consequence frequently resulting from a few careless or hasty words on the part of some fellow scientist. He has come increasingly to understand the need for the most relentless precision of expression. He has come to realize ever more keenly the enormously complicated nature of all the phenomena investigated by science. He finds it increasingly difficult to make clear to untrained men the conclusions to which his patient, lifetime work have brought him. He finds himself perplexed and annoyed by the dangerous implicit fallacies and errors in the writings of "popularizers" seeking to give the general population some understanding of the work of himself and his confrères. For progress in his own speciality, unceasing concentration upon his researches is necessary. Inevitably he loses something of the common touch, he finds himself ever less interested in the reflection of contemporary life given by magazines and newspapers, he finds himself unable to give the attention necessary to understand the reality underlying contemporary political movements and bringing into prominence conspicuous political personalities. Naturally, he is drawn to those men who are equipped to understand his work—his fellow scientists throughout the world. Every day brings him reason to doubt the capacity of the masses of the population to understand the work with which he is concerned. When, occasionally, he seeks to lend assistance to movements apparently seeking social betterment he is generally perplexed or shocked by the obstacles, intrigues, and ignorances he encounters. However strong his sense of social responsibility, he finds it difficult or impossible to make any effective contributions save in his own work. He realizes that he is performing a highly specialized social function. He comes generally to feel that those concerned with the other highly specialized social functions of government, religion, journalism, education, are performing their tasks in the same spirit in which he attempts to perform his own and that any methods by which he might effectively cooperate with them are difficult to perfect and require thought and energy which his own activities do not allow him. As an actual problem confronting every scientist this situation and this conclusion seem inescapable. Yet, the fact remains that the body of thought with which these scientists, as a world-wide group, are concerned is relatively disinterested and comprises the most enduringly precious possession of mankind, while the activities and concerns of those dealing with government, finance, commerce and all the other complicated general social activities of man are inevitably influenced by considerations arising from self-interest. They are, moreover, socially valuable only to the degree in which they are influenced by the broad social vision which can result only from the knowledge gained from these men in the vanguard, insulated from the great mass of the population and isolated from the daily concerns of men by the wall which all the considerations we have stressed have served to erect.

QUOTATIONS

THE FOOD-PRODUCING POWER OF GREAT BRITAIN

THREE years of war have seen a great increase of our food-producing power. In this time, in what is potentially from the standpoint of the scientist a magnificent agricultural country, agriculture has been more substantially improved than in any previous period, even ten times as long.

To four factors are due the progress made: the farmers and their workers, the Women's Land Army, a great increase in mechanical power on the land, and the application of scientific knowledge. And influencing the form of the progress made has been the policy of the Government, with three outstanding aspects: (1) to plough up grassland for the production of crops for man; (2) to adjust livestock numbers; and (3) to ensure better farming and more from every acre.

In all this the application of science has played an important part. For instance, a large part of the success of the ploughing up campaign may be attributed to making good deficiencies in the soil. There were large stretches of soil which, deficient in lime or phosphates, would not produce good crops or grass. Farmers, by practical experience, had discovered the cause and acquired skill in dealing with it; but science has now supplied a complete remedy. It has been widely applied by the various agents of the Ministry of Agriculture, and in consequence many thousands of acres which had a poor reputation formerly have been made to yield handsome crops. Giant machines and gelignite have helped to reclaim for cultivation swampy fen, the tree-covered tops of downs and bleak mountain sides, but the foundation on which this activity rested was knowledge of the soil and application of the necessary fertilizers.

Last year alone scientific staffs supplied by the Ministry of Agriculture were responsible for 115,000 separate analyses of soil. The wire worm—the grub stage of a little beetle—which can do enormous harm to crops, has baffled the best scientists throughout the world for years, and no remedy is yet known. However, scientists can indicate whether a given piece of land contains many or few of these pests and so advise

what should be grown there. There may be 1,500,000 wire worms to an acre, and the only way to count them is to take a sample of land here and there. Where this number exists, it means that there is one to every four square inches of land, or, put in another way, one and a half wire worms are waiting to eat every seed sown were wheat to be sown there.

Many of the problems of the Minister of Food are shared by the Minister of Agriculture, for the farmers, too, have their heavy workers (horses), their expectant and nursing mothers, and their children, not all of one breed. The two main features of the national livestock feeding plan are rationing, which is so complete that it caters for every animal on every farm and the backyard pigs and hens as well, and the growing of more food for livestock on every farm.

Last year farmers were set the target of an increase of 5 per cent. in output from every acre. If that were achieved it would save well over 1,000,000 tons of shipping. There can be little doubt that it has been achieved, according to one well qualified to judge, and the reasons are favorable weather and better farming, which, as well as better effort, meant the application of scientific principles. Prominent here have been the wide-spread introduction of ley farming and the wise use of fertilizers, including a top dressing administered at the right time.

In these war years the link between the farmer and the scientist has been greatly strengthened. In every county there is a county organizer, with a staff, who works with the war agricultural executive committee, and from whom the farmer can obtain advice on every aspect of his work. He is able to refer special difficulties to thirteen advisory centers, where highly specialized workers in the agricultural sciences are able to answer his questions. These centers must be fed from research institutes, of which there are now a great number. But the scientific knowledge available to the farmer is drawn from the whole world. There is maintained in England on behalf of the Empire a series of imperial agricultural bureaus whose work it is to abstract and present in convenient form the scientific knowledge of the entire world.—Food correspondent of *The Times,* London.

SCIENTIFIC BOOKS

ELECTRICITY AND MAGNETISM

Electricity and Magnetism. By NORMAN E. GILBERT. Revised edition. New York: The Macmillan Company. 1941. $4.50.

IN producing a revised edition of this well-known text many changes have been made. The material on power engineering, some of which seemed rather out of place in a physics text, has been abbreviated, but the sections dealing with electron tubes and their uses have been rewritten and brought up to date. Sections have been added on the theory of dielectrics, moving electrons and electron optics and on the recently proposed systems of units. The last chapter contains a good elementary introduction to the physics of the nucleus.

It should be remarked that a number of statements still occur which might be questioned by advanced students of the subject. This is doubtless not an easy fault to avoid, however, for few of us can hope to become experts in more than one or two lines. Perhaps users of text-books should form the habit of not relying too strongly upon incidental statements without checking their validity by reference to more advanced treatises.

The book constitutes, as it did in its original form, a good introduction to the entire field of electricity and its applications. It is designedly more elementary on the theoretical side than the standard text of Page and Adams, but the treatment is careful, thorough and easily understood. Ample lists of problems are included.

E. H. KENNARD

CORNELL UNIVERSITY

A BIBLIOGRAPHY OF AVIATION MEDICINE

A Bibliography of Aviation Medicine. By EBBE CURTIS HOFF and JOHN FARQUHAR FULTON. 237 pp. Charles C Thomas. $4.00.

A TIMELY and much-needed bibliography of aviation medicine has been prepared by Ebbe C. Hoff and John F. Fulton, of the Department of Physiology of the Yale School of Medicine. This work was done under the auspices of the National Research Council Committee on Aviation Medicine, acting for the Committee on Medical Research of the Office of Scientific Research and Development. It is now available for investigators in this country. The labor has been extensive, as there are over 6,000 citations from 800 journals. References are well classified according to subjects and there are many cross references, for example, 107 under "Hemoglobin."

Unusual care has been taken with make-up and typography and the George Banta Company deserves much credit for the press work. This carefully prepared, comprehensive bibliography will prove invaluable not only for investigators of aviation physiology and medicine but also for the many physiologists working in related fields.

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