field of science. For obvious reasons, prediction to be orthodox must come from competent, not to say prominent, men of science. The prediction described below appears somewhat difficult to classify as either artistic or orthodox, but seems worthy of record.

During the winter of 1878–9 a rough Pennsylvania mountain school teacher, aged about fifty, ventured to express his belief in the coming of wireless telegraphy. For this he was mercilessly rebuked by one of the most distinguished physicists of America, then a man in his late thirties. This incident, described below in the words of an eye-witness, is all the more interesting because the physicist was a man of lively mind and intense natural curiosity. The eye-witness is an early graduate of Mount Holyoke.

It was the winter of 1878–9. The Teachers' Institute of Fayette County, Pennsylvania, was meeting at Uniontown in the courthouse.

Public-school teachers from all over the county—big towns, small towns, rich farming sections and mountain districts—were present.

This week's break in the routine teaching—the week between Christmas and New Year's—was an unusual opportunity for these teachers. There were sure to be on the program a few real celebrities—scientific, literary, musical and what-not.

In this particular year, Dr. ———— was the great light.

One of his talks was on telegraphy—the Atlantic cable and the marvelous achievements of Morse and Fields. At the close, opportunity was given for questions.

In the far corner of the court-room there arose a red-headed, rather unkempt individual whom we recognized as a teacher of one of the mountain districts—a man of at least forty.

This was his question: "Professor, don't you think that the time is coming when messages will be sent without connecting horizontal wires? Perhaps with only upright wires at each station?"

The learned professor turned upon the mountaineer all the force of his polished sarcasm. It seemed to us who were breathless listeners that the mountaineer must be properly punished for even thinking such a preposterous and unscientific possibility.

When Dr. ———— had finished, the man who had remained standing throughout his tirade quietly remarked, "That's all right, Professor, but there are some folks in this room who will live to see just the thing that you say can't happen."

P. B. S.

SCIENTIFIC BOOKS

Conditioned Reflexes. An Investigation of the Physiological Activity of the Cerebral Cortex. By I. P. PAVLOV, director of physiological laboratories in the Russian Academy of Sciences and the Institute of Experimental Medicine. Translated and edited by G. V. ANREP, MD., D.Sc., lecturer in physiology in the University of Cambridge. Cloth. Price, $9.00. 430 pp. 18 illustrations. New York: Oxford University Press, 1927.

Lectures on Conditioned Reflexes. 35 Years of Objective Study of the Higher Nervous Activity (Behavior) of Animals. By IVAN PETROVITCH PAVLOV, M.D., director of the physiological laboratories, Institute of Experimental Medicine and Academy of Sciences; formerly professor of physiology, Military Medical Academy Leningrad. Translated from the Russian by W. HORSLEY GANTT, M.D., B.Sc., with the collaboration of G. VOLBORTH, M.D. 414 pp. Bibliography and index. Price, $6.50. International Publishers, New York. 1928.

WITHIN the short period of one year there has been rendered available for English-speaking people the monumental work of Pavlov and his pupils on conditioned reflexes. The Anrep translation comprises essentially a stenographic account of a series of lectures given by Pavlov at the Military Medical Academy of Petrograd. The Gantt translation consists essentially of a series of papers and addresses delivered by Pavlov before various medical and scientific organizations in different parts of the world during the last twenty-five years. The first book is a more systematic development of the experiments and interpretations of conditioned reflexes. The second book, although bearing the same title, is essentially a source book of experimental data in that here Pavlov gives somewhat more in detail the methods and results in the various experimental attacks.

Pavlov is universally recognized as the pathfinder in the field of nervous physiology and animal behavior now grouped under the term "conditioned reflexes." Conditioned reflexes are those reactions or behavior mechanisms developed after birth as a result of individual experience and learning or as a result of particular developmental stages of the individual as distinct from the simpler and less variable reflexes laid down in the structural relations of the individual and already perfected at birth. The problem of analysis and development of conditioned reflexes is therefore one of highest interest biologically, and of the highest practical importance in education and in the problems of social control. In Gantt's translation there is an interesting chapter dealing with the life of Professor Pavlov himself. This biographical sketch and the prefaces occupy the first forty-six pages of the book. The bibliography at the end of both translations contains citations of all publications on the subject of conditioned reflexes from Pavlov's own laboratory in Petrograd. It is interesting to note that practically all these publications appear un-

der the name of Pavlov's students; only occasionally does Pavlov's own name appear on a title.

