RADIO NEWS

DECEMBER
1940
25c
In Canada 30c

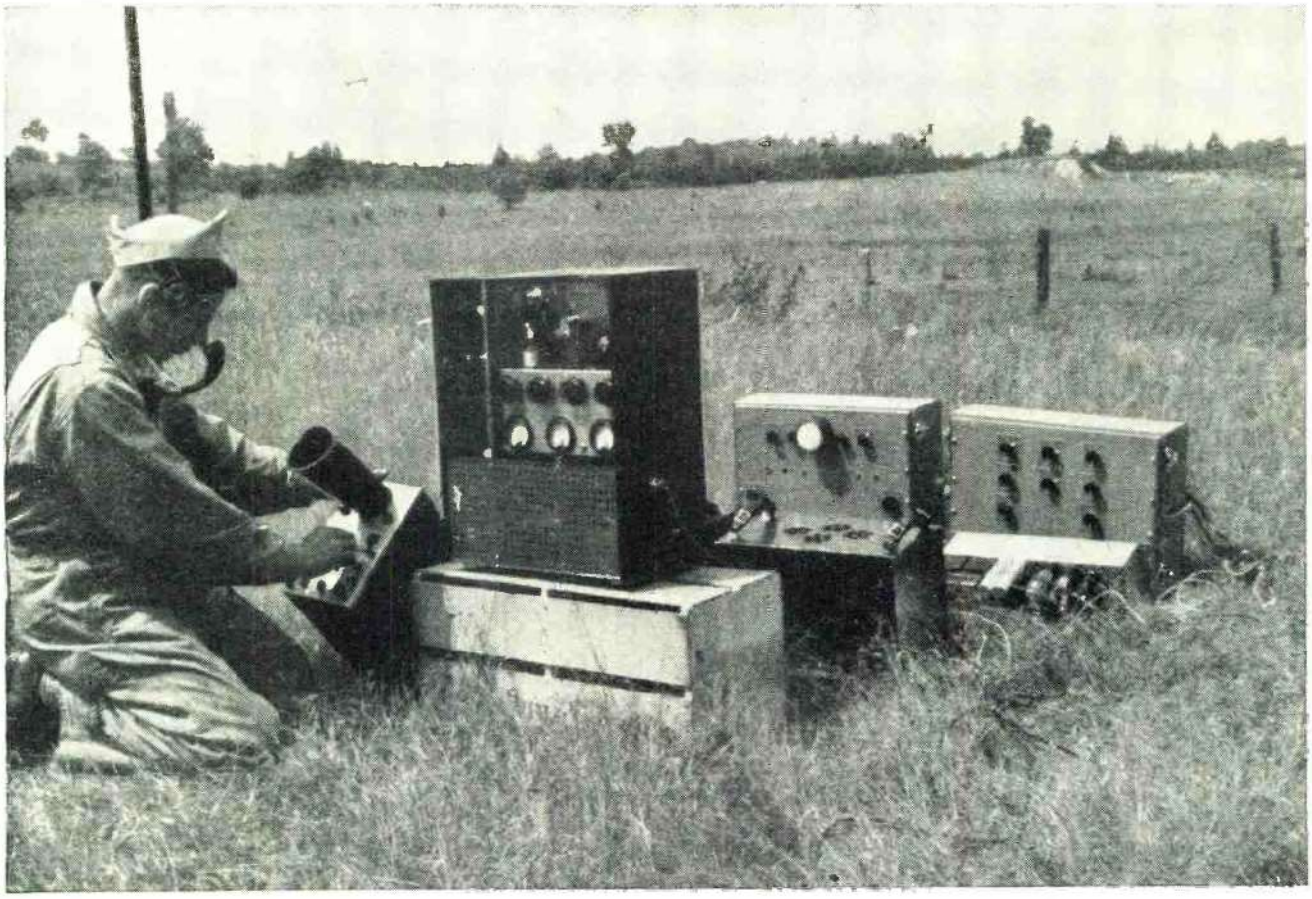
Army's new radio-equipped mechanized unit

"BLITZKRIEG" TELEVISION

BUILD A HOME RECORDIN

BREAKING THE BLO

5-Meter FM-AM Transmitter ★ Improved Regen. Receiver



This soldier is viewing the actual scenes of a "battle" taking place several miles away. Note the chest-phone for quick relaying of information to the proper centers.

