On an objective consideration of the development of our knowledge concerning the existence of vitamines we must, in my opinion, come to the conclusion that it is impossible to speak here of a discovery made by one person and of no use to quarrel about who was the discoverer, but that we can only think here of a conviction, growing in the course of years, that there are indispensable, though still unknown elements in food—a conviction which has led to a more and more searching investigation.

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A LOGIC POEM

WHAT is logic? Are not the following examples cases of logic? The first is a poem developed out of a well-known Irish distich. (1) It goes thus:

Unless the kettle boiling be
They labor in vain who make the tea;
Unless the tea be properly made
My guest will not like it, I am afraid;
Unless my guest contented be
She 'll never again come visiting me.

Consequently:

Unless the kettle boiling be
She 'll never again come visiting me.

(2) Are the two following sentences logically equivalent or are they not? "Not unless it rains do I take an umbrella," "Not unless I do not take an umbrella does it not rain."

(3) A child of four, sitting at the dinner table, was making the interesting experiment of eating her soup with a fork. Her mother said to her: "Nobody eats soup with a fork, Emily," and Emily replied, "*But* I do, and I am somebody."

This last is an antilogism—a form of reasoning which it has been proposed to substitute for the syllogism. It is the argument of rebuttal, the conversational argument, and it doubtless arose earlier, in the development of the human race, than the argument of drawing conclusions. It is certainly fully as easy, as is proved (if proof were necessary) by its having been used, in exactly this form, by a very young child. Here is another example of it, expressed in terms of the logician's favorite *s*, *m* and *p*:

"If no priests are martyrs and there are no saints who are non-martyrs, then it-is-impossible-that any saints should be priests." Here it will be noticed that the common term of the first two premises is martyrs and non-martyrs, *i.e.*, a positive and a negative term. Common logic, however, insists upon it that the term common to two premises must be absolutely and exactly the same; nevertheless, this argument would appear, to the untrained logician, to have a certain degree of validity; what is the trouble? Senator N. said: "*It-cannot-be-that* any of these measures are idiotic, *for* they are all necessary, and nothing that is necessary is idiotic." This is not common logic. What, then, is it? What *is* logic?

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QUOTATIONS

A BERTHELOT MEMORIAL

IT is not as a man of a particular nationality that a monument to Berthelot, one of the pioneers of synthetic chemistry, is proposed. France has reason to be proud that she gave birthplace and domicile to this great chemist, "the undisputed head of French chemistry and perhaps the most versatile of modern chemists" (as one of our foremost chemists wrote a few years ago), as well as to Pasteur, the pioneer in another field of science; Mme. Curie in still another, Henri Poincaré, "the greatest mathematician of his age," and Henri Bergson, who has illustrated in his own achievement the claim he has made for France in the field of philosophy that she has been "the great initiator"—not to go back into certain other periods when the scepter of science was undisputedly held in her hands.

It is characteristic of the French that they hold their supreme men of science and the arts and letters in highest popular esteem. There is scarcely a town in France that does not have a street or a square bearing the name of Pasteur, while no great scientist, man of letters, artist, musician, is without his monument. When Goethe was in Paris a century ago (1827) he wrote of the sympathetic atmosphere of the place:

> Only imagine a city like Paris where the cleverest heads of a great kingdom are grouped together in one spot and in daily intercourse incite and stimulate each other by mutual emulation, where all that is of most value in the kingdom of nature and art from every part of the world is daily open to inspection, and all this in a city where every bridge and square is associated with some great event of the past and where every street corner has a page of history to unfold.

The thing celebrated is not always nor even usually military achievement but intellectual power. Goethe said that such intellectual power could never be met with a second time on any single spot in the whole world. It was entirely in character that the people of Paris, when the days were almost if not quite the blackest in the war, when the city was within reach of the guns of the enemy and when there were night

combats in the skies, should have gathered in the great amphitheater of the Sorbonne, thousands of them, in the presence of the President of France and the Minister of War, not to speak of the war or to stir new zeal, but to pay homage to a great scientist and teacher, M. Berthelot. To him it is now proposed to erect an international memorial. He was foremost in giving effect to the conception that chemistry can become creative in the organic field as well as in the inorganic, and so passed from the purely analytic to the synthetic.

