d. Fusion of the anterior piece of one larva with the ventral side of another.
e. Fusion of two posterior pieces.
f. Fusion of the heads of two larvæ.
g. Fusion of anterior pieces.

2. The larvæ belong to different species or even genera.
a. Fusion of the ventral surfaces.
b. Fusion of the posterior piece of one larva with the ventral surface of the other.
c. Fusion of an anterior with a posterior piece.
d. Fusion of the heads of two larvæ.

Every one of these unions was repeated many times, and the monograph presents an exact description of the anatomical condition of several specimens of each form of double larva, after the development had continued some weeks. These descriptions are based upon the examination of serial sections, the specimens being sacrificed on the microtomic altar. It is not using too strong a word to characterize the labor involved as enormous. The work, moreover, bears throughout the stamp of extreme conscientiousness.

It is impossible to enter here into details, but some of the general conclusions formulated by the author are so interesting that they are here presented. If, by the fusion, corresponding organs or their anlages are brought into contact they unite continuously by the concrescence of the specific tissue of the organ (the process might be appropriately named '*Histofusion*,' *Rev.*). If the anlages of unlike organs are brought in contact they become united by connective tissue. If the similar organs are hollow not only do their walls fuse, but also smooth open communication of their cavities is established, and in such cases it is not necessary that parts precisely corresponding should be joined. The different parts of the digestive tube will fuse, or the spinal cord will unite with the brain, and there will be produced a smooth passage from the cavity of one to that of the other, similarly in cases of fusion of the abdominal, pericardial or vascular cavities, of hearts, wolffian ducts, etc. Tissues are found united in this way which at the time of the union were still undifferentiated. Under certain conditions ectodermal and entodermal epithelia may become connected. The notochord takes an exceptional position in that the notochord of one piece does not concresce with that of another. The growing together of similar organs or tissues may occur in any plane or direction; there is no trace of polarity in the growth, such as Vöchting records for plants. The union of two pieces may be not only anatomical, but also physiological, and Born designates this as physiological symbiosis. It occurs in various degrees. In probably all cases the blood vessels are in open communication, so that the circulation is common to both components. A higher degree of symbiosis is marked in the cases where the intestine of the major larva has annexed a piece of the intestine of the minor, and both function together to the common advantage, or when the two larvæ have a stretch of intestine in common. The highest degree is reached when a whole end of the body, together with all its organs, is replaced, lengthened or doubled, for then the posterior piece from one larva works with the anterior piece of another, as if they were one individual. The highest degree is equally attained when the right and left halves of two larvæ are united in a single individual. The '*individuum*' is not dependent on the derivation from one egg. We have a single organism from two eggs (einen einheitlichen organismus aus zwei eiern). In the derivation from a single ovum there is no mystic, metaphysical unity.

The development, from the stage at which the experiments begin, depends upon self-differentiation of the single parts. No correlative influence of the surrounding parts can be recognized; the development is mosaic—Feis' organic areas (*organbildende Keimbezirke*) are partitioned off.

We commend this work to the attention of all biologists, and venture to predict that further important deductions will be garnered from these experiments of Professor Born, supplemented as they soon will be by additional researches. CHARLES S. MINOT.

The Concise Knowledge Library: Natural History. By R. LYDEKKER, W. F. KIRBY, B. B. WOODWARD, R. KIRKPATRICK, R. I. POCOCK,

R. Bowdler Sharpe, W. Garstang, F. A. Bather, H. M. Bernard. New York, D. Appleton & Company. 1897. 8vo. Pp. 771. Price, $2.00.

The Concise Knowledge Library's *Natural History*—a misleading title inasmuch as the book contains no botany—treats of the animal kingdom from the higher mammalia down to the protozoa. Its authors, as may be seen from the above list, are Europeans, and the forms of life they describe and illustrate are, from the American standpoint, chiefly exotic. At the same time, where an abridged encyclopedia is wanted the book will be found convenient for reference.

The preface states that "the text is illustrated by upwards of five hundred original drawings made and reproduced expressly for the work." Those of the insects and some of the other invertebrates are fair; the remainder may probably be regarded as the worst batch of illustrations published in modern times. This is due partly to faulty drawing and partly to bad ink and poor printing. The type is small, and the volume as a whole has a cheap appearance, which ill fits the high reputation of its authors.

The mammals are treated first and come in for the largest share of attention (217 pages); then the birds, reptiles and fishes, and so on down the scale. Mammalogists will be amused to hear that the American black and grizzly bears "are now considered merely as varieties of the European species," and that "the stoat or ermine (*Mustela erminea*) and the weasel (*Mustela vulgaris*) are common to Europe, North and Central Asia, and North America." Perhaps the best feature of the book is its index, which occupies nearly fifty pages and is said to contain about ten thousand references.

C. H. M.

Citizen Bird: Scenes from Bird-Life in Plain English for Beginners. By Mabel Osgood Wright and Elliott Coues. With 111 illustrations by Louis Agassiz Fuertes. New York and London, The Macmillan Company. 8vo. Pp. 430. Price, $1.50.

Among the new books awaiting the reviewer on his recent return from the West is one which, from its authorship, attractive appearance and odd title, could not be put aside. 'Citizen Bird' is its name—a book for girls and boys. It is admirabiy written and is illustrated by a remarkable series of original drawings.

In order to test the book the reviewer called his children, two little girls, and read them the opening chapters. The younger (aged five years) was hardly able to follow the story, though interested in certain passages, but her elder sister (aged seven) was simply spellbound from first to last; from which it may be inferred that the book will hold the attention of children of seven and upwards.

The subject-matter is very cleverly woven into a story of a family of bird lovers in their country home at 'Orchard Farm.' The owner of the farm, who is a doctor and something of an ornithologist, takes the children out into the woods and fields and tells them about the birds, their habits and their value to man; and afterward, in his 'wonder room,' gives them special talks on particular species, which are grouped by some easily remembered characteristic, as 'a silver-tongued family' (bluebirds, robins and thrushes), 'Peepers and Creepers' (creepers, kinglets, chickadees and nuthatches) and so on. The children at once become enthusiastic observers and ask innumerable questions, which, in the main, are admirably answered. The story is charmingly told, kindling an interest in bird-life which is kept up to the end. The child is taught a multitude of entertaining facts about nature, and at the same time filled with a healthy sentiment against the wanton destruction of birds and their eggs.

A few of the statements are a little lax from the standpoint of scientific precision, and one or two of the incidents narrated are liable to tax one's credulity, as when one of the boys tells of brushing newly-fallen snow from the back of a live woodcock on its nest; but the book as a whole may be commended as by far the best bird book for boys and girls yet produced in America.

The illustrations deserve more than passing notice. They are uncommonly good half-tone reproductions of wash drawings by young Fuertes, whose phenomenal talent in grasping bird attitudes was first brought to the attention of the public in Miss Florence A. Merriam's