Blitzkrieg Television

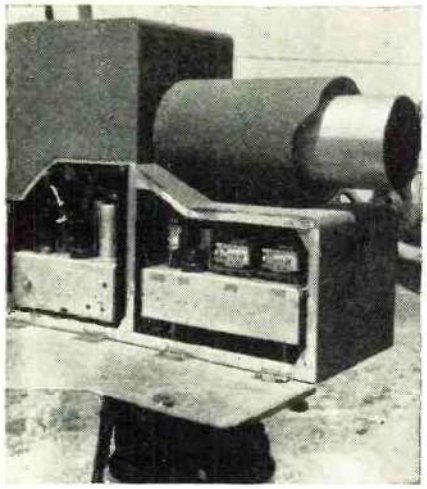
by AUSTIN C. LESCARBOURA
Croton-on-Hudson, New York

The rapidity with which information can be passed along is the measure of the Army's success in any engagement. Television makes information available *while* it happens.

FOR the first time in our military history, commanders saw as well as heard the reports of scattered scouts, instantly, fully, clearly, during the giant maneuvers of the U. S. Army recently held in northern New York State. Television donned khaki, took the field at a moment's notice, and proved that such visual means of communication can play an important role in the defense of our nation. Indeed, offensive "Blitzkrieg" now meets defensive "Blitzkrieg" as lightning-fast scouting neutralizes the all-important surprise element of the lightning-fast attack. Once again military science strikes a balance between attack and defense.

Quick to recognize the vast military significance of television, Allen B. Du Mont, one of America's leading television pioneers and head of his own company manufacturing television receivers and transmitting equipment, arranged with Army officials to send a full-equipped mobile television unit to the scene of the gigantic maneuvers. A base was established on the campus of St. Lawrence University at Canton, N. Y., and the television crew of fifteen men lost no time in getting their mobile and stationary equipment into action. Soon these television experts were flashing scenes of troop movements of the invading "Blacks" to television viewing posts at the headquarters of the "Defending Army," with a network of FM transmitters and receivers handling the accompanying verbal reports and coordinating the ultra-modern scouting activities. [*Note the use of FM.*—Ed.]

The main television transmitter, a 50-watt job operating on 51¼ megacycles, was installed in the Physics Building at the University. The television antenna was raised to the top of one of the towers of radio station WCAD located in that building. Some 200 feet away, on the college Chapel Tower, a second antenna was placed, serving as the relay link in picking up the 158 megacycle image signals transmitted by the mobile unit out in the field. The video signals thus picked up were sent via 300 feet of coaxial cable to the main transmitter for re-



The Iconoscope camera used in the Army maneuvers. All power came from batteries and portable generators.

transmission to receivers at Second and Third Corps Headquarters. The Du Mont flexible synchronizing system whereby the receiver sweeps are controlled from the transmitting end, was used, with a repetitive rate of 30 pictures per second as against the usual 60, made possible by the Du Mont "memory screen."

Television scouting falls right in with the mechanization of the modern army. A small truck carried the complete mobile television pickup equipment, followed by an Army truck carrying a gasoline-driven generator for the necessary power supply on the battlefield. The 25-watt mobile transmitter flashed its television report to the relay receiver located in the Chapel Tower at St. Lawrence University, for relaying and retransmission as already stated.

