

hol, in a 33½ per cent. solution of acetic acid and in a 20 per cent. sulphuric acid solution.

Concerning Professor Barker's suggestion in regard to the uncertainty as to the previous natural infection of the rabbit used, it should be noted that in the article in the *Journal of Parasitology* I stated that it could not be positively demonstrated that the rabbit was uninfested at the time it was fed. Attention, however, was called to the fact that spontaneous infestation among rabbits from the same source was unknown, and it was considered that this was very strong evidence for assuming that the cysticeri found in the rabbit resulted from the feeding experiment. How strong this presumptive evidence was will be seen from the following:

The records of the Bureau of Animal Industry Experiment station at Bethesda, Md., show that about 5,000 rabbits have been reared and used for laboratory purposes. By inquiry among the members of the bureau laboratories where these rabbits have been used, it was learned that cysticeri have never been observed in any case except as the result of experiments in which tapeworm eggs were fed to the animals. As all these rabbits are reared under practically identical conditions and the greater number of them during and subsequent to the experiments in which they are used, are kept until death under essentially the same conditions as my experiment rabbit, it would seem that the feeding experiment with proglottids of a triradiate *T. pisiformis* was very well safeguarded by checks, and that the results though (as was noted) not conclusive, justified the statements which I made to the effect that the feeding experiment in question tended to show that normal larvæ may result from the eggs of triradiate adults, and on the other hand that it failed to demonstrate the development of abnormal larvæ from polyradiate adults. In other words, recognizing the inadequacy of a single feeding experiment, I did not draw any definite conclusions from the results. I accepted these results merely as indicating certain probabilities and placed them on record so that they would be available for reference to others who might have opportu-

nity to undertake feeding experiments with the eggs of polyradiate cestodes.

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QUOTATIONS

SCIENCE AND COMMERCE

In commenting on the report of the National Physical Laboratory for 1915-16, *Nature* recalls the serious anxiety caused to those responsible for the supply of optical munitions by the shortage of suitable glass at the beginning of the war, for the industry of optical glass production had tended more and more to become a German monopoly. With the aid of a grant from the Privy Council Committee for Scientific and Industrial Research, a number of inquiries were instituted. So far the main work has been directed to the production of satisfactory pots, since one of the principal difficulties in the manufacture of optical glass lies in the choice of suitable material for the pots in which it is made. Similar work on heat-resisting materials, and generally on the behavior of the rare earths and other substances at high temperatures, is of great importance in a large number of industrial processes, but for such work a technological laboratory on a large scale is needed, and will, it is hoped, be provided. Other research on chemical and other glasses has been done during the year by the National Laboratory, as well as by other institutions. The work is of the utmost national and scientific importance, and our scientific contemporary expresses the hope that the committee will spare no effort "to ensure that it is actively continued and extended, and that in the future no risk shall be run of this fundamentally important industry passing into foreign hands."

The committee is in a good position to achieve the first object, and the acquisition of scientific knowledge and the perfecting of technical methods will make the attainment of the second possible, but it will not do more; commercial organization is necessary, and also probably state action. As an example of what

happens we may say that we had occasion a short time ago to make some inquiries as to a particular kind of glass, and found that though its formula was due to British research, and though it had been and perhaps is still being made in this country, commercial control was in the hands of foreigners.

The position with regard to the production of fine chemicals and synthetic drugs and the commerce in them is very similar to that in which the authorities of the National Physical Laboratory found the manufacture of optical glass. In commenting, in the *Journal* of August 12, on the resolutions adopted by the Annual Representative Meeting recommending medical practitioners to avoid using drugs made in Germany or Austria if identical substances manufactured by ourselves or by our Allies can be obtained, and instructing the council to bring to the notice of the government the possibility of guaranteeing protection to firms willing to lay down plants to manufacture drugs and chemicals made in Germany before the war, we pointed out that while it was probably the opinion of the majority of chemical manufacturers that some form of government assistance by tariff or otherwise was necessary, yet a considerable degree of cooperation among manufacturers is a more fundamental requisite for the establishment of the manufacture of synthetic drugs on a sound commercial basis.

It is probably owing to the resolutions of the Annual Representative Meeting and this comment on them that Dr. Sidney Barwise, medical officer for Derbyshire, has sent us a copy of a pamphlet on economics and the war which he published last May. Dr. Barwise refers to the resolution adopted by the Chambers of Commerce of the United Kingdom "that the strength and the safety of the empire lie in ability to produce what it requires from its own soil and factories," and compares it with a famous pronouncement of Alexander Hamilton during the American War of Independence: "Every nation . . . ought to endeavor to possess within itself all the essentials of national supply. These comprise the means of subsistence, habitation, clothing and defence.

