subject would then locate the spot where pain was felt in himself, and was correct even to a very narrow and definite limit. It seemed a wild guess to suppose that he formed his judgments from the small portions of the movements of the arms only of the third person, which were visible to him; and yet further experiment showed, that, if a screen were placed so that he could not see any of the movements of this third person, his ability to locate entirely disappeared. Experiments somewhat similar showed that the patient could tell what word the operator was writing, simply by the general movements of the arms of the latter.

Burgson himself calls attention to these experiments more as evidences of what he terms unconscious deception on the part of the hypnotized subject, than for other reasons. He calls attention, however, to the necessity of repeating those experiments of the English members of the Society of psychical research which seemed to point to mind-reading pure and simple. The average literary man who handles these latter facts does not seem to be aware of the great objection which holds against them scientifically. Absolutely the only way hitherto known of mental communication is the expression of an idea through physical media, and the retranslation of this back into a mental state. Mind-reading pure and simple does away with the intervening physical medium of expression. It is a fact of a different order from any now known. If it can be shown that what really takes place in these cases is cornea reading, or some similar occurrence, the facts are reduced to those of the same order as ordinary mind-reading or muscle-reading, and they admit of a scientific explanation.

But these experiments also afford, as it seems to me, the most conclusive evidence yet offered of the law laid down by Helmholtz, that the existence of a sensation is always neglected in behalf of the meaning conveyed by it. Here the minute image on the cornea is perceived, not as what it is, but as a series of two or three figures which are definitely and correctly located in their proper spatial position. There is in these experiments no question of conscious deceit. The subject does not secretly and consciously perceive the image on the cornea, and then pass off the knowledge thus gained as if he had actually seen the figures. He himself is a victim of the deception. He thinks he sees them on the book. His sensations, in short, are mere signs or symbols, to which in themselves he pays no attention. He observes only the objective bearing, the information conveyed. The proof of the theory did not require such a crucial experiment as this, perhaps, and yet it is as striking an evidence as could be desired. But it also shows that the interpretation of the sensation is governed by the conceptions already in consciousness, and this affords a valuable contribution to the growing theory of apperception. There is an increasing tendency among psychologists to regard all perceptions as judgments passed upon sensations by means of the conceptions present in the mind at the time of their occurrence. The sensation is interpreted into harmony with these dominant conceptions; so that we see not merely what is really there to see, but what the mind is adjusted to see, what it can read in out of itself. All hypnotism is one page of evidence to the influence of dominant conceptions, but the present instance is typical of the extent to which it may be carried. It is to be hoped that some one will carry the experiments further, and particularly see how far unsuspected cornea and muscle reading has entered into the as yet unexplained cases of mind-reading, so called. J. D.

VOLUNTARY AMPUTATION AMONG CRAYFISH.

IN referring to limb-shedding as a voluntary act among certain crustaceans, Professor Huxley tells us in his 'Crayfish' that "this voluntary amputation is always effected at the same place; namely, where the limb is slenderest, just beyond the articulation which unites the basal joint with the next. The other limbs also readily part at the joints; and it is very common to meet with crayfish which have undergone such mutilation." Quite recently (Sept. 4) M. H. de Varigny, in a very instructive paper which he has published in the *Revue scientifique*, entitled "L'amputation réflexe des pattes chez les crustacés," presents us with the results of a long series of experiments of his, undertaken with the view of throwing additional light upon this subject. M. Varigny studied the phenomenon in quite a variety of species and in several hundred individuals. He claims that in every instance the amputation is voluntary, and is truly an amputation, and not a disarticulation due to the feebleness of the interarticular membrane of the joint. Much less is the throwing-off of the limb ever due to a fracture.

Then referring to the previous researches of M. Frédéricq, M. Varigny further claims that this act on the part of the crustacean will not only follow a direct blow, but may often be induced through either scratching or bruising the claw, or simply rubbing it, or through the action of the electric current. Moreover, it is found that the amputation is reflex, and depends upon the action of the central nervous system, for when the latter

is injured, or the animal brought under the influence of an anaesthetic, it cannot be performed; that when the amputation is voluntary, the crab loses but little blood, which is not the case when the limb is removed by the experimenter, thus going to show that the act is purely a protective one, often saving the life of the animal with the minimum amount of injury.

