ciples. Such collaborators include, for instance, persons stemming from the Vienna circle, from the Berlin group of scientific philosophers, from the Polish school of logicians, from the group centering around *Scientia* and the *Centre de Synthèse,* as well as representatives of American pragmatism, the English analytical school, French conventionalism, various groups of scientific philosophers in Belgium, Holland, Switzerland, Denmark, Sweden and other countries, and a large number of scientists from the various special branches of science.

For these and other reasons there will be a certain divergence of opinions within the wider set of agreements which give unity to the work; tendencies which are often called scientific empiricism and logical empiricism will find a place by the side of other tendencies which prefer to be called scientific or experimental rationalism. Collaborators of various nationalities have been invited; only their personal competence has been considered or the benefits to be obtained from a variety of cultural view-points—their political views or the political ideologies of the countries they represent have not come into consideration, since the Encyclopedia is a scientific and not a political enterprise. Each collaborator will, of course, be responsible only for the ideas which he himself expresses.

The subjects chosen will insure that the total series of contributions will form a systematic whole dealing with all the main fields of science and with all the types of consideration which the existence of science provokes. The monographs will be intelligible to the person of a scientific habit of mind interested in the whole range of science. The Encyclopedia is not designed to popularize science or to compete with the existing type of scientific encyclopedia. It is believed that the general educational implications of the unity of science movement are important, but the immediate aim of the proposed work is rather to reach those persons upon whom the future of science depends and to stress those matters which existing encyclopedias of science neglect.

As a means of launching the project of an "International Encyclopedia of Unified Science," there is to be published by the University of Chicago Press a series of short monographs or pamphlets, twenty in number, which will serve as introductions to all the main fields which are to be represented in the Encyclopedia. This series of pamphlets taken as a whole will constitute the first two introductory volumes of the Encyclopedia, but will be issued as an independent and completely self-contained unit under the title of "Foundations of the Unity of Science."

It is to be hoped that scientists as well as those interested in the institution of science will make the Encyclopedia project and the International Congresses for the Unity of Science their own. The most concrete form of aid at the moment toward realizing the larger project of the Encyclopedia is to subscribe to these independent volumes, "Foundations of the Unity of Science."

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SCIENTIFIC BOOKS

MARCONI

Marconi the Man and His Wireless. By ORRIN E. DUNLAP, JR. The Macmillan Company, New York, $3.50.

IN his latest book, the radio editor of *The New York Times* has presented an interesting and timely biography of one of the most constructive workers of our age. Marconi was always an attractive figure to Americans, for, like Henry Ford, the public felt that he had attained personal eminence and affluence through originality, daring and hard work. These qualifications, at least in the past, were the "camel's eye" through which even wealth might be admitted to the heaven of good repute.

Mr. Dunlap has most painstakingly searched the record for data relative to the career of Marconi, and the results attest to his thoroughness. If the book is occasionally chatty, discursive and verging on hero worship, it is not unnatural that in so full a compendium, Marconi's aims, ambitions, reactions and recognition should have loomed large before the biographer. A mountain in the foreground can block out an entire mountain range and stand in vast and horizon-shadowing perspective.

Mr. Dunlap, nevertheless, is careful to give numerous quotations giving full credit to the pure scientists, Maxwell and Hertz, who made possible the work of Marconi, and as well many later workers who will follow in their steps. Maxwell first gave us the concept of the electromagnetic wave, and to this day the problems of its production and propagation over the earth are only partly understood. The physical existence of surface and space waves is still sharply debated among radio scientists. Hertz first taught us how to transmit and receive these waves. The Hertz-

ian transmissions were on extremely high frequencies producing the so-called ultra-short waves. It is again curious that we should have closed a cycle. The first waves used for communication were hundreds or thousands of times longer than those which Hertz produced. Gradually long-distance communication came back to the short waves. And to-day television conditions require our return to ultra-short waves. From Hertz to television seems a long cycle, and yet this is another instance where pure research first produced the agency which, generations later, was both needed and available.

Mr. Dunlap properly emphasizes the position of Marconi as a sort of bridge between the rudimentary foundations of electromagnetic wave technique and our present evolved and complicated radio art. He makes it clear, however, that Marconi was far from a passive medium. His personal bravery and tenacity, combined with scientific thoroughness and faith in technical development, led Marconi step by step from the rôle of the world's first radio amateur to a position as its leading radio engineer.

