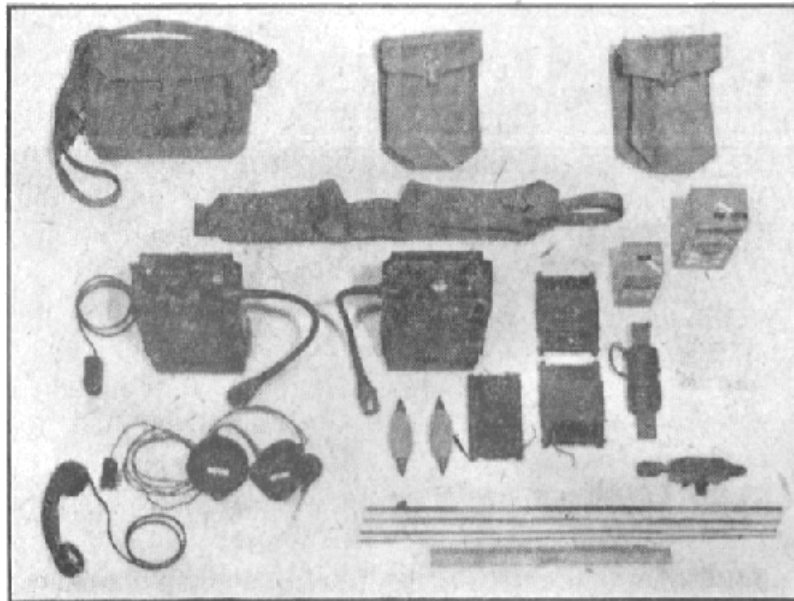


NEW ARMY RADIO IN THE JUNGLE



The new pack communications set which has been adopted by the Australian Army has been specially designed to give maximum freedom of movement to the operator. This picture shows a soldier hacking his way through heavy growth unhampered by his burden. Both hands are free and the equipment fits snugly to his body. It is unaffected by heat, cold, water or dust. The microphone has a special mouthpiece conveniently placed which does not restrict movement. The receiver is in one pack at the front, the transmitter in the other. (Full story on the new set begins on next page.)



Here are the main components which make up a tiny portable radio station. Easily recognisable are the carrying cases at the rear, the two units themselves, "A" and "B" batteries, aerials, both wire and whip section, headphones and handset. A 15-in ruler lies below the aerial sections to indicate size.

These are coupled together with a single cable carrying battery and control connections. They are slung in their canvas cases around the shoulders of the wearer, and carried at waist height for easy reach.

Another case is carried like a knapsack, and holds extra equipment, such as aerials and spare batteries, which may be needed during operations.

CASES ARE SEALED

Each unit is approximately the same weight, and to help achieve this, the filament battery is contained in the base of the receiver; and the high tension and bias batteries in the transmitter. Each is easily and quickly replaceable by rotating a sensibly-sized knob outside the case. The cases themselves are made of aluminium, specially processed to resist corrosion.

The controls have been kept to the absolute minimum and are grouped at the top of each unit. All joints and shafts on the cases are so well fitted that neither water nor dust can enter. Both sets can operate totally immersed in fresh or salt water, with only the aerial above the surface.

And to make sure that any condensation inside the cases will not damage the components, each has an absorbent container of silica-gel to keep

Radio for the Army

Communications are the veins and arteries of war and defence, just as they are in industry and the things of peace. But in war, everything is an emergency. If men cannot speak to each other, co-ordinated armies become isolated groups and effective action is reduced to chaos. Speed is more important than secrecy, and radio gives speed to speech. To an army, radio is a weapon which, although it cannot fight, helps to weld fighting power into the force which strikes.

RADIO communication for the army poses its special problems, for the demands upon it are heavy. Not the least difficult of these problems applies to the radio receiving and transmitting sets which fighting men must take with them into the field, and which they use to keep touch with each other and with their points of control.

LESSONS FROM WAR

World War II taught many lessons about man-carried radio sets, and these lessons have been well learned and well absorbed. Equipment which was good enough in the early days soon became an encumbrance as mobility and speed received greater emphasis. The old inevitably had to give away to the new, and the requirements set down by the army for their mobile equipments for the future were stringent and uncompromising.

If war should come again, despite our efforts to avoid it, our soldiers must have a radio which can be carried through hot sun and bitter cold,

smothered in the water and mud of swamps, discolored by dust which creeps through impossible cracks and works its ruin.

Today the army believes it has such a radio set. You have heard it mentioned in the newspapers and seen pictures of it operating under severe test conditions. It has already been in the field in Korea and has proved capable of doing the job for which it was built.

Through the co-operation of the army and of Amalgamated Wireless (Australasia) Ltd., where the equipment was designed and is being built, we are able to give you for the first time some of the features of this new pack-set, omitting only those details of circuits and design which, for security reasons, it might not be wise to publish.

