in the Natural History Museum of Princeton University.

WILLIAM LEE STOKES

CLEVELAND, UTAH

THE "SCIENCE" TALENT SEARCH

THE "Science" Talent Search is in its fourth year. As a teacher of science (and a worker in plant pathology), the writer has regularly brought it to the attention of all science students, has complied with the rules of the contest and has sent the papers of the contestants to the examination committee. During these years, the writer has shared with others the feeling that this may not be a science talent search.

The implications for science teaching of this venture of Westinghouse is such that the methods which are being used, and the conclusions which are being derived, deserve the careful examination of every scientist and of every teacher of science.

Some thought has been given the matter.[1, 2, 3, 4, 5] One fact remains outstanding. The sponsors of the examination persist in calling this a "Science Talent Search" and are apparently heralding this far and wide in what appears to the writer to be a remarkable amount of advertising, in spite of the fact that no one yet knows (within the bounds of scientific method and scientific certainty) just what science talent is.

The sponsors of the examination have an excellent opportunity to gain for science a quantity of data which may determine just what makes a scientist. Assumptions have been made that if a student passes the complete examination (consisting of written examination, essay, interview and review of record) to the satisfaction of the examiners, he has science talent. As a matter of fact, by calling the contest "Science Talent Search," the sponsors seem to have accepted this assumption as a conclusion.

Is this conclusion valid?

Is it possible that students who can not succeed in the written examination and who were successful in the other parts, if given the publicity and opportunities afforded the winners, might make equally good scientists? Is it possible that students who are not among those who "pass" the written examination and who have poor "personalities" (as recorded by teachers), but who have a marked ability to work in high-school science, as shown by an actual undertaking of such work, might still become successful scientists, especially if they obtained the publicity and opportunities afforded the winner?

It is hoped that the sponsors of the Science Talent Search will not neglect the fine opportunity available to them to organize an investigation along experimental lines to determine the nature of science talent. The present Science Talent Search could well be called "Scholarships for Good Students with Present Interests in Science." It is, of course, entirely possible that all that is necessary to be a good scientist is to be a good student with an interest in science. Much would be accomplished if this could be proved scientifically.

PAUL F. BRANDWEIN

TEACHERS COLLEGE, COLUMBIA UNIVERSITY, AND FOREST HILLS HIGH SCHOOL

SCIENTIFIC BOOKS

BESSEL FUNCTIONS

A Treatise on the Theory of Bessel Functions. By G. N. WATSON. Second edition. vi + 804 pp. $7\frac{1}{2} \times 10$ inches. Cambridge University Press. New York: Macmillan. 1944. $15.

THIS excellent book was written at a time when the author was much interested in the propagation of electromagnetic waves over the surface of the earth, and consequently one of the important features of the book is that it contains material of interest to the radio engineer. Such a man is interested particularly in the asymptotic expansions of the Bessel functions, in definite integrals involving Bessel functions and in tables of Bessel functions. The subject of asymptotic expansions is treated with the thoroughness characteristic of a master in this field. It may be recalled that in 1912 Watson published in the Rendiconti di Palermo a memoir crowned by the Danish Royal Academy of Science in which among other things he gave expressions for the functions $J_n(x)$, $J_{-n}(x)$, $Y_n(x)$ and $K_n(x)$ as series of inverse factorials.

In Chapter III the Bessel functions of various types are defined for complex values of both the variable and index. The functions of an imaginary variable were required in physical investigations over a hundred years ago, the use of Bessel functions of a complex quantity is almost as old, as it began with work on the motion of a pendulum in a resisting medium. These functions were given a special notation by Lord Kelvin and were much used by electrical engineers

[1] H. A. Edgerton and S. H. Britt, *American Scientist*, 31: 255–262, 1943.

[2] Banesh Hoffman, *American Scientist*, 31: 255, 262, 1943.

[3] H. A. Edgerton and S. H. Britt, *American Scientist*, 31: 263–265, 1943.

[4] Paul F. Brandwein, *Science Education*, 28: 47–49, 1944.

[5] H. A. Edgerton, S. H. Britt and H. M. Davis, *Science Education*, 28: 229, 1944.