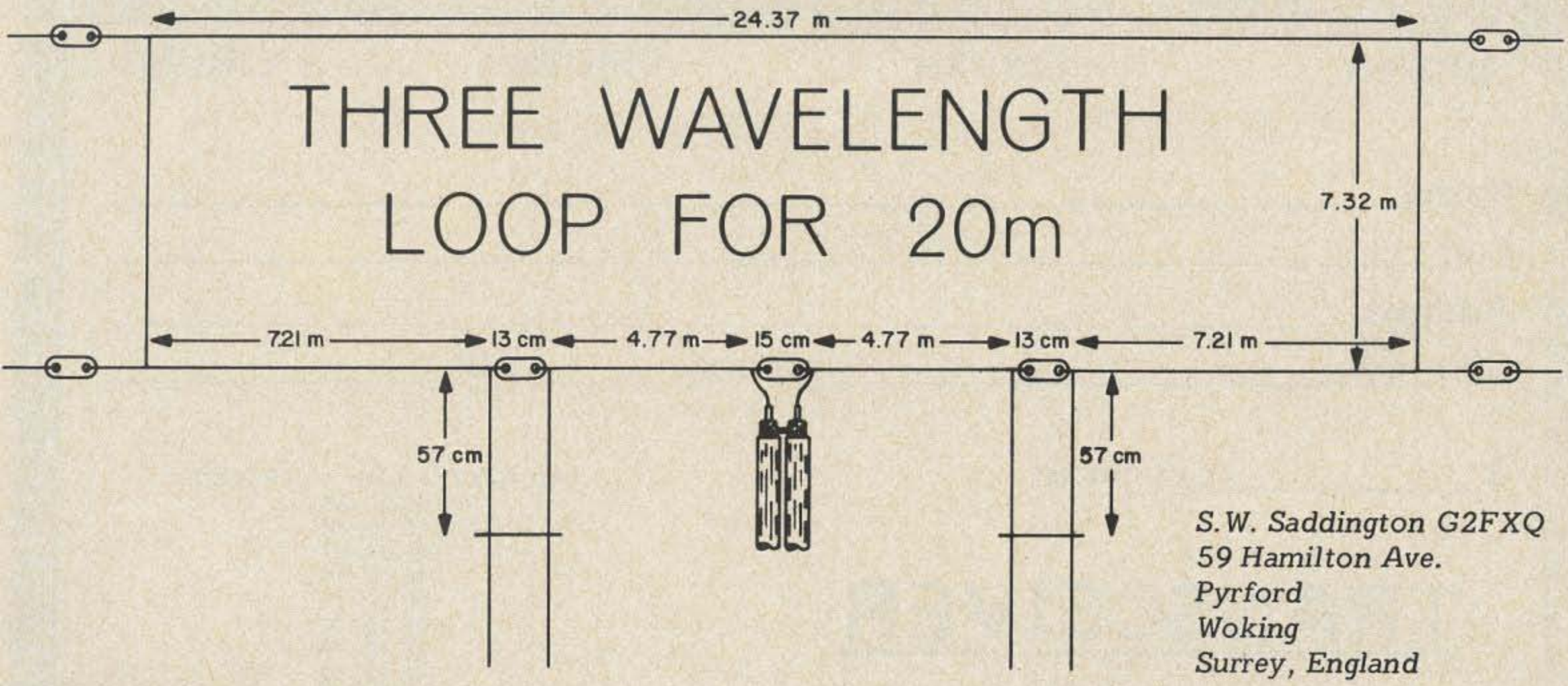

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Fig. 1. Three wavelength loop antenna for 20 meters. All measurements are metric.

The three wavelength loop antenna is no substitute for a carefully constructed and well elevated cubical quad or three element beam, but it is simple to make, easy to adjust, and does provide a valuable measure of that all important low angle radiation. It also has a more or less all-round radiation pattern and therefore needs neither tower nor rotating gear.