While Berthelot does not stand alone as did Pasteur, he was of the small group in the van, and his brilliant service to his science deserves to be remembered not by France alone but throughout the world that has been benefited by his researches. It is suggestive of his service that his influence has been extended through the researches of his pupils, among whom was M. Sabatier, a recipient of the Nobel prize, whose discoveries in pure science have found such important practical application that an American manufacturer has asked the privilege of making, through the American Chemical Society, a material recognition of one of them. It is significant, too, that the proposed memorial building which is to be a center of continued research in organic chemistry is to stand by the side of Napoleon's tomb. So are peace's renowned victories to be celebrated no less than those of war.—*The London Times.*

SCIENTIFIC BOOKS

The Physiology of Plants: The Principles of Food Production. By GEORGE JAMES PEIRCE. x + 363 pp. New York, Henry Holt and Co. 1926.

PROFESSOR PEIRCE'S new book will be welcomed by both teachers and students. It represents many improvements on the author's earlier treatise. I like its literary style and the general background of broad and liberal philosophy that shows through on every page. It presents in a very readable form an account of the subject as it appears to the author, after his many years of successful teaching and research. It is characteristically a personal account rather than an attempt to present the science in an impersonal way. "Some of the departures from the usual are by way of suggestion for the future of the science, some for the convenience of the reader," is the second sentence of the preface. A few lines below, we read, "Whatever my own opinions about disputed matters may be, I have wished to express them, not as dogma, but as hypothesis or opinion, hoping and desiring always to say what will stimulate rather than satisfy." It is indeed a book of personal notes and suggestions, which will surely be stimulating and pleasant to read, though just as surely not wholly satisfying to either teacher or student.

Some of the very features that make this volume pleasantly readable and stimulating, or even exciting in places, due to the geniality and broad facility and originality of the author, may tend to detract from the usableness of the presentation for elementary classes, but the book is intended for more advanced students. It seems desirable that beginners should first study a clearly impersonal presentation of the current, or at present orthodox, theories and modes of expression before being led far into the confessedly mischancy although stimulating realm of theoretical and philosophical criticism. The present volume includes many critical discussions of pieces of research that are not adequately described, but references to the literature are generally given, and it is intended that the reader will be familiar with the papers referred to before trying to understand the criticisms.

Fundamental physical and chemical phenomena are in many instances too briefly treated, perhaps because the reader is supposed to be already familiar with them. For one example, air is said (page 25) *to dissolve water vapor,* and the subsequent presentation of relative humidity is incomplete, with no mention of vapor-tension deficit and the allied important relations. The student who leans upon the solvent theory in studying the vaporization of water into a supernatant gas will surely find himself in intellectual quicksands if he tries to travel far.

Professor Peirce's treatment of the ascent of water in plants is extensive and should arouse critical interest, but I am sure the presentation of the Askenasy-Dixon hypothesis is far too brief and incomplete; for the existence in plants of liquid water in a state of tension, together with the logical deductions that derive therefrom, are most fundamental to many considerations in plant physiology, and it is unfortunate that so many teachers of the subject appear to avoid venturing with their students into the analysis of these fundamental phenomena. Indeed, some specialists in physics and engineering fail to grasp the full meaning of stretched liquid water, and a few seem inclined even to deny the possibility of any such phenomenon. Texts should emphasize the inevitable importance of such things, the clear presentation of which might offer opportunities for inculcating and encouraging as much of rigid logic and the principles of controlled experimentation as is possible in a science like physiology, still so hazy with opinions and superficially reasoned hypotheses.

This book is unusually praiseworthy in that energy transformations and relations are generally considered along with material relations. The living plant is a machine that receives material and energy from