port band" may be an exact transliteration of the German original, but an English engineer would employ the usual phrase "conveyor-belt," in the same way that he would speak of the "flue" of a stove, and not, as the translator has done, of a "smoke-pipe." Unless the reader of this unsatisfactory translation himself knows German, he would be hard put to it to discover that what the translator calls the hard cast-iron "covers" of crushing rolls are really chilled iron roll-shells. No good purpose can be served by further extending this list of blunders; enough has been said to show that the reader must be on his guard throughout the book, and will have to use his ingenuity in order to arrive at the author's real meaning in many unintelligible passages.

Messrs. Griffin and Co. have earned for themselves a high reputation for their splendid series of technological publications, which have been productive of the utmost benefit to our industries, and it is a matter for grave regret that the present volume should fall so far below the high standard of excellence of these works. It is sincerely to be hoped that if a translation of the second volume of Prof. Franke's book is in hand, they will take care to have the proofs revised by someone capable of doing justice to the original.

H. L.

PROBLEMS OF BEHAVIOUR.

(1) *What is Instinct? Some Thoughts on Telepathy and Subconsciousness in Animals.* By C. Bingham Newland. Pp. xv+217. (London: John Murray, 1916.) Price 6*s*. net.

(2) *Studies in Animal Behavior.* By Dr. S. J. Holmes. Pp. 266. (Boston: Richard G. Badger, 1916.) Price 2.50 dollars.

THESE two books deal with the same subject—animal behaviour; but they could scarcely be more sharply contrasted, for the one is scientific and the other is not.

(1) Mr. Newland, as sportsman and field naturalist, has many interesting facts to submit and personal observations to relate, which is all to the good; but he has ventured on a line of interpretation where verification is impossible. His study of adaptive behaviour has led him to the conclusion that "the marvellous precision and fitness of these actions can only be attributed to Omniscience manifesting in the creature." In spite of the abundant illustrations of "trial and error" procedure to be found among animals, he tells us that "the creatures involved make no tentative experiments, but the perception of how and when to act comes to them subconsciously." But it is not exactly their own subconscious mind that operates; it is a "subconscious principle directly transmitted from the 'mainspring'—All-Mind." The life-principle (soul) of the insect or other member of the animal world is a centre of subconsciousness, temporarily set apart, but ever "in touch" with the All-Conscious. Hence their infallibility! Mr. Newland is altogether too metaphysical.

(2) We breathe a different atmosphere in Dr. Holmes's careful study, which adheres to scientific methods and verifiable formulæ. The book begins with an historical sketch which shows how the pendulum has swung many times between the extremes of generosity and parsimony, reading the man into the beast and reducing the animal to an automatic machine. The second chapter pictures the stages in the evolution of parental care, which is regarded as an extension of reproductive processes and as the foundation of social instincts. It is long, however, before it becomes necessary to insist on the psychical aspect of behaviour, which, objectively considered, cannot but be described as very efficient parental care.

The next three chapters deal with tropisms, which are prominent among lower organisms, and enter as components into the more complex activities of higher animals. While there are many orientations that may be described as tropisms and regarded as inevitable reflex effects, there are in other cases sundry complications which suggest more than the involuntary reaction of a "reflex machine." There is apparent selection of random movements, and there are modifications of routine which are consequent on experience. An account is given of the widespread phenomenon of the reversal of tropisms, and the variety of causes by which it is induced.

In regard to "learning" Dr. Holmes writes: "Given the power of forming associations between responses, the animal acquires new habits of action by repeating those responses which arouse instinctive acts of a congruous kind, and by discontinuing those responses which arouse instinctive acts of an incongruous kind." "The new things an animal learns to do are done because they have been assimilated to its instinctive activities." "The securing of any advantage through the method of trial and error presupposes congenital modes of response which are adapted to secure the welfare of the individual." Blundering into success would be of no service unless the organism were capable of turning to advantage its fortunate trial movement. "In order to do this the organism must be provided for the situation by its inherited endowment." "It is inheritance that affords the means by which inheritance is improved." We cannot do more than refer to the author's suggestive discussion of the way in which behaviour may help to mould form, of the analogy between behaviour and development, of the twofold origin of "feigning death," of the diverse modes of sex-recognition, and of the *rôle* of sex in the evolution of mind. The last chapter gives a charming account of a study of a bonnet monkey's mind.

The whole book is vividly interesting, and while the author flies a number of kites, he is careful to distinguish between fact and theory. He shows true scientific caution in stating his own views, and fair-mindedness in his criticism of those which he rejects. A distinctive feature of his method is the combination of analytic and genetic inquiry.

J. A. T.