The dimensions of the antenna in meters, as I erected it, are shown in Fig. 2. The two stubs, positioned approximately at voltage antinodes, are for tuning purposes, and should be adjusted equally for mid-band resonance. This is done in the normal way, with a grid dip oscillator at the feed point, before the λ/4 transformer and line are attached.

Figure 1 shows the shape of the antenna in its vertical plane, and its dimensions in terms of wavelength. By feeding it with a low impedance line at point "x," voltage maxima occur at points marked "A" and "B,' these two letters signifying opposite phase. There are thus, in effect, two 1½λ wires which are in phase, and stacked λ/3 apart. The impedance at point "x" is 130Ω a value which can be conveniently matched to a 75Ω line by a 100Ω λ/4 transformer. In my case this λ/4 transformer is made from two λ/4 lengths of 500Ω coaxial cable connected in series. My version of the antenna is also fitted with a λ/4 balun to reduce radiation from the 75Ω coaxial line, but this is a refinement which could be omitted.

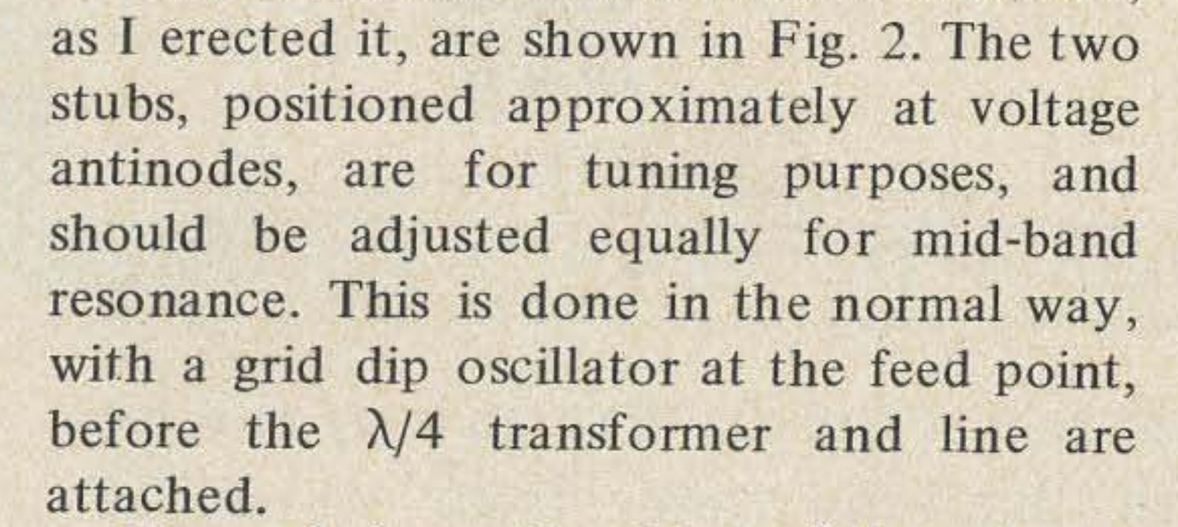

Fig. 2. The same antenna expressed in terms of wavelength as an aid in adapting the design to other bands.

Using the matching system described, the SWR achieved was 1/1.04 at mid-band and 1/1.08 at the band edges.

The theoretical gain of the antenna is about 4 dB (1 dB for the overall length of 1½λ plus 3 dB for the λ/3 stacking). This is not a particularly impressive figure, but you may judge for yourself whether or not the antenna is worth a trail. With a power input of 200 watts PEP, stations from all hemispheres were contacted with a minimum signal report of S5. Some stations worked were: HR2(S5), ZM3(S6), 5NZ(S7), 4 x 4(S7), ZLI(S7), EP2(S8), JA6(S8), CR6(S2), PY4(S2) 6Y5(S9+). All these contacts were during a six month period of random operation.

The height of the antenna used for the tests was 5 meters, and its position (near London) was roughly ENE/WSW. The horizontal radiation pattern is apparently the same as in the case of a single 1½λ wire.

. . .G2FXQ