Our photographs show some of the units which have served as pilot models in the final production, but otherwise they are exactly the same as thousands of others now coming off the factory line.

The set is made up of two essential units, a receiver and a transmitter.

the inside quite dry. A small indicator fitted to each unit changes color when this container needs replacing.

And as if this were not enough, each individual component is treated to be moisture proof—special sealing for cased items, tested resistors, fixed condensers with ceramic end-pieces, through which nothing can pass. The tiny meter and tuning window are hermetically sealed.

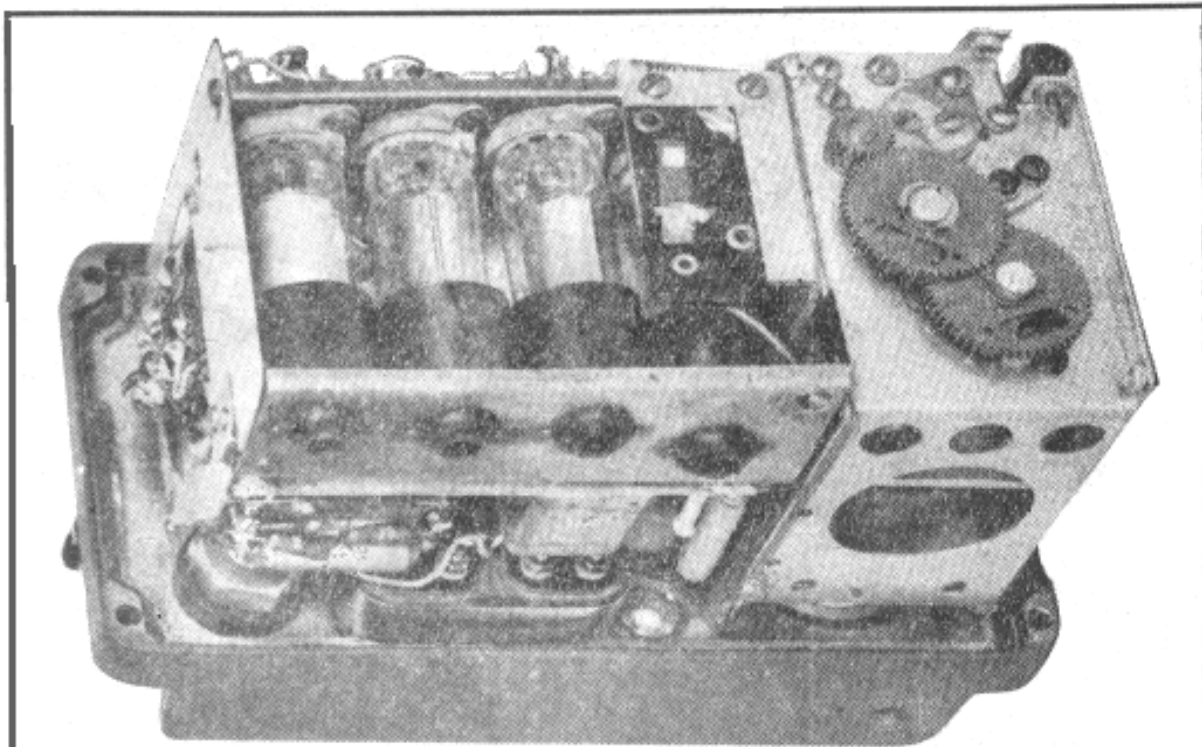
The equipment is tested over a very wide temperature range, and will work at less than minus 40 and more than plus 85 degrees Centigrade. It can be dropped several feet to hard ground, and otherwise manhandled without damage.

