study of the complete life history of the species.

Mr. B. A. Bean, curator of fishes in the National Museum, and his assistant, Mr. McKnew, spent two weeks at the laboratory, June 6–20, studying fishes and making a collection of certain forms for the National Museum. Mr. Bean went over the Beaufort collection of fishes and very kindly verified or corrected the doubtful identifications of some of the specimens. Tanks of alcohol were left by him at the laboratory, with a request that specimens of fishes taken this season, in duplicate, not collected by him, be preserved for the National Museum. This request was complied with.

Dr. J. I. Hamaker, professor of biology in the Randolph-Macon Woman's College, beginning August 18, spent two weeks in general collecting and in making observations on actinians.

CASWELL GRAVE.

SCIENTIFIC BOOKS.

Heredity of Coat Characters in Guinea Pigs and Rabbits. By Professor W. E. CASTLE. Carnegie Institution of Washington, Publication, No. 23. February, 1905.

This paper includes a careful account of the color varieties of domesticated cavies or guinea-pigs, of which the agouti, the yellow, the chocolate, the black, the albino, the spotted, the brindled, the roan and silvered, the long-haired and the rough-coated forms are described. Cross-breeding between many of these types was carried out and a detailed account of the results is given. Without attempting to review all of the many important results of this elaborate study of heredity a few of the more unusual or salient points may be indicated.

Albino or white guinea-pigs breed true, but crossing experiments with pigs of different colors show that individual albinos give different results, which is due, Castle believes, to the presence, in a greater or less degree, of *latent* pigment tendencies, which do not show up except in crossing. Thus the albino ♂ 2002 when mated with red females invariably produces offspring marked with black; while albino ♂ 1999 similarly mated produces only red (or yellow) offspring, never black ones. From these and similar results Castle makes a distinction between the two terms *latency* and *recessive*. Latency "is a condition of inactivity in which a normally *dominant* character may exist in a *recessive* individual. It is questionable whether a recessive character may ever be latent." Recessive is used in Mendel's sense to designate a character "which disappears when brought by fertilization into the same (hybrid) individual with a contrasted 'dominant' character, but which is transmitted, distinct from the dominant character, in half of the gametes formed by the hybrid individual."

As is well known pure albino animals have pink eyes. This means that pigment is absent from the eyes as well as from the skin. Now pure white guinea-pigs and mice are known having black eyes. These are not albinos but 'spotted' animals, in which the pigment spots have been so far reduced as to be practically obliterated, except in the eyes. The black-eyed white animals that appeared in Castle's experiments did not breed true, since spotted offspring often cropped up. Whether by prolonged selection they could be made into a pure race can not be stated, but Castle thinks it not impossible. When mated to pure albinos spotted offspring are produced.

Guinea-pigs with a rough coat are animals whose hair is arranged in rosettes or 'cowlicks' around certain centers. Nine such centers can be recognized in individuals with the best developed rough coats. In crossing these roughs with ordinary or smooth-haired forms the rough character is dominant. Here we have another interesting instance of a recently acquired character dominating in the offspring. The rough character is as fully developed as in the rough parent. The offspring of these rough hybrids follow the Mendelian ratio, provided the *degree* in which the rough character is developed in the offspring is left out of consideration. Just here, however, comes a curious result, that is of the

utmost importance in the debated question of discontinuous *versus* blended inheritance. Although, as has just been said, the rough coat dominates in the first generation of hybrids (rough × smooth), yet sometimes it shows a weakened condition; and what is even more interesting is that certain smooth individuals which may be said to be prepotent show a stronger tendency to weaken the rough coat than do other individuals. Such partially rough individuals may later transmit the rough character to their offspring in its full intensity. Again, repeated crossing of rough animals with prepotent smooth ones leads to a further weakening of the rough coat until it may be almost eliminated. Here are some nuts to crack for those who believe the Mendelian purity of the germ cells depends on the elimination of maternal or paternal chromosomes *which have never mixed* during their sojourn in the same nucleus!

Another apparent Mendelian inconsistency is found in the ratio of inheritance of the long coat, which is dominated by the short, or ordinary coat. In the second generation of inbred hybrids the proportion of long coated individuals exceeds the expected number.

An interesting point in regard to heredity in rabbits is shown when pure white and Himalayan rabbits are crossed. The Himalayan character dominates in the first generation only *imperfectly,* yet complete segregation of the characters takes place in the germ-cells, so that the two pure parent types reappear in some of the offspring.

For other important facts the paper itself must be consulted. That some of the conclusions are only tentative the author himself fully realizes. The constant attention and great labor involved in an extended experiment of this sort will be appreciated by those who have had experience in such matters, and we can confidently expect the future to bring forth many important results from these pedigree animals. Already enough 'problems' are indicated to engage many other workers who have the opportunity, the patience and the skill to give to investigation of this sort. Carefully recorded histories, such as is given for these hybrids, are invaluable to science. Professor Castle is to be much congratulated upon his admirable work.

T. H. Morgan.

Columbia University.

The Stone Reefs of Brazil, their Geological and Geographical Relations, with a Chapter on the Coral Reefs. By John Casper Branner. Bulletin of the Museum of Comparative Zoology, Vol. XLIV. (Geological series, Vol. VII.). Cambridge, Mass. May, 1904.

This important memoir treats of a geological phenomenon that has not hitherto received the attention that its importance and interest, both commercial and scientific, deserve. A port formed by a stone reef harbored in 1500 the fleet of the first Portuguese discoverers of Brazil and the impression produced by it on their minds is strikingly shown by the fact that they applied to it a descriptive title, 'Porto Seguro,' instead of a name taken from the Saint's Calendar, as was the almost universal custom of the early Iberian explorers. From this point as a center a considerable section of the Brazilian coast region was explored and peopled, while two other stone-reef-protected ports, Recife (Pernambuco) and Rio Grande do Norte, became equally or even more important in the history of the early development of the country. The first of these has retained its commercial importance to the present day, and, being situated on a great line of travel, has attracted the attention and excited the wonder of all mariners and travelers who have visited the Brazilian coast. The former very naturally confounded the reefs formed by sandstone with those, still more frequent along this coast, composed of coral rock, and the latter have repeated the sailors' statements to the effect that a large section of the coast is bordered by a reef of the same nature as that of Pernambuco.

The first to accurately describe the Pernambuco reef as a consolidated bar of sand was Darwin, who touched there in the celebrated voyage of the *Beagle.* Hartt, in 1870, showed that the reputed great barrier reef of Brazil was a myth, though detached reefs, both of coral and of sandstone rock, occurred at numerous points; the latter being due to a superficial consolidation of beach sands which