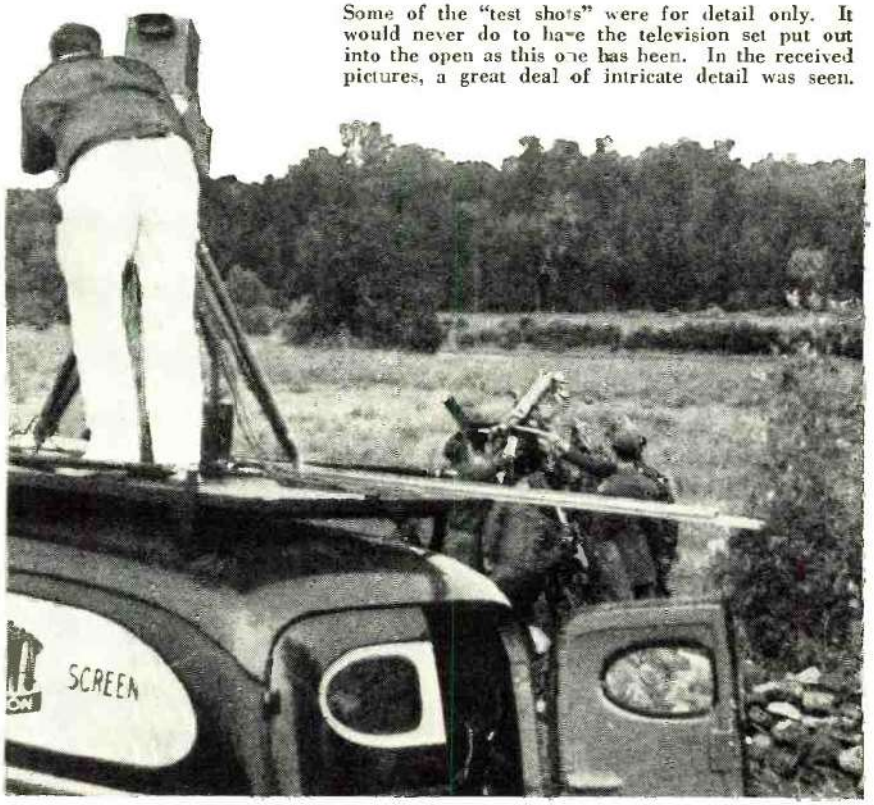
Engineers stationed in the Chapel Tower checked the images as they were received, and relayed them by coaxial cable to the main transmitter in the nearby Physics Building. There they were again monitored and then sent out to the Army officers who watched the action with avid interest, on receivers installed at Huevelton and DeKalb Junction, and also in Canton.

Working under the most difficult conditions of actual military action, the video boys gained invaluable experience in setting up and operating their television mobile and stationary equipment. The crew admittedly were relatively "green" at this sort of thing, and the mobile equipment hardly had its paint dry when it was rushed into battle, so to speak. Nevertheless, the simplicity of the mobile and stationary units enabled quick setups and operation, while an FM intercommunication system, also brought along, enabled the highest degree of coordination among the scattered television operators. Speaking of this FM equipment, the men kept in touch with each other and with the main transmitting quarters, at distances up to 25 miles. The FM equipment was used even in fast-moving cars dashing about the field, maintaining necessary contact all the while. By patching in on the Army telephone lines, all points in the communication network were reached.

(*Continued on page* 51)

In spite of its bulky size and shape, this shows that the iconoscope could not only be camouflaged, but could operate successfully from deep shadows. In war times the sign painted on the back, naturally, would not be used; and the paint would be broken up with the now-familiar blotches to foil detection.

Some of the "test shots" were for detail only. It would never do to have the television set put out into the open as this one has been. In the received pictures, a great deal of intricate detail was seen.



FM-AM Mobile Receiver

(*Continued from page 21*)

one stage only. All of the tube shells and shields are grounded. The socket for the 6K8GTX has been mounted purposely above the chassis so as to make possible shorter leads to the tuning circuits without resorting to passing the leads down to the chassis and over to the socket pins.

