Manufacturers' Literature

Our readers are asked to write directly to the manufacturer for this literature. By mentioning RADIO NEWS and the issue and page, we are sure the reader will get fine service. Enclose the proper sum requested when it is indicated. This will prevent delay.

FACTS ABOUT PLASTICS

A new, twenty-four page, non-technical booklet covering all types of plastics, their uses, and general information on the plastics industry has just been released by *The Richardson Company,* Melrose Park, Illinois.

This illustrated book explains the host of properties which fit INSUROK and other plastics to the wide range of present and postwar uses. The limitations of plastics are also covered.

The two main groupings of plastics, Thermosetting and Thermoplastic, are described and illustrated in layman's language. Special sections are devoted to the forms of plastics, laminated and molded. The manufacturing and production processes of each are well illustrated.

The book is designed primarily for the non-technical man who may be serving on his company's postwar product committee and is desirous of obtaining a general knowledge of plastics and their applications. Copies are available only to those who write for them on their company letterhead to: *The Richardson Company,* Department 100, Melrose Park, Illinois.

TIMING DEVICES

An attractive new catalog covering various synchronous timing control mechanisms, has been released by *Haydon Mfg. Co., Inc.*

The broad range of special timing devices, tailor-made to the customer's requirements, includes improved designs of repeat and interval timers, time delay relays, contactors, interrupters, instrument clocks, elapsed time indicators, and other electrical apparatus for almost every conceivable timing application. Complete descriptions are given of each unit, and the catalog is profusely illustrated with photographs and dimensional diagrams of the devices.

Copies of this catalog may be had by writing directly to *Haydon Mfg. Co., Inc.,* Forestville, Connecticut.

RESISTANCE WELDING

An attractive 46-page booklet, consisting for the most part of published articles by *General Electric* engineers on the circuits and operation of electronic controls for resistance welding, has been published by the *General*

(*Continued on page* 109)

TELEVISION

By PHIL GLANZER

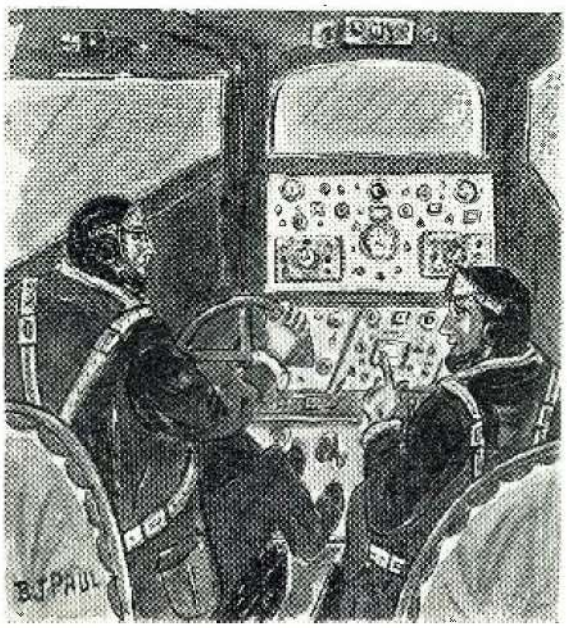
The future of television and the effect it will have on our economic conditions and social lives

ONCE again the world looks to science to supply it with a new industry, and, as the radio and motion pictures have proved possible, a new, vital force to aid in economic recovery and advancement. That invention which science is holding up its long sleeve is television.

The day of television is nearing. Before the war, England and Germany were both planning television on a large scale. A new television station was being built at Alexandria Palace in London.

In the United States, despite wartime conditions, active research and experimentation is proceeding behind the scenes with television programs. Canada, too, is participating with experimentation. A score or so of corporations and independent workers are hard at it on the North American continent—seeking to master the technique of sending pictures through the air or by wire. Thousands are experimenting with receiving apparatus and helping to perfect this startling new science—just as they "pushed" radio along.