The reader who is familiar with Pavlov's earlier researches on the digestive glands, for which he received the first Nobel prize awarded in the medical sciences, will be impressed with the continued high quality of mental activity disclosed in the present volume by the eighty-year-old investigator. The reader will also be impressed with the fact that Pavlov has become more speculative with advancing years. While Pavlov, on almost every page, emphasizes the necessity and importance of strict objectiveness in science, he almost as frequently disregards it, especially in the interpretations of sleep, and inhibitions and in the extension of data from dog to man. It is to be remembered that nearly all the objective experiments on conditioned reflexes reported from Pavlov's school have been done on the dog and mainly in connection with the feeding behavior. The philosophical aura permeating the present volumes adds more interest in the work on the part of the general reader than it contributes to the progress of science. As an instance in point might be mentioned the two short chapters in Gantt's translation headed: "Reflexes of Purpose," and "The Reflexes of Freedom." In the chapter on "Reflexes of Purpose" occurs the following paragraph:

> When the negative features of the Russian character—laziness, lack of enterprise, and even slovenly relations to every vital work—provoke melancholy moods, I say to myself, No, these are not real qualities, they are only the veneering, the damning inheritance of slavery. It made a parasite of the master, freeing him, through the unpaid work of others, from the practice of natural and normal striving to obtain his daily bread for himself and family, from the necessity of making his way in life; and it left the reflex of purpose without exercise in the fundamental habits of living.

Under the heading of "The Reflexes of Freedom" after a brief description of a kind of behavior of only one dog out of many hundreds of dogs investigated, Pavlov ends with the following story from fiction:

> In Kuprin's story, "River of Life," there is described the suicide of a student who was tormented by his conscience after having betrayed his companions to the police. From a letter of the suicide it was evident that he was made a victim of the reflex of slavery inherited from his mother, who was a *prijivalka*.[1] If he had had an insight into his condition, he would first have understood his limitation, and secondly he might by systematic measures have developed control and successful suppression of this reflex.
>
> [1] A parasitic servant of the nobility.

Gantt's translation contains some needless repetitions and, occasionally, interpretations that are abandoned in subsequent addresses. Neither volume contains any references to or accounts of investigations in the same field in laboratories other than Pavlov's. These investigations have frequently confirmed, but sometimes disagreed with Pavlov's actual findings or interpretations. It would have been interesting and valuable to have had the aged investigator's review of and reaction to the entire aspect of conditioned reflexes up to the year 1928. But we must be grateful to have at least the main body of contributions from Pavlov's own laboratory accessible in English. These volumes are of compelling interest to every educated man and woman. They are opening preludes in a problem as baffling as it is important. Pavlov himself would be the last man to describe them as a scientific finale. But we do actually seem to be making progress in the analysis of behavior on the basis of chain reflexes, conditioned by experience, memory and hormones. The reader will forget the minor defects in the books in contemplating, as Professor Cannon says, "the splendid example of industry and devotion to science which the first explorer in the field of conditioned reflexes has given during his long life." It is the unanimous hope of American physiologists that nothing may prevent Professor Pavlov's stimulating presence at the International Physiological Congress in Boston in August this year.

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The Story of the Moon. By GARRETT P. SERVISS. Appleton and Co. xii + 248 pp. 1928.

THIS is a book for the amateur astronomer and for the general reader, written in a simple manner and scientifically sound. It is divided into five main parts. The introduction contains a non-technical explanation of fundamental facts about the moon. Among these are described the origin and the orbit of the moon, its effect on terrestrial tides and the causes of lunar and solar eclipses.

The next three sections are devoted to a very thorough topographic study of the moon, which is made more intelligible by a series of fine photographs, obtained in 1903 and 1904 by Professor G. W. Ritchey and Mr. James Wallace at the Yerkes Observatory. The age of the moon, as pictured in these photographs, varies from 3.85 to 26.89 days, and all the points of interest are mentioned in the descriptions. Each important object is usually mentioned several times in connection with each photograph upon which it appears, under the changing conditions