trial duty or for other activities in the national interest. It would do for the nation what the National Roster of Scientific and Specialized Personnel has done for some of the professions. It would enable us to plan our educational program more intelligently, and to correct remediable health defects in those who must be the backbone of any military effort we may be called upon to make.

(4) It would provide an almost limitless source for research in genetics, longevity, disease, human behavior and a hundred other fields. From the systematic study of such data would come leads and discoveries of tremendous value to science, and, ultimately, of tremendous benefit to the individual. Such a reservoir of data would have a thousand and one uses, many of which we to-day can not even foresee.

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EDITORIAL CHANGES IN SCIENTIFIC PAPERS

DR. WILLIAM C. BOYD (SCIENCE, August 27, 1943) complains of editorial changes whereby a substantive modifying a noun (in his manuscript) becomes an adjective modifying a noun (on the printed page).

Probably the most important factor in the impairment of English speech to-day is the fallacy that parts of speech may be connected without the use of connectives. Without knowing what journals are under criticism, it may be safely conjectured that the editors have, as a safeguard, wisely established a style which will permit this malady (a noun modifying a noun) to be treated both in its early and in its acute stages, where (with apologies to Gert. Stein) a noun modifies a noun modifies a noun modifies a noun. More rigorous and more intelligent editing would have prevented the following expressions, all of which recently appeared in print: "rudder control mechanism sequence," "material control shortage group," and "instrument approach procedure summary."

The first cited instance of Dr. Boyd's displeasure is the editorial change of "horse serum" (which is ambiguous) to "equine serum" (which is unmistakably clear). "Horse serum" may mean serum *for* the horse, serum *from* the horse, or serum *of* the horse, just as the widely used expression "Consumer research" may mean research *by* the consumer, research *concerning* the consumer, or research *for* the consumer. The argument that the man who elects to read any material will understand which one is meant is not a valid one. How do we know? Surely one of the most important functions of language is to convey information to the uninformed, and the language of science should be written not only so that it can be understood, but so that it *can not be misunderstood.* In attaining this end, proper editing will continue to be of great value.

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SCIENTIFIC BOOKS

RADIO AND ELECTRONICS

Experimental Electronics. By RALPH H. MILLER, R. L. GARMAN and M. E. DROZ. New York: Prentice-Hall, 1942.

Principles of Radio. By KEITH HENNEY. 4th Edition. New York: John Wiley and Sons, 1942.

Principles of Electronics. By ROYCE G. KLOEFFLER. New York: John Wiley and Sons, 1942.

Elements of Radio. By ABRAHAM MARCUS and WILLIAM MARCUS under the editorship of RALPH E. HORTON. New York: Prentice-Hall, 1943. $4.00.

Fundamentals of Electricity. By LESTER R. WILLIARD. New York: Ginn and Company, 1943.

RADIO and electronics have permeated every branch of our war effort. The production of electronic equipment for the armed forces alone is several times the normal peace-time production. The dissemination of war information makes the maintenance of home radio receivers and the broadcast stations an industry essential to the prosecution of the war. In addition, war industries, from gasoline refineries to ordnance manufacturers, have found this new tool, electronics, so valuable in reducing man hours that the development and manufacture of such apparatus is being carried on under the highest priorities. The vacuum tube is no longer only the bulb in the parlor radio. It has gone to war. We find it by the guns and in the factory.

People from many walks of life are finding that they must learn of the electron tube and its applications. The chemical engineer finds it controlling his processes. The power plant engineer finds it increasing the efficiency of his boilers. The foreman of the manufacturing plant finds it used as a tool on his production line. The airplane manufacturer finds it molding his fuselage and wing parts. The shipbuilder finds it in his welding operations. The ordnance officer finds it throughout his equipment. The naval officer and the air force officer would be lost if it failed.