A bottom plate should be cut to fit the under side of the receiver to complete the shielding. This is very important in mobile work and the little trouble spent on details will help to guarantee the results of which this receiver is capable. Nameplates may be added. The ones used on this receiver are cut from regular 1⅜" plates and are cemented to the panel with Duco household cement. This method was chosen in order to cut down on the physical size of the plates which normally require the use of self-tapping screws for their mounting. Performance has been greatly improved over converters previously tried and those who have had difficulty in receiving 5 meter signals should find this set to be an answer to the problem of obtaining good mobile reception.

Reception of AM and FM Signals

This receiver is capable of receiving both standard Amplitude-Modulated and Frequency-Modulated signals. While it is not able to keep out noise from sources that include amplitude-modulated characteristics, such as ignition hash, it will offer a marked improvement in general reception due to the set's ability to receive a bandwidth of some 50 kc. This is made possible by the design of the I.F. transformers at the frequency of 5,000 kc.

Although the front end of the receiver is capable of ample selectivity characteristics for reception of standard amplitude-modulated 56 mc. signals, it will, nevertheless, allow signals of approximately 50 kc. band-width to enter the I.F. transformers. In other words—both types may be received *providing the signals do not occupy more than a 50 kc. spectrum.* In the case of a 50 kc. frequency-modulated carrier, we will hear the signals as originally sent, and in addition, will receive any amplitude-modulation that might accompany the carrier.

This is to our advantage as it is then possible to tune to either type of signal and be able to copy both. If the 56 mc. signal included other than voice frequencies—there would be distortion from the higher notes in music, etc. Inasmuch as we are only concerned with voice frequencies, we can discount the possibility of this condition presenting itself.

Tests from an automobile installation showed a decided improvement in reception from frequency-modulated signals in the 56 mc. band. It was possible to get good reception at dead spots previously encountered with regular equipment, and this was had in the midst of heavy automobile traffic where QRN was terrific. The inclusion of a limiter tube would result in even better performance on FM signals, but this would eliminate all a.m. signals from being received. At any rate—the idea works like a charm and has proved itself to be satisfactory for a happy medium for combined reception of both forms of transmission.

Blitzkrieg Television

(*Continued from page 7*)

The mobile or portable television pickup equipment consisted of eight metal cabinets with carrying handles and protective panel covers, plus the iconoscope camera and also the necessary power plant in the absence of a 115-volt power line. Units and camera could be readily packed in an automobile. Included in this mobile equipment are the camera synchronizing generator, the shading control whereby adjustments are made to correct for excessive highlights or shadows, the camera controls and power supply, the monitor, and the line amplifier. The signals are, of course, fed either to a nearby ultra-short-wave mobile transmitter which relays the pickup to the main transmitter, or via coaxial cable or line direct to the transmitter. The same units can be used as standard studio equipment, mounted in racks. In fact, the units can serve both in the studio and out in the field, in an economical dual capacity.

As for the television service range under the difficult conditions obtaining during the maneuvers, excellent pictorial detail was obtained at distances up to ten miles, after final adjustments had been made. With more thorough installation, good television pictures were received up to 23 miles away from the 50-watt main television transmitter, with a 60 microvolt signal at the set antenna terminals. The images suffered some loss in detail at this ex-

treme distance, due to local interference. However, up to 8 miles the picture resolution was 400 lines, when originating at the studio or at a remote point connected by coaxial cable. When images originated at the mobile transmitter and were relayed by the main transmitter, considerable interference from other transmitters was experienced, and the resolution of the received images was of the order of 300 lines.

The Army officers who viewed the television scouting reports flashing on their receivers seemed highly pleased with the results. The day-time images revealed a wealth of military information, especially as the camera crew, leaving the mobile equipment truck and advancing under cover of trees, bushes and tall grass, got in some nice "shots" with increased pictorial detail. Night television was also essayed, using some 10 kilowatts of floodlight illumination. However, images were relatively poor, since a minimum of 100 kilowatts of illumination would be necessary for satisfactory television pickup.