. . . The possession of these is necessary to the progress of the body politic; to the safety as well as to the welfare of the society. . . . To effect this change, as fast as shall be prudent, merits all the attention and the zeal of our public councils; it is the next great work to be accomplished."

Far be it from us to enter upon the thorny controversy as to free trade and tariff reform, which excites a degree of bitterness in the extreme champions on either side difficult for persons of scientific training to understand, but we are entitled to call attention to the effect on the nation's health and virility of the exodus from country to town, due in part at least to the depression of agriculture and the fact that peasant proprietors in Great Britain are so few as to be negligible in any general view. One result of the fiscal policy of Germany has been to keep the people on the land and to encourage small freeholders; in thirteen years one and a half million acres were thrown into small holdings. A similar fiscal policy in France has had a similar result. Before the passing of the Méline tariff law of 1892 France imported 441 million francs' worth of agricultural produce; ten years later she was exporting an excess of 152 million francs' worth, peasant proprietors had increased and the tide of population was set back from the town to the land. In thirty years the import of cereals into Great Britain more than doubled, while the population increased by less than a third. In the same issue of *Nature* as that from which we have already quoted there is a note on a recent report by Mr. T. H. Middleton, assistant secretary of the Board of Agriculture. He shows that it is not an empty boast to say that on each hundred acres of cultivated land Germany feeds seventy people, while Britain can only feed forty-five. According to this report, the two chief factors in the recent remarkable development of German agriculture are a settled economic policy and a well-thought-out system of agricultural education; coupled with these is the belief of the German farmer that he was essential to the community and that his land should not be allowed to go

out of cultivation. Mr. Middleton states that the chief immediate cause of the increased productivity of German soil is the increase in use of artificial manures; twice as much nitrogen, one third more phosphate, and five times as much potash are used in Germany as on an equal area of our cultivated land. The reason Mr. Middleton gives for this failure of the British farmer is want of education, but he thinks that this defect in our educational system is being remedied. There are, however, undoubtedly other causes, which might more quickly be removed, for the depression which has affected British agriculture during the last seventy and especially the last thirty or forty years.—*British Medical Journal*.

SCIENTIFIC BOOKS

An Introduction to the Study of Color Vision.

By J. HERBERT PARSONS, D.Sc., F.R.C.S., Ophthalmic Surgeon, University College Hospital; Surgeon, Royal London Ophthalmic Hospital. Cambridge, University Press. 1915. 308 pp.

Dr. Parsons has undertaken to present the facts and the theories of color vision in such form as shall be intelligible to the general reader. He states in his preface:

The vast literature on color vision consists almost entirely of papers written in support of some particular theory. It is peculiarly difficult to obtain a general and unbiased view of the subject. I have here endeavored to separate the best established facts of color vision from the theories, and have then discussed the chief theories in the light of these facts.

Accordingly he has divided his book into three parts. The first part (pp. 1-157) is devoted to a statement of the facts of normal color vision; the second part (pp. 158-192) deals with the facts of color-blindness; and the remaining portion (pp. 193-299) discusses theories of color vision.

The author's statement of the facts of normal color vision is prefaced by a brief summary of such phenomena of physical optics and such a description of the structure and function of the visual organ as shall serve as a basis for his subsequent discussion. This

is followed by a description of the color vision of the light-adapted eye and of the dark-adapted eye, together with a summary of the temporal and spatial effects of retinal stimulation (after-images, contrast, color-zones and the like). His chapter on the evolution of the color-sense presents evidence derived from the color vision of the lower animals, from the color vision of primitive peoples, and from the color vision of infants. The description of color-blindness summarizes the findings obtained in various investigations of certain typical deviations from normal color vision. The chapters on theories of color vision are prefaced by an historical sketch of the development of color theories, and this is followed by a summary statement of the most widely accepted theories.

Dr. Parsons has attempted a difficult task in his endeavor to present a readable summary of the exceedingly voluminous and exceedingly controversial literature of color vision; and his book bears evidence of painstaking effort and keen insight. The author has exercised sound judgment in selecting and presenting his material; and for the most part he has maintained an admirably non-partisan attitude throughout—except, perhaps, in dealing with the duplicity theory where his approval is more complete than the facts seem to the reviewer to warrant. The features in Dr. Parsons's book which are most likely to excite criticism are the author's tendency toward an uncritical statement of the findings of the various investigators, and his failure to recapitulate his mass of summaries and to give the reader a brief statement of the present status of the various problems. There is perhaps no field of investigation in which the refinement of apparatus and of technique has made greater progress within the past decade or two than in the field of color vision; it follows, therefore, that many of the earlier investigations now possess no more than historical value. It seems to the reviewer to be doubtful wisdom to lump together the findings of good, bad and indifferent investigations, and to present them to the reader without any attempt at critical evaluation. In several instances the