As Mr. Dunlap indicates, it is difficult for us to evaluate fairly the contributions of Marconi, since we are too close to some of them and have only inklings of others. So far as radio telegraphy and telephony are concerned, we have a fair idea of the outstanding character of Marconi's contribution. In the nascent arts of radio facsimile and television transmissions, we can not clearly view the vortex of progress in which we whirl. In more remote applications of radio technique, as, for example, meteorological studies, we have only a foreshadowing of what Marconi's work on short-wave transmission may ultimately mean.

We have learned much of the electrical constitution of the upper atmosphere by radio methods—and as Mr. Dunlap points out, the short wave experiments of Marconi here blazed a trail the ultimate significance of which few have appreciated.

It may be added that Marconi is presented as a prepossessing modest personality, never losing touch with humanity and the common things of everyday life. The major premise of the book, which is fully proven, is that men of the type of Marconi and his predecessors are beacons lighting the world toward what may be brighter days and constituting constructive forces in an age too prone to the destruction of human values.

ALFRED N. GOLDSMITH

SPECIAL ARTICLES

JAPANESE B ENCEPHALITIS VIRUS: ITS DIFFERENTIATION FROM ST. LOUIS ENCEPHALITIS VIRUS AND RELATIONSHIP TO LOUPING-ILL VIRUS

WHEN St. Louis encephalitis was first recognized in 1933, it was likened both clinically and epidemiologically to summer encephalitis B of Japan.[1] Later, however, when the St. Louis virus agent was discovered and established in mice,[2] it proved to be neutralized specifically by sera of St. Louis but not Japanese convalescents.[3] Now, within the past two years, the virus agent of the Japanese disease has been established in mice[4] and found by repeated cross serological and resistance tests to be immunologically distinct from the St. Louis virus.[5, 6]

Moreover, the reactions of the two viruses in animal species prove to be readily distinguishable. The St. Louis virus is pathogenic apparently only for mice and *Macacus rhesus* monkeys. Mice injected with the virus usually show as a first sign of disease tremors and convulsions, fail to show virus regularly in the blood stream, and are resistant to intraperitoneal or subcutaneous injections of all save maximum doses. Monkeys injected intracerebrally with massive doses are relatively resistant, less than 50 per cent. showing a mild, non-fatal encephalitis. Japanese virus, on the other hand, is pathogenic for mice, *Macacus rhesus* monkeys and sheep. Mice injected with the virus generally show paralysis of extremities as a first sign of disease, carry virus in the blood stream during the early stages of infection, and are relatively susceptible to intraperitoneal or subcutaneous injections. Monkeys given an intracerebral injection of a small quantity of virus develop an acute, fatal encephalitis characterized by cerebellar incoordination and specific necrosis of the Purkinje cells. Sheep injected intracerebrally or intranasally develop an acute, fatal encephalitis but appear resistant to subcutaneous injection.

[1] J. P. Leake, *Jour. Am. Med. Assn.*, 101: 928, 1933; 103: 728, 1934.

[2] L. T. Webster and G. L. Fite, SCIENCE, 78: 463, 1933; *Jour. Exp. Med.*, 61: 103, 411. 1935.

[3] L. T. Webster and G. L. Fite, SCIENCE, 79: 254, 1934; *Jour. Exp. Med.*, 62: 827, 1935.

[4] The first reports in Japanese journals are cited in later publications by S. Kasahara *et al.*, Kitasato Arch. *Exp. Med.*, 13: 48, 248, 1936; H. Hashimoto *et al.*, *Jour. Am. Med. Assn.*, 106: 1266, 1936; T. Taniguchi *et al.*, *Jap. Jour. Exp. Med.*, 14: 185, 1936; R. Kaneko *et al.*, *Klin. Woch.*, 15: 674, 1936; R. Kawamura *et al.*, *Kitasato Arch. Exp. Med.*, 13: 281, 1936.

[5] R. Kawamura *et al.*, *Kitasato Arch. Exp. Med.*, 13: 281, 1936; *Arch. Path.*, 22: 510, 1936; M. Kudo *et al.*, *Jour. Immunol.*, 32: 129, 1937; Y. Kawakita, personal communication.

[6] Unpublished tests on six Japanese strains by the author.