authorities have encountered comes from the British traders, who have taken advantage of the Chinese laws prohibiting the raising of the poppy in China to increase the importation of opium from India. So much for the boasted morality of European nations.

Dr. Ross says nothing of another great moral crusade that the Chinese nation has been long waging, viz., that for the abolition of slavery. For a very full account of that movement we are indebted to Mr. E. T. Williams, who was long Chinese Secretary of the U. S. Legation at Pekin, and was made Consul General at Tientsin in the spring of 1908. Mr. Williams is also a sociologist of no mean order, and is conversant with the entire literature of the science. He treated this subject in the *American Journal of International Law* for October, 1910 (Vol. IV., pp. 794–805; Supplement, Official Documents, pp. 359–373), in an exhaustive article entitled: "Abolition of Slavery in the Chinese Empire." The Supplement contains Mr. Williams's translation of the report of the commission recommending the abolition of slavery and the imperial rescript approving it. The whole is reprinted in pamphlet form.

In all matters relating to the influence of Christianity and Christian missionary work in China our author is decidedly partisan. As an American traveling in China, he was of course largely beholden to American and English missionaries for facilities in getting about, and must have seen a wholly disproportionate part of their influence in the country, and it would have ill become him to speak disparagingly of such things, whatever his real views might have been. But his extravagant praise of them, even where it was deserved, should have been tempered by countervailing considerations which everybody knows to exist. His idea of the ultimate conversion of the Chinese to Christianity is probably Utopian. The hint on page 235 that Christianity might ultimately become the "official religion" of the Chinese empire would be alarming if it rested on any basis of fact. The present humble attitude of the few Christian missionaries in China is no criterion. As Helvetius said: "Christians are lambs when weak, tigers when strong." Christianity is an exclusive religion. It is a militant, proselyting, persecuting religion, in which it differs wholly from Confucianism, Shintoism and Buddhism. If there was any danger that China would have to pass through the ordeal of blood to which Europe has been subjected by Christianity since the middle ages there would surely be grounds for grave apprehension. The Crusades, the Thirty-years War, and the Spanish Inquisition, would be trifles compared to the fanaticism of the whole vast Chinese population, should it ever be seized with the spirit that actuated Europe during six centuries of its unhappy history. If any hope is to be expressed, it should be that there may never be an "official religion" in China, but if there is to be such, let it be one of those tolerant, peaceful and rational forms, that harmonize with all others, permit free discussion and work to the advancement of all moral, material, intellectual and spiritual development.

Of this book, perhaps more than of most others, is the trite remark of the perfunctory reviewer true, that it must be read to be appreciated. The above is not a review of it, but merely a brief mention of a few of the most vital points contained in it. The book is a study in sociology by a leading sociologist, based on direct personal observation, of the numerically greatest people on the globe.

Lester F. Ward

Brown University,
Providence, R. I.

Natural History of the American Lobster. By Francis Hobart Herrick, Ph.D., Sc.D. Document No. 747, from the Bulletin of the Bureau of Fisheries, Vol. 29, 1911. Government Printing Office, Washington, D. C.

There is surely no one acquainted with Professor Herrick's earlier monograph[1] on the lobster, who does not heartily welcome his recent book, "Natural History of the American Lobster."

[1] "The American Lobster: A Study of its Habits and Development," *U. S. Fish Commission Bulletin*, Vol. 15, pp. 1–252.

Herrick's monograph of 1895 was an excellent assemblage of original data, bearing chiefly upon the anatomy and development—but to a very slight extent upon the habits—of our most far-famed decapod. The paper was adequately illustrated with original drawings and was accompanied by a bibliography of 213 titles. This was a book which merited a place upon the shelves of every zoologist and student of natural history—a place beside Professor Verrill's "Invertebrates of Vineyard Sound."