BATTERY OPERATED

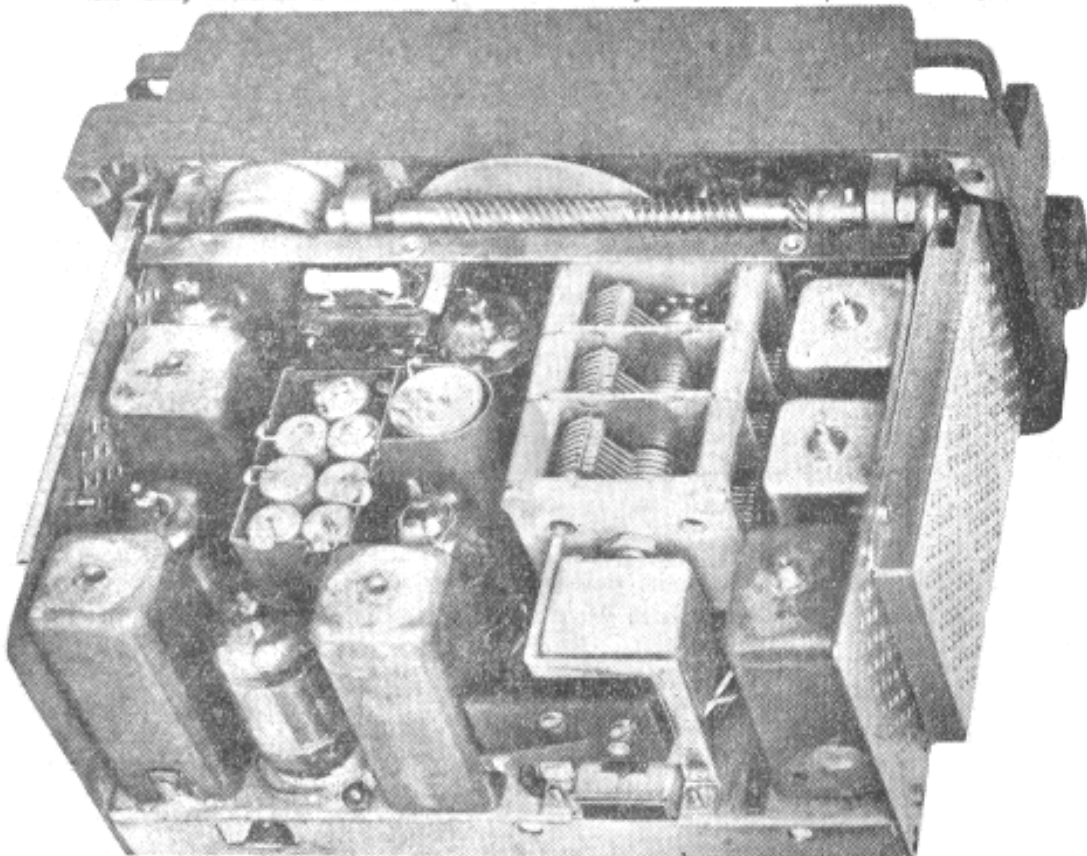
Both receiver and transmitter use battery valves of the same type as might be found in ordinary portable receivers, valves which have been proved reliable and long-lived. The receiver can run continuously for 10 hours on a single set of batteries—the transmitter for a period depending on its use.

The same batteries are used for each unit, 1.4 volts for the filaments and 90 volts for high tension. The interconnection cable joins these to a send-receive switch operated by the user.

The receiver is tuneable in two bands through a range of 2-10 Mc and has an RF stage, converter, and two IF stages plus a BFO for reception of Morse signals. The valves are



This picture of the transmitter withdrawn from its case shows the four miniature valves [one partly obscured]. The final tank tuning mechanism is in the compartment at the right and is driven by the train of gears.



The receiver looks very like a small car radio. All coils and other components are individually sealed against moisture. The silica-gel container is seen at the extreme right. Note the worm-drive shaft which operates the tuning condenser and indicator dial. The containers for both units are cast aluminium treated to resist corrosion.

1T4, 1R5, two 1T5's and a 1S5, in that order. A reflex circuit gives added sensitivity. The controls include a tuning knob with a light which can be switched on for illumination in the dark, a wave change switch to select the receiving band, and a volume control. It also has a multi-socket plug which connects up the headphones and microphone. The tuning dial has a lock adjustment to fix the dial setting when tuning is completed.

The transmitter uses four valves, a 3A4 crystal oscillator, two 3A4's in parallel in the final amplifier stage, and a 1T4 to provide grid modulation for voice operation. It can also be keyed for Morse code, for which purpose about double the power is available.

CRYSTAL CONTROLLED

Only the final amplifier stage is tuned, as the transmitter is designed to operate on a number of crystal-controlled channels. A most ingenious method of amplifier tuning is used which varies both inductance and capacitance at the same time, thus covering the full operating range without changing coils.

The transmitter is tuned by reference to a meter which reads actual power radiation from the transmitter. On maximum deflection it is correctly tuned. Simplification of this operation plus crystal control removes one of the greatest sources of operator error.

In addition to the tuning control there are two twin switches. One selects the crystal channel and adjusts for aerial matching. The other provides a "netting" position so that the receiver can be tuned to the same frequency as the crystal being used in the transmitter, and a function switch which turns the equipment on and off, and selects either voice or CW positions for the transmitter.

There is also a loaded switch to illuminate the meter face and sockets for quickly changing crystals, four of which can be fitted at one time.

The ability of the equipment to "net" to its own frequency is a valuable improvement over earlier equipment, as it does not depend on reception of any other station to set up a pre-arranged channel. Any number of these sets can therefore be adjusted to a given channel and brought into synchronised operation without test transmissions of any kind.

USE OF METER

The meter is also used for checking the conditions of the batteries, testing different circuits with different positions of the function switch.