But for the past few years we have heard much talk of postwar television —literally—in the air. We have heard wild promises and rash statements—that television would be "here as soon as the war is over," or "it would never be completely perfected."



"THIS complicated? Say, you should see my radio-servicing test bench back home."

These various contradictory statements have puzzled many—and occasional premature exhibitions of television sets have weakened the confidence of many in the final perfection of television. Many wonder as to just where television stands today—in the laboratory—and also wonder as to its possibility and proximity for use in the home and movie theater.

There are two problems facing television. One is technical—the other is financial. As engineers approach solutions to the technical questions, industrialists gasp at the cost of future television. As the technician gets ready to place television at the service of the public, the manufacturer and merchant are appalled at the apparent costs of an "image service."

There can be no gainsaying the fact that television has made huge advances—in the laboratory—in the last three years. Although few realize it, right on through the last depression, hundreds of thousands of dollars have been invested in the developing of television apparatus.

Large corporations, including the Radio Corporation of America, the American Telephone and Telegraph Co., Philco Radio and Television Co., and a host of independent companies have kept their scientific noses at the grindstone and are gradually perfecting television. The financial problems, which we will discuss later, are important — but can be, and will be, surmounted.

But let us understand that television will affect all of us quite directly. It will change our economic conditions, our social lives and even the educations of our children. Just as the general introduction of the auto and radio aided industry by furnishing thousands of jobs to mechanics, entertainers and salespeople, television will do the same.

Like the auto and the radio, it will bring the country closer to the city. It will remove the last vestige of country isolation. Just as the car has brought the country to the city and as radio has made Europe's news ours

(*Continued on page* 61)

oscillator, the action comes from the negative slope of the static-characteristic curve which gives rise to the necessary negative resistance. Once the electrons leave the filament they travel on to one of the split-anode segments and do not oscillate in the inter-electrode space. Oscillations do not come from the travel time of the electrons, but rather from the fact that the electrons have a tendency to hit the plate of lower potential, a condition brought about by the strong magnetic field present.

In the transit-time magnetron, on the other hand, the oscillations are dependent on the time of flight of the electron from the filament to the plate and back again. Here the electrons that are most important remain in the inter-electrode space for a relatively long time, oscillating between the filament and plate. The path is usually complicated and any diagrams are, at best, only approximations. Fig. 7 is such a diagram. It is hard to say where the magnetron oscillator ends with the negative-resistence operating principle and switches over to the transit-time idea. The transition is not entirely distinct and the only generalization that can be made is to say that for very high frequencies, the transit-time oscillator should be used whereas for longer wavelengths, the negative-resistance magnetron is more efficient. The circuits remain the same in either case, the only change occurring in the operating conditions.

(To be continued)

Postwar Television

(*Continued from page* 46)

and the price of wheat in Russia today's news—let alone its heroic victories—so will television make the world's events visible to us—almost as soon as they happen. The education of our children, the dissemination of information of the new and proper methods of the raising and treatment of crops and livestock will be "televised" to all. Breeding methods, prices and discussion of agricultural problems will be broadcast—sound and sight—to all.

This unpleasant business of war has undoubtedly hastened television's debut. On the credit side of the last war are but few items; such progress would have been made with less loss of life and suffering, with great financial saving and better coordination under the civilizing influence of peace—but, nevertheless, it is true that the war hastened the general introduction of the airplane, tractor transportation, certain dye formulas and other inventions. It is not a civilized desire to hope for the war to hasten inventions (except for barbarious war profiteers) but, it still is a sad fact that the war does quicken the introduction of inventions; and military leaders realize the potentialities of television.

Photographers in planes may take pictures which may be almost imme-

diately televised back to headquarters. Enemy lines, retreats, advances, and other data may be flashed back to commanding officers.