At the time of this earlier work, the lobster's main interest for the zoologist lay in the fact that it was an easily obtained "type-specimen"; gastronomically it was well known and appreciated, and the term, lobster, in the discussion of lobster laws, might sometimes have been heard in the halls of legislatures; that was about all. During the last fifteen years, circumstances have changed greatly. This species now finds itself at the focus of several zoological interests, and in legislative assemblies many word-battles have been fought in efforts to do equal justice to the lobster, on the one hand, and to the great American public on the other. The lobster fisheries of the country have become recognized as never before, as a point of great economic importance. The spirit of conservation, coupled with biological incentive, has rendered important the consideration of artificial propagation of marine fauna—a movement in which the propagation of the lobster has been foremost. But in addition to all this, the lobster has become possessed of more subjective interests. Important and instructive as has proved its developmental history, it has become a means of attack upon larger problems. As a subject for the study of regeneration and problems in morphogenesis, the lobster has supplied valuable material; and metamorphic transitions in cellular and tissue elements have been more clearly revealed through histological researches upon this invertebrate. Moreover, the student of animal behavior, a branch of study which, at the time of Herrick's earlier report, had scarcely emerged from the general field of natural history, has found in this crustacean a subject of value with reference to the investigation of problems in comparative psychology, instinct and habit-formation in lower animals. Both in this country and in Europe, many eyes have been turned upon *Homarus* and during the past six or eight years, alone, several important contributions based upon the study of this crustacean have been made. Indeed, as Herrick states, there is probably at the present time no invertebrate in the world better known than the American lobster.

Such a growing interest in *Homarus* can readily explain why it is that in Herrick's new publication we find 408 pages as compared with 252 in his earlier report; and why the bibliography has expanded from 213 to 329 titles. But this increased outside interest in the lobster does not account entirely for the greater proportions of the present work, since the author himself, through his continued studies, has added much, both in the text and in valuable illustrative features.

The subject matter of the book is presented in twelve chapters, which have the following headings: (1) The Lobsters and Allied Crustacea; their Zoological Relations, Habits, Development and Use as Food; (2) The American Lobster; its Economic Importance and General Habits; (3) Giant Lobsters; (4) Molting; (5) Enemies of the Lobster; (6) The Anatomy of the Lobster, with Embryological and Physiological Notes; (7) The Great Forceps, or Big Claws; (8) Defensive Mutilation and Regeneration; (9) Reproduction; (10) Development; (11) Behavior and Rate of Growth; (12) The Preservation and Propagation of the Lobster.

The text of these chapters has been practically rewritten and many valuable additions have been made. These additions relate to chapter I., with its section on the "natural history of the Crustacea," to chapter VI., with the much more complete references to the internal anatomy, especially of the nervous system and its connections; to chapter VII., with its added sections discussing symmetry, asymmetry and torsion, data largely supplied by Herrick's recent investigations;

to chapter VIII., with fundamental additions to our knowledge of the regenerative process, and embodying the excellent work of Emmel; to chapter XI., bringing in an almost new section concerning the behavior of the lobster; and, finally, to chapter XII. (and also to part of chapter I.) discussing the economic importance of the lobster fisheries in this country and considering means of preservation and propagation.

In this last chapter, Herrick frankly considers the question, "What is the matter with the lobster?" and discusses very fully the pros and cons of all methods, legislative and otherwise, suggested for its protection. "Unfortunately for many years," says the author, "we have watched this race decline until some have even thought that commercial extinction, and that not far remote, awaited the fishery. . . . If this is primarily a scientific question, the zoological history of the animal should give us the answer. . . . The main biological facts . . . are now well in hand, and excuse can no longer be offered on the ground of ignorance."

After showing by means of convincing statistics the fact of the decline in the lobster fishery in this country, Herrick considers the cause.

> More lobsters have been taken from the sea than Nature has been able to replace by the slow process of reproduction and growth. In other words, man has been continually gathering in the wild crop, but has bestowed no effective care upon the seed. The demands of a continent steadily increasing in wealth and in population have stimulated the efforts of dealers and fishermen, who must work harder each year for what they receive in order to keep up the waning supply. The natural result has followed, namely, a scarcity of numbers and a decrease in the size of the animals caught, with steadily advancing prices paid for the product. This is precisely what we should expect, had we based our judgment upon any sound principles of common sense and human economy, not to speak of a knowledge of the mode of life and general natural history of the animal in question.

Herrick shows that all measures which have heretofore been adopted in this country to check the decline have failed, and it can be concluded that "either the laws are defective or the means of enforcing them are insufficient." Since a *closed season* for any animal, to have protective value, must correspond with the breeding season, and since this is impossible in the case of the female lobster (which spawns only once in two years and carries its eggs externally for about a year), closed seasons are not recommended as a possible means of improving conditions.

