ing he was to be heard calling GKZ but GKZ was not heard; but on a later date GKZ was heard on 32 metres calling G2AA, but I could not find this station. A foreign station can be heard most evenings on approximately 49 metres; modulation is always good and strength R7; but the lingo is a puzzle to me; he generally opens up at about 11.30 p.m.

W3XAL Heard

A New Station

WHILE listening in last night I heard a S.W. station that I have not seen mentioned in your short-wave notes, so it may be of interest to readers. This is W3XAL, Bound Brook, New Jersey, U.S.A., operating on a frequency of 6100 kilocycles, or 49.81 metres. They closed down at 5 p.m. (N.Z. time), which was 1 a.m. Eastern Standard Time. Volume was good speaker strength.

Could any reader enlighten me as to the whereabouts of S.W. station on about 35 metres on duplex calling WOO just before 8 p.m., 29/1/30, and XKZ after 8 p.m. Call sign of this station, which was a foreigner, sounded like J2GN.—R. J. Eatwell (Greymouth).

"Short-Wage" Adapter

A PRINTER'S error crept into our Questions and Answers page last week, and "Short-wave adapter" appeared "Short-wage adapter." Someone saw the humorous side, and wrote:

"Dear 'Radio Record,'—On page 36 of your 31/1/1930 number you reply to 'Dynamic' re a 'short-wage' adapter. I married one some 18 years ago, and she is still doing well.—Yours, etc., C.E.W."

We congratulate C.E.W., for these are not easy pieces of apparatus to handle.

Crystal Sets for Short Waves

A Puzzling Question Answered

"WHY can't I use my crystal set for reception on the short waves?" is a type of query sent in quite often by readers. The number of shortwave enthusiasts is steadily increasing, and it is only natural that many of them should wonder why crystal receivers should not be employed on wavelengths of 20 to 50 metres, provided suitable coils are available.

A crystal set appeals chiefly because of its economy and simplicity, but its limitations become very apparent as the wavelength decreases. In the first place our crystal receiver has no amplifying properties of its own. A crystal will rectify but it will not magnify. Our aerial picks up the weak high-frequency impulses which are transmitted from a broadcasting station, and the amount of energy actually picked up is dependent solely upon the efficiency of the aerial and earth system.

A Good Aerial Essential.

IF the aerial is high, unscreened, and has reasonable length, then one may expect good sensitivity or pick-up from it. These high-frequency impulses which the aerial absorbs are passed on to the wireless set and, of course, have to be rectified by a detector before they become audible as speech or music in the telephones or loudspeaker. Now a crystal will rectify these impulses and pass them on to a pair of telephones, and thus we are able to hear what the broadcasting station gives out.

This is perfectly straightforward in the case of the local station or a high-power transmitter situated within range of our aerial. Unfortunately, however, the aerial has only a limited pick-up, and, moreover, a crystal has but a fair sensitivity, and in consequence will not respond to impulses below a certain intensity. For instance, it will not respond to very weak signals, such as those from a distant station.

A Valve more Sensitive.

NOW let us take the case of the ordinary reacting detector valve. Here we have a device which will do two things. First, it will rectify. Secondly, it will magnify and we are able to react, that is to say, "feed back" energy, into the tuned circuit, and by so doing increase the sensitivity of the set very greatly. This property of reaction enables us to obtain a very simple but extremely efficient and sensitive arrangement with which to receive distant stations. We are enabled to pick up and magnify impulses which would not be audible in the case of a straightforward crystal receiver. Thus, a reacting valve detector is many times more sensitive than a crystal set ever can be. Shortwave transmissions are often sent out from stations many thousands of miles away, and it is this fact that the waves are travelling over such vast distances that makes shortwave reception so extremely interesting.

Crystal Damping.

THESE shortwave impulses, when they reach this country, are extremely minute, and no crystal receiver can be expected to detect them and render them audible in a pair of telephones. Readers who have themselves operated a shortwave receiver will know quite well from practical experience that the success of their reception depends entirely upon the intelligent use of reaction and it is a fact that most of these transmissions are received with the set very near the oscillation point.

That is, of course, the condition when the detector valve is in its most sensitive state. Hence, for shortwave reception a crystal detector alone is hopeless.

There is also another point. A crystal is connected across the tuned circuit, either directly or indirectly. Because of its comparatively low resistance it exercises what is termed a damping effect upon the tuned circuit, and produces a decrease in efficiency. As the wavelength gets lower we have to cut down all losses in order to gain the greatest possible tuning efficiency and the lowest high-frequency resistance.

Therefore, our friend the crystal becomes a much greater nuisance on the short waves than on the long waves, because the crystal damping exercises a much bigger effect upon the circuit as a whole. Thus, apart from the question of sensitivity, our tuning difficulties are increased, and for shortwave work a crystal cannot in any way be compared with a reacting valv detector. Finally, even if the crystal were highly sensitive, there is still the fact that it requires constant adjustment and that its sensitiveness varies with pressure, and sometimes with the atmospheric conditions. The more sensitive the crystal the more is its adjustment upset. This is a disadvantage not possessed by a three-electrode valve which, provided it is operated correctly, is perfectly stable day in and day out.

Again, there is the question of shortwave Morse transmissions. Messages are sent out on what is termed the continuous wave (C.W.) system, and to receive them it is necessary for the set to be in an oscillating condition. A crystal will not oscillate, and therefore could not be employed for C.W. reception.

Not worth While.

POSSIBLY something could be achieved by using a separate reaction valve to "feed" oscillations into the tuned crystal circuit, but this would not be worth while. If one has to utilise a valve and its attendant circuit why not do so in the ordinary conventional manner and employ a straight valve detector?

Therefore, the answer to our readers' questions is that, first, a crystal, in itself, is far to insensitive for general shortwave work. Secondly, reaction cannot be used to increase its efficiency and thus to make it more sensitive to weak signals, such as those from stations on the short wavelengths. Thirdly, a crystal will not oscillate, and consequently cannot be used for the reception of continuous waves.

Removing Insulation

THE common method of removing the insulation from the wire by scraping with a knife is not advised, as both the knife and the wire may be damaged. The knife edge is blunted by such use, and quite an appreciable amount of copper conductor may be cut away. The best method is to untwist the covering with the fingers until the required amount of wire is bared, when the loose ends may either be cut off with a knife or twisted round the wire out of the way. In the case of double-covered wire, owing to the fact that the layers of insulating material are wound in opposite directions, the ends may be tied securely in many cases. Enamelled wire, which causes quite a large amount of trouble to some amateurs, may be quite easily cleaned with a small piece of emery paper. Sufficient use should be made of the emery paper just to remove the enamel, as it is quite possible to considerably reduce the gauge of wire by overdoing the operation.

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