The power to perform the act with promptness varies with the different species, and in any of them, when the animal is fatigued, it is not apt to resort to it. In experimenting with vigorous specimens of Carcinus maenas, it was observed that when the ten limbs were successively struck, allowing sufficient time for each one to detach itself before the next leg was struck, a far greater number were thrown off than when they were all struck together, or in very rapid succession.

Then, in one hundred and ten specimens of the same species, it was found that a second blow upon the undetached claws would cause them, in nearly all cases, to come away likewise, especially after the animal had somewhat recovered from the shock caused by the loss of its other limbs. And when the same experiments are undertaken in the case of only five of the limbs, the number that come away was proportionately much greater. Further, it was noted that the animal was more successful in getting rid of its great claws, or pincers, than it was with the ambulatory limbs.

To sum up, then, M. Varigny believes this reflex function of defence, as performed among crustaceans, consists in a voluntary amputation, indifferently executed among those species wherein the musculature of the limbs is but feebly developed, and among individuals exhausted by severe pain, as in such cases where all the limbs have been simultaneously removed.

As the hemorrhage is so much less as resulting from the voluntary amputation, when compared with what takes place after the removal of the limb by artificial means, it will not be questioned but that this power as possessed by these animals is one of service to them.

Further investigations in this direction will be not only interesting, but valuable.

ELLIOTT'S ALASKA AND THE SEAL ISLANDS.

THIS handsomely illustrated and printed volume is evidently intended for a popular audience. Little of its contents is new. That which is original with the author, and due to his personal observation, is in great part a re-arrangement and amplification of matter printed by him two or three times previously, especially in the octavo report on the 'Condition of affairs in Alaska,' issued by the government in 1875, and in the quarto document of the census series of 1880, relating to the fur-seal fisheries and kindred topics, published in 1882, from which part of the illustrations of the present volume have been adapted or reduced. This, however, will not diminish the interest or value of the work for those who are not in the habit of consulting government documents, or who read merely for general information. The part of the work which is a re-arrangement of matter original with others is naturally less satisfactory than that on the Aleutian and Seal islands, where the author is at home in the scenes he, for the most part, very fairly and accurately describes. Many of the illustrations are faithful and good, especially those due to pen-and-ink sketches. From these, however, the human figure-pieces must be excepted: the faces in particular partake somewhat of caricature, are generally out of drawing, and have absolutely no anthropological value. The landscapes, excepting a few representing mountains, are generally very good. In the copy before us, Mount Shishaldin has disappeared from the plate which claims to give a glimpse of it (p. 146); Mount Iliamna is represented with a slope near the peak (p. 87) of about twenty-three degrees from the vertical; and Verstovia (p. 32) has hardly more than forty-five.

The book is to some extent a misnomer, the most interesting and available part of Alaska lying between latitudes 50° and 60° north, as does the greater part of the British Islands, which no one would think of calling arctic. The nomenclature and transliteration of Russian words are very irregular and often inaccurate, in no respect conforming to the systems generally adopted. Apart from the biology of the fur-seals and birds of the Seal Islands, the natural history of the book is very shaky, and the anthropology almost a minus quantity. But it is hardly worth while to lay much stress on its deficiencies from a scientific stand-point, since it is hardly likely to be consulted for precise data of that sort. Its historical errors are less numerous but more important. To give a single instance, the author repeats the error of Petroff in Bancroft's 'Alaska,' by stating that in 1868 Messrs. Hutchinson and Morgan passed the season in exclusive control of the sealing on St. George and St. Paul islands. As a matter of fact, there were five or more competing companies. There is an insufficient index; and the map, though well drawn and printed, in spite of the date, 1886, which it bears, is destitute of all the more important geographical discoveries of the last few years.

Our arctic province Alaska and the Seal Islands. By HENRY W. ELLIOTT. New York, *Scribner*, 1886. 8°.