

leaves the ground in May, . . . and the frost does not appear in the fall until about September 20." Mr. F. S. Lawrence's experiences with wheat in the Peace River country (latitude $58\frac{1}{2}^{\circ}$ N.) provide valuable information (pp. 101-105). Spring wheat has fully matured here in eighty-six days. The word "muskeg" is used freely by witnesses, and is not very lucidly explained on p. 123; it appears to be a poor wet kind of soil, which may be as much as 6 feet in depth, and is generally to be avoided.

The simple and unvarnished statements of the various witnesses furnish a manly contrast with the prospectuses of company-promoters, and from them we gather that timber and minerals will probably form the main attraction for new settlers. The evidence of Mr. A. von Hamerstein (pp. 36-43) is full of delightful touches. Like Mr. Lawrence, he speaks highly of the Peace River valley, but remarks sadly of the climate of the Athabaska district:—"They say it may change, but up to this time it has not changed." He mentions places where small areas of good soil occur, but says that at Fort Chipewyan "a little garden stuff is raised, on soil brought there by the Sisters in pails." His account of the moral defects of the wolverine, among which is an objection to taking poison, should delight the naturalist. This animal has hung behind in the march of evolution, for "the horse and other animals have developed, but the wolverine has kept his original shape."

We close the book with renewed admiration for those who are engaged in making Canada. There is to be no "boom"; no hardships are to be concealed; the settler is invited to follow the trapper and the Indian, and to see if he can make more out of this enormous tract than they have done. In latitudes below those of Stockholm and the Orkneys, or even as far south as Belfast or Newcastle-upon-Tyne, he is called on to meet the rigours of a continental winter. But he is encouraged by diagrams showing the length of summer days and the shortness of summer nights, themselves as starless as the days; and the cover that encloses so much plain speaking is labelled "Canada's Fertile Northland." Success should surely come to those who have this high faith, and tell no untruths while spreading it.

G. A. J. COLE.

OUR BOOK SHELF.

The Functional Inertia of Living Matter. A Contribution to the Physiological Theory of Life. By Dr. D. F. Harris. Pp. xi+136. (London: J. and A. Churchill, 1908.) Price 5s. net.

THE book before us deals, mainly from the physiologico-philosophical standpoint, with a property of living matter which has excited the interest of biologists, and which, indeed, has been the field, not only of much speculation, but also of much experiment. The fact that certain forms of living matter, whether they are integral parts of a highly-developed and differentiated organism, or whether they consist of more or less apparently undifferentiated protoplasm, either do not respond at all or respond only after varying intervals of time to certain stimuli has long been

known, and the condition of the protoplasm in question during this time has long been investigated by biologists. We use the term *apparently* undifferentiated advisedly, since, as has been often pointed out, it is sometimes a matter of extreme difficulty to know whether, when dealing with the infinitely simple, we are not really dealing with the infinitely complex.

Dr. Harris's brochure is an elaborate, for the most part literary, examination of this subject, and quite apart from the conclusions he draws from his investigations is of considerable interest, and will well repay the reading. In a short review of this nature it would be quite impossible to consider in even approximate detail the facts related in the book, the observations upon which they rest, or the interpretations to which they are open. The property of living matter upon which the non-response to stimuli or the so-called latent period preceding response depends is termed by the author functional inertia. He at first introduces this term, so well known and accurately applied by physicists, somewhat apologetically, as perhaps complicating physiological nomenclature; in reviewing the literature of the subject, however, he finds many precedents for the use of the term inertia as describing the resistance offered by living matter to any change in its condition. Perhaps to others, as was actually the case to the reviewer, the first cause to occur to one's mind, of failure on the part of living matter to react to stimuli, is fatigue. Dr. Harris discusses fatigue and its bearing upon functional inertia.

In a short summary the author postulates that functional inertia is as fundamental, primary, and primitive a property of protoplasm as its opposite, irritability, and that the phenomena of vitality cannot be adequately conceived in one of these properties exclusively.

We would conclude our remarks upon Dr. Harris's work by simply saying that it is interesting and suggestive, and well worthy of careful perusal, not only by those interested in the many observations relating to the phenomena of the latent period accompanying the stimulation of living matter, but also by those interested in the larger if less accurately conditioned field of biophysical philosophy.

F. W. T.

The Elementary Theory of the Symmetrical Optical Instrument. By J. G. Leathem. Cambridge Tracts in Mathematics and Mathematical Physics, No. 8. Pp. vi+74. (Cambridge: University Press, 1908.) Price 2s. 6d. net.

MAKING a Cambridge tract is a feat, performed in this instance with a finish of which the writer may well be immensely proud. The Gauss theory of refraction through a series of media bounded by spherical surfaces having the same optic axis admits of being handled with that deftness which is the most marked characteristic of the Cambridge mathematician, and which is here admirably exemplified. All the essentials of the Gauss theory are condensed into some fifty octavo pages, and so clearly set out that the average mathematical student should have no difficulty in absorbing the whole in a few hours, to forget it, not impossibly, with equal readiness.

For, in spite of some reference to concrete instruments and some remarks on certain facts of observation not generally recognised, the book remains—unavoidably, perhaps, in view of its aim and its limited space—essentially academic. It will be grateful to the student, and appreciated by the mathematician already familiar with the matter it presents, but we fear there are few designers of symmetrical optical instruments, in this country at least, to whom it will appear attractive—in spite of the avoidance of the now familiar continued fraction. In its very