letter. I did not postulate a " connection " between the propagation difficulties found around 1 cm wavelength and the existence of a limit to the performance of resonator-valves at the same part of the wavelength gamut. On the contrary, I said (Section 10) that it was a " singular coincidence " that two unconnected but fundamental phenomena should both adversely affect radio communication at the same part of the gamut. I am sorry that this does not seem as interesting to Mr. Beck as it does to me, but I am, I fear, unrepentant and still find it well worthy of comment that, at this particular part of the gamut, one finds not merely one but two separate obstacles which have to be taken into account when one is trying to establish communication.

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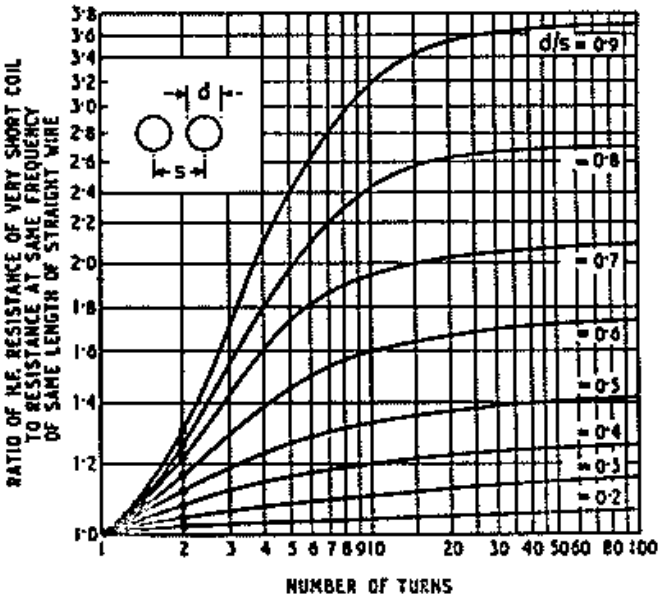
Q of Solenoid Coils

To The Editor, " Wireless Engineer "

SIR,—Mr. Callendar points out (*Wireless Engineer*, June 1947) that there is little indication in my article as to how far Butterworth's correction factor for coils of few turns can be relied on. That is a deficiency of which I was acutely aware and I can only plead lack of time for making the large number of measurements necessary to fill this gap.

Very tentatively, we can deal with short coils in the following way. Suppose we try to plot curves of ϕ (ratio of h.f. coil resistance to resistance of the same length of straight wire at the same frequency) against the number of turns (n), for various spacing ratios. We know that the curve has to approach asymptotically the values given in column 1 of Table VIII (*Wireless Engineer*, March 1947, p. 88). Also we know two more points, those for $n = 1$ and $n = 2$ values come from Butterworth's exact solution of the problem of two parallel wires carrying high-frequency currents in the same direction (*Proc. Roy. Soc.*, 1925, 107A, p. 708). From these we can draw a plausible looking curve, being guided by the very rough device suggested previously (*Wireless Engineer*, February 1947, p. 39) namely that ϕ should be diminished by $\frac{100}{n}\%$ when n is greater than, say, 20. The results of this procedure are shown in the diagram. Of course, as the ratio of length to diameter increases the curves become modified even for the smaller n values, in what is at the moment, an unpredictable way.

All this juggling with doubtful approximation is clearly quite unsatisfactory, and, as Mr. Callendar



remarks, further experimental work would be useful. It has, however, to be remembered that exact knowledge of the h.f. resistance of coils of two or three turns is likely to be required rather infrequently. The total resistance of circuits containing such coils will usually be dominated by other features of the circuits.

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