That this television demonstration took place under the most adverse conditions, is again confirmed in the matter of operating voltages. The main television transmitter, working off the local power line, frequently had to operate on 80 volts, although built specifically for 115 volts. Even so, satisfactory images were put out, despite the limitations of the local power system.

The television crew worked from 16 to 18 hours each day. They set up six field installations for the reception of the television images, in addition to the mobile transmitter, relay receiver and main transmitter with monitoring facilities.

In addition to pickups from the "field of battle," Du Mont engineers set up their camera at the Message Center in Canton, from which point Army officers took part in the telecasts. Among those who appeared before the iconoscope were Major E. L. Upson, I.G.D., Major George B. Barth, F.A., and Majors Anderson and Savage. Assistance in carrying out the demonstrations was graciously rendered to the video engineers by Colonel John C. Moore, First Army Signal Officer.

The successful demonstrations were supervised by Allen B. Du Mont assisted by Richard L. Campbell who is in charge of transmitting equipment at the laboratories, as well as by Dr. Thomas T. Goldsmith, Charles Huffman, Walter Swenson, Anthony Vitale, William Sayer, Herbert Bernard, Charles Bace, Morris Spector, Klaus Landsberg, Newton Smalley, Robert Kessler, Raymond Lafferty, Harold Bests, and Will Baltin, the last-mentioned being the program director of the new Du Mont television station now being completed in New York City.

Highly pleased with the results of this first military television demonstration, authoritative sources look ahead to startling developments in this ultra-modern branch of scouting, particularly if and when special television equipment is designed and built for the peculiarities of military service.

"I was hoping," stated Mr. Du Mont, "that we might try television scouting from the vantage point of an airplane flying over the maneuvers, but no such facilities were available. With our television technique now providing satisfactory pictorial resolution, especially when using the greater number of lines which we get with our synchronizing, halved repetitive rate, and memory screen system, we can provide television images which compare most favorably with standard motion pictures. Thus commanding officers back at headquarters can see precisely what is going on at the front and even in the back areas of the enemy's line by means of aerial television.

"Just a bit more stretching of the imagination, yet entirely within bounds of present-day achievement, and we have the television aerial bomb, whereby a command post can see that the radio-controlled crewless bomb-diver reaches its goal, can line up the target and release the lethal cargo at the precise moment.

"A parallel development can take place in naval warfare, with scouting ships or planes flashing back television reports, and with crewless 'mosquito boats' or bomb-divers remotely controlled with all the accuracy that goes with actual sight at the scene of battle.

"It is to be hoped that in our military preparations we shall not overlook the important role that can be played by television. It is only through the mobilization of such scientific, technical and industrial assets that we can make absolutely sure of our invulnerability in the face of potential enemies whom, until now, have had all the surprises up their own sleeves to the consternation of their victims."

External Noise Silencer

(*Continued from page* 15)

circuit trimmer of the preceding I.F. transformer must be realigned to resonance. The receiver should now operate in normal fashion, since the only change that has been made has been in the substitution of the last I.F. tube with the 6L7. The trimmer of T1 should now be adjusted for minimum noise. If a voltmeter is available, it can be placed directly across R3 to ascertain when resonance is obtained.

Varying R1 will determine the amount of voltage fed into the injector grid of the 6L7 and, therefore, the amount of silencing action of the unit. The silencer incorporates a variable resistor (R6) in the cathode circuit of the 6K7 which controls the sensitivity.

If you are an amateur operator and have a receiver without some means of noise silencing you should certainly incorporate this unit in your receiver. You will find it especially effective on the higher frequencies where man-made static of the ignition type hampers reception.

If you are a service man, here is an opportunity to increase your income. Home set manufacturers have, somehow, overlooked the fact that the growing short-wave listening public could be made very happy if some or all of the noise on the short-wave DX broadcast bands could be eliminated. Build up one of these units for demonstration. They are easily installed in any superhet receiver using 456 kc. I.F.'s.