Moreover, legislation calculated to protect the "berried" lobsters has not been successful, because many fishermen evade the law by combing the eggs from the abdomen of the female. In addition, Herrick clearly points out that, even if an egg-lobster law could be enforced, the protection aimed at must necessarily be reduced by one half, since the adult females lay eggs but once in two years, and therefore, at any given time only one half of them would be "in berry." The plan sometimes followed, of enclosing the "berried" females in crates and allowing the eggs to hatch naturally, Herrick thinks commendable, but inadequate for the preservation of the fishery.

As to the gauge law, while admitting that it has scarcely ever been thoroughly enforced in any locality, Herrick also believes this to be inadequate, whether short lobsters are destroyed or not.

> First, by legalizing the capture of the large adult animals, above 10½ inches in length, we have destroyed the chief egg-producers, upon which the race in this animal, as in every other, must depend. Second, as supporting or contributory causes, some of us now, like others in the past, have entertained false ideas upon the biology of this animal, especially (*a*) upon the value of the eggs or their rate of survival, that is, the ratio between the eggs and the adults which come from them, and (*b*) of the true significance to the fisheries of the breeding habits, especially in regard to time and frequency of spawning and the fosterage or carriage of the eggs. Our practises have been neither logical nor consistent, for, while we have overestimated the amount of gold in the egg, we have killed the "goose" which lays it. We have thought the eggs so valuable that we have been to great

trouble and expense in collecting and afterwards hatching them and committing the young to the mercy of the sea, while we have legalized the destruction of the great source of the eggs themselves—the large producing females.

And again Herrick states:

This race needs eggs, not by the tens of thousands merely, but by the tens of billions, and it must have them or perish. Moreover, it can get them only, or mainly, through the big producers, the destruction of which the present gauge laws have legalized. If the lobster is a good incubator, the sea is a very poor nursery.

Thus Herrick brands as thoroughly ineffective any gauge law which protects the female lobster merely to the 9, 10 or 10½ inch limit. This limit enables them to lay, in all probability, but a single lot of eggs, usually not more than 10,000, and, according to Herrick's estimate, only one lobster out of 15,000 eggs reaches maturity.

Analyzed in the light of the law of survival (one out of 15,000 eggs), Herrick does not look upon the showing of the lobster hatcheries as very encouraging, since, to hold the lobster fishery at an equilibrium would require the hatching of larvæ by the trillions; we can not work on such a scale. In the method of rearing the young through the critical or larval period, as practised at the Wickford Experiment Station of the Rhode Island Commission of Inland Fisheries, Herrick, however, sees great possibilities of material aid to the lobster fishery.

The chapter on Preservation and Propagation concludes with a set of five recommendations devised to protect the lobster fishery. These are worth presenting in full:

1. Adopt a double gauge or length limit, placing in a perpetual close season or protected class all below and all above these limits. Place the legal bar so as to embrace the average period of sexual maturity, and thus to include what we have called the intermediate class of adolescents, or smaller adults. These limits should be approximately 9 inches and 11 inches, inclusive, thus legalizing the destruction of lobsters from 9 to 11 inches long only when measured alive. In this way we protect the young as well as the larger adults, upon which we depend for a continuous supply of eggs. The precise terms of these limits are not so vital, provided we preserve the principle of protecting the larger adults.

2. Protect the "berried" lobster on principle, and pay a bounty for it, as is now done, whether the law is evaded or not, and use its eggs for constructive work, or for experimental purposes with such work in view.

3. Abolish the closed season if it still exists; let the fishing extend throughout the year.

4. Wherever possible, adopt the plan of rearing the young to the bottom-seeking stage before liberation, or cooperate with the United States Bureau of Fisheries or with sister states to this end.

5. License every lobster fisherman, and adopt a standard trap or pot which shall work automatically, so far as possible in favor of the double gauge, the entrance rings being of such a diameter as to exclude all lobsters above the gauge, and the slats of the trap of such a distance apart as to permit the undersized animals to escape.

