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In the 1860s, radio waves were predicted by James Clerk Maxwell in his work on electromagnetism. It took a further twenty years for the first experiments to produce a working demonstration. In this guide to radio technology, first published in 1925, eminent physicist Sir Oliver Lodge (1851–1940) provides a concise history of the development of the wireless radio, explains the theory behind it, and includes some practical tips for amateurs. Having lived through and contributed to the discovery, he explains the difficulty of the early experiments, which took place in a time when terms like 'frequency' and 'inductance', now taken for granted, did not exist in the scientific vocabulary. His first-hand account reveals the incredible efforts poured into the development of a revolutionary modern technology, rekindling the sense of wonder that once surrounded this strange new science.

Talks About Wireless

With Some Pioneering History and Some Hints and Calculations for Wireless Amateurs

OLIVER LODGE

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TALKS ABOUT WIRELESS

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With some Pioneering History and some Hints and Calculations for Wireless Amateurs

By

SIR OLIVER LODGE

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PREFACE

THIS is a friendly rather than an ambitious book. It is a message of greeting to the great army of wireless amateurs and experimenters, from one who—always enthusiastic about ether waves—did some pioneering work; and who now admires the remarkable progress that has been made by others. May they all take it as conveying the author's good wishes, combined with a hope that, in the diversity of these gossipy chapters, each may find something acceptable, something worthy of his or her interest.

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INTRODUCTION

The Spirit of Progress

WHEN we think of the early beginnings of the generation and detection of ether waves (which, except in the form of light and other very high-frequency radiation, had never been generated or detected before 1887 and '88, though their theory was initially given by Clerk Maxwell in 1865), we may well be amazed at the rapid progress that has been made in their application to signalling all over the world, and especially to the transmission of human speech to surprising distances, with clear articulation and with avoidance of many of the difficulties which accompany cable transmission.

By no other means than through the free and untrammelled universal ether could the fine shades of articulate utterance be transmitted instantaneously, and with so little power considering the long range achieved in all directions.

The broadcasting of news and speech always seemed to be the object for which etheric waves were specially adapted; but I never expected to live to see the process so success-

fully and marvellously developed, by the labour and ingenuity of a number of workers in co-operation, as has now been accomplished in a way which is a daily surprise and delight to listeners.

The creation of a new industry, which has come into existence as a consequence of the widespread demand, is but one of its benefits: the younger generation will surely be stimulated to take more interest than ever in the science of physics, which has rendered such an achievement possible. And the widespread and growing interest in science which has thus been begun may lead a few of the enthusiasts towards further investigation, and to further inventions and discoveries of which we at present have hardly an idea.

It is devoutly to be hoped that in the long run, when present international troubles have subsided, the power of rapid communication will surely conduce to better understanding among the nations, and will lead in due time to the much-desired but long-delayed era of universal peace. To this end much more than physical and material progress must contribute, for nothing can replace the whole-hearted desire for co-operative advancement of all nations on terms of mutual amity and good will.

The interchange of discoveries between the

nations has long been in operation. All scientific discoverers throughout the world virtually pool their resources and communicate to each other their results, except indeed those of a destructive and inhuman character. Secrecy is alien to the spirit of science; and all true wealth increases in value when freely shared.

Indeed, that is the test of true wealth, as Ruskin long ago pointed out—namely, that the more it is shared the more it is possessed and the greater value it has for everybody. Witness the broadcast distribution of music and drama and works of art generally. These are not things for private possession only, but can be shared and enjoyed by all. Things of this sort constitute the true wealth of humanity, and to that category scientific discoveries belong.

The spirit of nationalism is wholesome enough if it be held reasonably and without flaunting claims to superiority. The spirit of emulation is also wholesome, for it is by no means the same as competition. Emulation is the desire to do something better than has been done before, and better than others have as yet learnt to do it; while competition is mainly the effort to monopolize some activity, and to do things instead of others. In extreme cases unfair competition may prevent others

from taking their due share in the beneficent work of the world.

Hence progress surely lies in the direction of co-operation all round, each nation and each individual doing his best, and not seeking to prevent others from doing theirs. Nations which interchange scientific discoveries might also wisely interchange commodities, since not every locality is equally suitable for producing everything. Division of labour, of this sane and salutary kind, might be recognized as good. And international jealousies, based on mere rivalry and competition, ought to cease, especially rivalry and competition in armaments and instruments of destruction.

Civilization ought to have progressed too far by now for the perversion of ingenuity responsible for the construction of diabolical and otherwise useless mechanism, and for the artificial increase of those natural evils among which it is our lot to live and against which it is our business to contend.

Sorrow and sighing there must be in plenty during this planetary existence, without our trying to increase their sum, without adding to each other's difficulties, and without bringing about those horrors of death and torture and destruction which, when they occur by inadvertence or by accident or by the uncon-

scious and uncontrolled forces of Nature, arouse world-wide feelings of sympathy and desire to help.

It is not viciousness that perverts humanity most, it is a kind of stupidity, a lack of clear perception of what the straight course is; so it blunders into evil without really willing it, swayed by passing fancies, and lacking self-control.

> Our wills are ours, we know not how;
> Our wills are ours, to make them Thine,

and until the will of man is brought into harmony with what we can gather of Divine intention, humanity cannot be called really and effectively civilized, although it may achieve marvellous feats of locomotion, and although it has extended the range of human speech to distances undreamt of by our ancestors. Now that we are able to travel farther and faster, we should travel to some good purpose. And now that we can speak across a continent, let us see to it that we have something worthy to say.