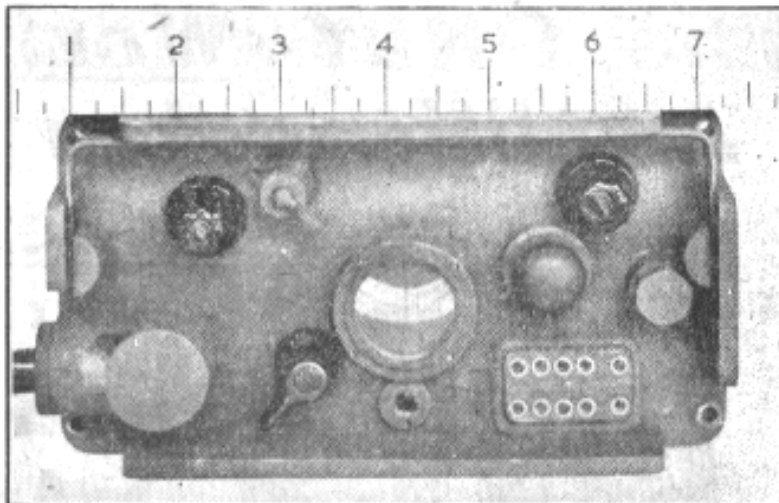
The set can be used with various types of aeriels selected for use whether the operator is moving or stationary.

While on the move, a whip aerial plugs into a special terminal point on the transmitter. It is of the "loaded" type, which means the inclusion of a tuned circuit unit at the base of the whip. This can be adjusted by means of another extremely clever piece of design to suit the frequency being used.

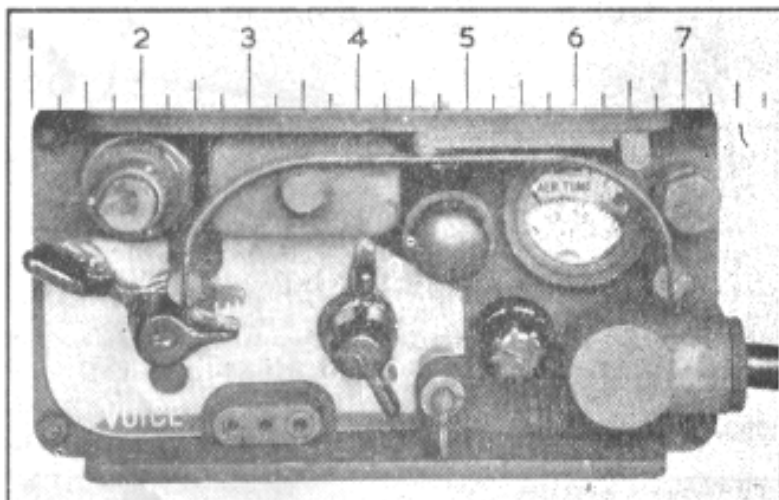
This type of whip is a big advance on the plain rod, and is universally used with modern mobile equipment. It effects a decided improvement in reliability and range.

If the user is outside the communication range using the whip, he can

FRONT PANELS OF THE TWO UNITS



The receiver front panel shows the tuning dial window at the centre plus wave-change switch, tuning knob and volume control. Immediately above the socket for headphones etc, is a spring-loaded, rubber-covered press switch to illuminate the dial face at night.



The tiny meter by which the transmitter is tuned and batteries tested is at the top right of its panel with the tank-tuning knob below it. To the left are the dual switches, and at top left the connecting post for the aerial.

sling wire aeriels to some convenient tree or high point and take advantage of the better efficiency such an aerial allows. Either a single wire or a dipole aerial can be used and matched into the transmitter.

The army is somewhat cagey about quoting operating ranges, but it can be fairly assumed that several miles can be covered at almost any time, and distances of many hundreds with wire aeriels and under suitable conditions. Every care has been taken to see that the maximum use is made of the necessarily low power of the transmitter. The receiver would have a range virtually as great as much larger sets.

The microphone and headset are essentially similar to the standard carbon and magnetic types, but with much improved sensitivity. The operator has a choice of a type he can wear on the march, or a light-weight telephone handset when stationary. And, of course, he has a tiny Morse key which he plugs into the transmitter when sending CW.

When assembled as a one-man pack set, the total weight of the equipment and the extras he must carry is 22lb.

From this description it will be seen that, despite its size and miraculously compact construction, the equipment is flexible enough to operate under any conditions which might be experienced in the field. At the same time, the controls have been so grouped that adjustments can be made, day or night, with the utmost speed. Once set, operating is reduced to a single-hand job, and the flap of the transmitter cover need not even be opened to do it.

More than this, we cannot say. The engineering and circuit details for the moment remain the army's secret. But from our observation we can only record that not only has the army received a remarkably efficient and robust radio set, but that the Australian engineers who produced it have rendered a great service to their country.