If the double gauge should prove ineffectual because of not being uniformly adopted or rigidly enforced, Herrick recommends the following steps with reference to the maintenance of the present laws:

1. Raise the legal gauge to 10½ inches wherever it now stands below this limit.

2. License every lobster fisherman, and adopt a standard trap, with slats of sufficient distance apart to permit the undersized lobsters to escape.

3. Destroy the enormously destructive interstate commerce in short lobsters.

4. Do not turn another larval lobster into the sea, but devote the energy expended in lobster hatcheries to rearing these young to the bottom-seeking stage after the methods now successfully practised at Wickford, R. I.

To conclude, it may be said that this volume on the American lobster is written in a clear and fascinating style, by virtue of which it will find approval in the hands of many classes of readers. To the scientifically minded it will be a mine of information, exact, well-classified and marvelously complete; to the ordinary reader it will prove an entertaining essay and study in natural history, while to those especially interested in the preservation and propagation of the lobster, it should serve as a trustworthy guide

for adequate legislation and for effective control of the lobster fishery.

PHILIP B. HADLEY

KINGSTON, R. I.

Farmers of Forty Centuries, or Permanent Agriculture in China, Korea and Japan. By F. H. KING, D.Sc. Published by Mrs. F. H. King, Madison, Wis. 8vo. Pp. 441, 248 illustrations. 1911.

A more wholesome work at the present stage in agricultural agitation in this country could scarcely be written; nor could it well come from one better fitted to write it, for the tenor of the story falls closely into line with Professor King's intensive studies on soil management. In a very peculiar sense the art of soil management in distinction from soil science constitutes the theme of this work. Until recently, the Chinese, Japanese and Koreans were almost wholly without formal agricultural science in the western technical sense, while they have for centuries been adepts of unsurpassed skill in agricultural practise. The story of Professor King is not the less weighty because he has seemed to lean a little at times to the tide of Occidental opinion that has set rather strongly heretofore toward chemical analysis as the decisive mode of attack and source of guidance, and he can not be thought partial in setting forth the attainments of Oriental peoples who have worked in almost entire negligence of all resources but those of the farm, the home and the town. "Farmers of Forty Centuries" is in effect a sketch of domestic methods of nursing crops.

As Dr. Bailey intimates in a graceful preface to the book, Dr. King has played well the rare part of "an *agricultural* traveler" and his results are quite on the high level of those other traveling experts who set forth natural features or social phenomena with expert touch. Professor King crossed Japan and touched eastern China on his inward trip, but his serious work only commenced when he reached the tropical border of south China and began to work northward with the advancing season. This put him in the way of critically following the modes of treatment in vogue just at the transition from the winter crops to the spring and early summer crops. These combined at once the maturing and the harvesting of the one and the fitting, the planting and the early culture of the other. Thus he advanced by stages—looping back for restudy midway—from the tropical border in Kwangtung and Kwangsi, into Chekiang and Kiangsu in the latitude of our southern states, later into Shantung and Chili in latitudes comparable to Kentucky and Illinois, and at length into Manchuria, whose climate is comparable to that of our distinctly northern states. Passing through Korea, he was guided in a further study of Japan by details from the Japanese agricultural stations in which western science has already joined hands with Oriental experience with the happiest results.

King's treatment is everywhere sympathetic and appreciative. He is singularly free from the Occidental provincialisms that mar so many stories of Oriental travel. He seems to have carried at all times the trained sense of the agriculturalist and of the student of fertilization, not the sniffing nose of the typical westerner. He seems in no wise to have been squeamish about inevitable organic odors, but yet was keen enough to note the singular scarcity of flies and to draw the inference that it meant a vital order of cleanliness and carried a sanitary significance. In the universal use of hot tea-tinctured drinks he saw as other incisive travelers have done an important protective custom. Nowhere does he lapse into grewsome pictures of putative decimations due to invited diseases. His tale is that of a fair-minded friendly visitor seeking to learn, and his story is in grateful contrast to the irksome animadversions of the commonplace Occidental writer who plumes himself on looking down on Oriental customs "e superiore loco," as Cæsar would say.

King's statements are larded with quantitative data and carry a wealth of precise fact brought close home to the special cases of individual farmers or particular practises. The smallness of the farms, the largeness of the product, the lavishness of the labor and a multitude of special items relative to specific