These applications of the electron tube have shown the need for personnel trained in the field of radio and electronics. The present scarcity of trained personnel is requiring the employment of many persons who are unfamiliar with even the basic principles

of electronic circuits. Many in positions of responsibility are finding that they must dig in and learn something of this field if they are to avoid being surpassed by progressive youngsters.

Training in this subject is different from mathematics or any such standard subject. Except for a negligible number of specialists, it has been omitted from the training of all who now need it, from the Ph.D.'s training as well as from the high-school course. However, the individual with a mathematical and scientific training may be expected to learn the subject in an entirely different manner from that adopted by the high-school boy. The electrical engineer would be in a different class from the naval architect. The trainee who is to become an electronic design specialist should approach the study in a different manner than the trainee who needs a brief course to learn to maintain a particular type of equipment or the trainee who needs a survey course to determine possibilities of electronics in a new field.

The books included in the above group are five of the many recent books on radio and electronics, each intended to train persons who have a particular type of background to fill some position among the varied electronic applications or to start along the road toward a thorough training in the field. Because of the varied character of the training needed, none of these books compete directly with each other. They each have their own special zone of application.

"Fundamentals of Electricity," by Williard, is written for use in training in high school. Upon finishing this course together with the courses regularly taken by the high-school student, the trainee will have a background upon which he can build a thorough training in any of the many branches of electricity. It fits nicely as the first course in electricity for the boy who will continue in one of the several vocational training courses in electricity. Its use as a basic pre-induction training for the several technician ratings in the Army is quite natural. The specialized training given to these men in the Army itself is far more satisfactory when it is preceded by a general course in the basic fundamentals of electricity.

"Elements of Radio," by Abraham Marcus and William Marcus, is written specifically for the person with an avid interest in learning about radio. In this book each section is started by posing a question such as that asked by the beginner in radio or describing a phenomenon with which the student is undoubtedly familiar. Then follows the process of leading his thoughts, bringing him up against a barrier which he can cross only by learning the fundamentals of electricity. This process may be expected to fan the waning interest of the bored student, causing him to continue with his study. The book is to be recommended to those who start studies enthusiastically but fail to continue when the study approaches drudgery.

"Principles of Radio," by Henney, is in its fourth edition in a little over a decade. That shows definitely that it has been well received. This book has been very popular as the text in vocational training in radio. It is very good in this field and is to be recommended for the radio student who has recently studied his high-school algebra and trigonometry. It is necessary for the student to have a working knowledge of algebra. With this background the student using this book gets a far more thorough understanding of radio than with either of the two preceding books. The student after completing one of the above books might well continue his studies with this as a text.

"Principles of Electronics," by Kloeffler, leaves the subject of radio to other texts, presenting the general principles and devices involving the flow of electricity through mediums other than solids. Various devices involving such flow together with circuits using these devices are discussed. The uses of electronics are covered very briefly. For instance, radio receivers and transmitters are treated in four and a half pages. The book is definitely designed for engineers. While it is written for an introductory survey course in electronics for prospective students of electrical engineering, it seems best adapted for the graduate engineer who completed his studies before electronics was introduced into the curriculum and now finds that subject necessary. It may be criticized for being too condensed even as a short survey. Where the subject must be condensed to this extent, this book fits the bill admirably.

"Experimental Electronics," by Muller, Garman and Droz, is written specifically for research workers who find electronics necessary as a laboratory tool. The book is a laboratory manual for use in an extensive laboratory course. Such a course is an ideal training for the scientific experimentalist. However, the book's usefulness is not limited to the role of accompaniment with many hours spent in the electronics laboratory. The experiments are discussed and described so adequately and the sample results are set forth so completely that experimenters experienced in reviewing reports of laboratory work hardly need to see the experiment performed in the laboratory to fully visualize the apparatus and its operation. The book may be advantageously used by such workers, even though they intend to carry out very few or even none of the experiments specified. It should be strongly recommended for the research worker who expects or hopes to use electronic devices in his laboratory.

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