As already mentioned, television has financial obstacles which it must overcome. The problem of sending clear, sharp images through space or by wire is a large one. Dr. Alfred N. Goldsmith, a famous engineer, has studied the possible costs of television entertainment production. As films may be used to a large extent, motion-picture costs were compared with radio costs. It costs about $120,000 for an hour of movie entertainment. It costs about $2,500 for an hour's fun and song by radio. Obviously, television cannot proceed at the radio rate of consumption and at the film cost of production!

No matter what plan is evolved (there are several possible ones) such as the continuation of the present system of programs sponsored by advertisers; or programs supported by taxes on receiving sets (which is done in England and Canada); or programs supported wholly or in part by the Government; or any combination of these methods, the cost will be higher than radio costs.

The solution to this particular financial problem seems to lie in finding cheaper program material—such as cheaper methods of producing pictures, use of radio studios, stage and vaudeville entertainment, and educational programs. It is also possible that television entertainment may not be continuous—as is radio. It may be just offered at certain set periods—such as a few hours nightly, as in the theater.

The other major financial difficulties are the cost of building stations, transmitting programs, of relay stations, wire systems, and last, but never least, the cost to us—the well-known ultimate consumer.

If our large radio companies believe that television will be the future of their business, they will find some way to pay for the cost of equipping and maintaining stations. The other cost, a possible selling price of $250 or so, for receiving sets is a horse of a different color. It is a serious question as to how many of us could afford $250 for a set—even if purchased on the installment plan. Perhaps that is possible during wartime conditions—but who can tell what conditions will be like after the war? In any case, if television sets were manufactured in large quantities, it is entirely possible that sets could sell at a much lower figure than $250. This, of course, is something to be worked out by the manufacturers.

Television, of course, will be primarily a source of entertainment—just as the radio and movies. But it will also be an educational medium of considerable importance. Obviously, it will aid in the spread of farm and general information. It will also help the teacher and the student. A professor at the University of Iowa has demonstrated conclusively that tele-

vision can be utilized in the classroom. Lectures on such subjects as astronomy, botany, art and shorthand were supplemented with television pictures of material pertaining to these lectures. The class in astronomy saw pictures of constellations "televised" to a screen in the classroom; shorthand students saw the hood and line symbols televised.

We can only guess what the postwar world will bring us in the way of television, but one thing we can be sure of—scientists are even now working to bring that achievement to a reality.

—30—

Practical Radio Course
(*Continued from page* 48)

it. The so-called *voice-coil impedance* specified is usually that impedance which the speaker shows at some middle frequency (400 or 1000 cycles), or else it may be an average of the impedance variation over some middle range of frequencies. Accordingly, no speaker can be "matched" to an amplifier at all frequencies. Moreover, the speaker impedance usually increases abruptly and appreciably at the several resonance points in its response range. If an amplifier has a high output plate resistance, as will be the case if pentode or beam tubes without feedback are used in the output, the variation of plate circuit loading due to either of these causes will result in distorted response. However, with inverse feedback greatly reducing the value of the plate resistance, these variations can be made to have little or no effect on the amplification obtained.

In addition, it often becomes necessary in the field, to mismatch a speaker load to an amplifier, because the proper impedance taps are not available on the amplifier. A feedback amplifier can tolerate appreciable mismatching of this kind without difficulty.

In a multiple-speaker P-A system, if loudspeakers are cut in or out of the circuit the impedance reflected to the primary of the output transformer will change, causing variations in the voltage developed across it. For example, if two 8-ohm voice coils are connected in parallel across a 4-ohm output tap, a certain impedance will be reflected to the primary. Now, if one of the loudspeakers is removed from the circuit, the effective impedance of the primary will be doubled, and a higher signal voltage will be developed across it. Consequently, a greater voltage will be fed back through the inverse feedback circuit and the gain will be reduced, tending to keep the power output of the amplifier at a constant level. This property of inverse feedback amplifiers greatly facilitates loudspeaker switching problems and makes the use of artificial loads unnecessary provided the load is not permitted to vary over too wide