(5) Sources of research material (1).
(6) Readings in literature of research.
(7) Orientation in the various sciences and fields of endeavor (9).
(8) Aptitude tests and personal problems (2).
(9) Elementary principles of statistical methods (4).
(10) Semantics (4).
(11) Logic—with particular reference to fallacies (2).
(12) Presentation of research reports (1).

Obviously, such a course could not be handled by any one instructor; it should be handled by the leaders or best speakers in the various fields. One of the by-products of this would be considerable vocational orientation or guidance.

The numbers in parenthesis cover, tentatively, the number of weeks' study that I would devote to each of the various general topics.

This course is not presented as a panacea or cure-all—but it can help do some of the things that James McKeen Cattell fought for for over fifty years—and which Dr. Carlson advocates to-day—extend the use of scientific methods.

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STARRING SUBJECTS IN "AMERICAN MEN OF SCIENCE"

IN view of the long service rendered by J. McKeen Cattell to science in our country it would seem appropriate to devote considerable space to his life work in SCIENCE. I would be especially interested in a discussion of the advantages of starring men in "American Men of Science." It seems to me that it is very important for the progress of science that the achievements of those working in this field should become known more widely and more reliably than is now customary.

If the methods adopted by J. McKeen Cattell can be replaced by better ones it is highly important that this should be done. I realize that it is very difficult to find methods of procedure which will be generally acceptable, but this does not seem to be a sufficient reason for not considering the possibility of improvement. I have heard many favorable comments on the success of J. McKeen Cattell along this line, and it seems to me that we could honor him mostly by considering the possibility of improvements of his methods.

G. A. MILLER

SCIENTIFIC BOOKS

WILLARD GIBBS

Willard Gibbs. By MURIEL RUKEYSER. xi + 465 pp. New York: Doubleday, Doran and Company, Inc. $3.50.

I HAVE always found it hard to write about Willard Gibbs. Neither my brief biographical sketch in the Dictionary of American Biography nor my Gibbs Lecture before the American Mathematical Society seems to me quite satisfactory. It may be a significant fact that in the forty years since his death none of his pupils, colleagues or friends have written so extensively about him as an English science writer, J. G. Crowther, or a native poet, Miss Rukeyser, whose whole background seems very remote from that of Gibbs.

There are two excellent biographical notices of Willard Gibbs. The one first published is by H. A. Bumstead, his pupil and colleague for the last decade of his life; it prints fifteen pages at the head of the first volume of "The Scientific Papers of Willard Gibbs." The second is by C. S. Hastings, who was his pupil during the first year of tenure of his professorship of mathematical physics, and who, except for a brief period of service away from Yale, was his colleague until the time of his death; it fills about twenty pages of volume 6 of the "Biographical Memoirs" of the National Academy of Sciences. These two notices represent Gibbs as I knew him better than I can; they deserve the most careful study by all who would know him as he appeared to his contemporaries, old or young.

The sixty-five pages Crowther devotes to Gibbs leave me rather cold. They constitute an interpretation rather than a biography, and much of the interpretation seems very dubious. The start is from: "The problem of Gibbs is the discovery of the explanations of his simultaneous greatness and obscurity, the nature of his own work, the influence of his personal psychology and social environment, and the social history of the United States."

One who sets himself such a task can hardly do otherwise than mold objective facts to his subjective philosophies. So far as I can see, Gibbs never suffered obscurity in matters that really counted—professor at 32, subject of Maxwell's praise at 35, elected to the National Academy at 40, called to Johns Hopkins a year later, recipient of the Rumford Medal within another year, he seems not at all to have suffered the fate of Gregor Mendel or Hermann Grassmann.

Later Crowther writes: "Is it possible that Maxwell's intelligibility was a reward for social conscience, and that Gibbs's unintelligibility was a penalty for the belief that he had no duty to ensure that his discoveries were understood and used?"

As to intelligibility or unintelligibility let me say that in the days when I was teaching Maxwell's electromagnetic theory and Gibb's thermodynamics I cer-