigation, by permitting vision at night or in fogs through the use of infrared rays; in metallurgical, chemical, physical and biological research; in manufacturing processes; in national defense; for advertising or display use in department stores, in showing goods exhibited at a central point throughout the store or in show windows; for personal or business communication in transmitting visual intelligence as we now transmit the voice by telephone; in printing and copying devices; in new photographic or motion-picture devices where "light amplifications" may be used to advantage; and in any other fields where an automatic, never-failing substitute for the human eye may be useful.

I have suggested some of the more immediate possibilities in the effects upon

society of the advent of television. What of the more distant future, or derivative effect?

A decline in the population of large cities is expected by the National Resources Board to set in some time between 1945 and 1960, with people moving into "satellite" areas within the metropolitan districts. We have already observed how the introduction of the automobile spurred the development of suburbs of large cities. Now, with steadily cheaper cars, increased and improved highways, it is anticipated—and the tendency is already clearly evident—that rural communities within perhaps fifty miles of the cities will increase in population and develop in scope.

All this provides a picture of a population which may increasingly center its interest once more in the home; a population with ample leisure time, of predominately mature years, and widespread distribution, in individual small houses which they will be able to afford because of the development of low-cost home construction and increased incomes per family. With such a setting radio-television will be a vital element in the lives of these people. It will link together in mind and spirit these vast numbers of individual homes, as the high-speed automobile roads and airways will link them together physically.

Popular Mechanics, September 1939