an acquaintance with the details of structure of selected forms. For a knowledge of animals, as members of taxonomic groups, is not lacking in those who pursue zoology in the way I have outlined; and about these animals there is always something besides structure that is worth knowing. In order that these worth-while things may be known adequately, they must be the subject matter of the laboratory exercises as well as the recitations.

Nothing in this article is intended to imply that advanced courses should be of the kind described for beginning students. It is recognized that to become a zoologist, or to prepare for certain professions, it is necessary to have a systematic knowledge, not only of taxonomic groups, but of several other fields of zoology as well. In the acquisition of such knowledge there must be courses in which facts seem to outweigh principles. But to attempt to gain such knowledge in the elementary courses, even for those who must later acquire it, is neither necessary nor desirable.

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A FORERUNNER OF EVOLUTION

BICENTENARY OF CHARLES DE BONNET, NATURALIST AND PHILOSOPHER

MARCH 13, 1920 marks the two hundredth anniversary of the birth of one of the most interesting of eighteenth century scientists, whose researches in entomology and botany were of solid and permanent importance in the history of these branches of learning, and whose philosophy, if superseded, was at least interesting and to some extent prophetic; yet who is comparatively seldom spoken of to-day.

Charles de Bonnet on that date was born in Geneva, the sometime home of one against whom he wielded most fiercely his philosophic pen—Jean Jacques Rousseau. Rather curiously, de Bonnet's birth and death dates anticipate by an exact century those of a pioneer of evolutionary science, John Tyndall. The earlier master died on May 20, 1793, after a life almost uneventful except for its mental activities.

One of the most striking facts about de Bonnet's career is the extreme precocity of his talent. His entire work in natural history is crowded into the first twenty-five years of his life; after which failing eyesight, induced by close work with the imperfect microscopes of the day, turned him perforce from laboratory research to theoretical speculation.

At sixteen he read Réamur's work on "Insectology." It proved the turning-point of his life. Born of a Huguenot exile family, all of whom were accustomed to hold high offices in the Swiss government, de Bonnet was studying law with the expectation of following in the footsteps of his kinfolk. His introduction to entomology ended his interest in law; although he persevered in his studies until he attained the degree of Doctor of Laws, he never practised, but devoted the rest of his life to the science which had become his passion.

Two years after he first read Réaumer and Pluche, he sent to the former a long list of "additions" to his works, based on further investigations. What was Réaumur's astonishment to discover that his valuable collaborator was a boy of eighteen! By the time he was twenty, de Bonnet had established the fact of at least usual, and probably invariable, parthenogenesis in aphides. Before he was of age, he had been appointed a corresponding member of the Academy of Sciences. Two years later he successfully demonstrated the reproduction of some forms of worms by simple fission; and in the same year he discovered the pores, or "stigmata," by which caterpillars and butterflies breathe, and made important studies in the structure of the tapeworm.

Turning to botany, and newly appointed a fellow of the Royal Society, the youthful scientist next experimented in plant physiology with special reference to the functions of leaves, and attempted to prove that all chlorophyllic plants are endowed with sensation and what he termed "discoverment." It was at this stage of his career that threatened blindness diverted his studies into an entirely different field.

De Bonnet's philosophical theories were largely influenced by the time in which he lived; he wrote a work on the "Proofs of Christianity" to defend Revelation, and valiantly opposed the teachings of Voltaire and Rousseau, and the epigenesis theory of Buffon. On the other hand, he advanced the purely materialistic idea that all thought is due to vibrations of the nerves. Bodily activity, he said, is a necessary condition of thought.

Following Cuvier and Leibnitz in the doctrine of original creation by a Deity, de Bonnet then premised a "germ" of perfecting evolution in every living thing. In his "Contemplation of Nature," he taught that all beings in nature form a graduated and unbroken scale from lowest to highest, with no gaps from the lowest atom of matter to "Archangels"; though the flaw in his perfectability theory appears when he denies that the highest of his heirarchy can ever exactly equal Deity itself. In "Philosophic Palingenesis," he elaborated this doctrine to show the survival not merely of man, but of all animals, and the perfecting of their faculties in the future state. Man, he said, is composed of a material body and an immaterial mind, resident in his brain; but he carries within himself the germ of a more attenuated body which will clothe his mind in the next stage after life on earth—a curious approximation to some of the teachings of modern Spiritualism. What he does not make clear is whether he expects each individual to carry within himself the germ of his own perfectability, or whether it is only races of men and kinds of animals that are perfected *en masse*.

De Bonnet's philosophy is chiefly interesting as a commentary on his scientific attainments. If he had died at twenty-five, he would have left his most valuable achievements already accomplished; but if, two hundred years ago, he had never been born, the world of science even to-day would have been a great deal the loser.

Maynard Shipley

SCIENTIFIC EVENTS

THE PRESERVATION OF NATURAL CONDITIONS

For three years the Ecological Society of America has had a committee composed of about twenty-five interested persons, investigating the question of preserving natural conditions for scientific study. The work to date has been concerned with (*a*) listing and describing preserved areas and areas desirable for reservation, (*b*) determining the policies governing existing reservations and the desirability of reserving natural areas within them, (*c*) collecting arguments in favor of preserves, (*d*) determining lines of research and education, scientific, artistic and historical which require or can make use of reservations, and (*e*) methods which have been successfully employed in securing reservations. The matter in hand includes a list of more than six hundred areas in United States and Canada which are preserved or are desirable for preservation. It is evident that some types of natural conditions are not represented and for some localities no areas have been brought to our attention. Persons having information regarding areas desirable for preservation or already preserved or knowledge concerning any of the subjects noted above, especially methods employed in securing reservations, are requested to send information, which will be fully credited, to the chairman or any member of the committee. The present committee is composed of C. W. Alvord (history), Univ. of Ill.; H. C. Cowles (plant communities), Univ. of Chicago; R. T. Fisher (forest practice), Harvard Univ.; S. A. Forbes (entomology), Univ. of Ill., A. S. Pearse (aquatic preserves), Univ. Wis., C. F. Korstian (grazing), Ogden, Utah; R. B. Miller (forest laws), Univ. of Ill.; T. C. Stephens (bird preserves), Sioux City, Ia.; R. H. Wolcott (fires), Univ. of Nebr.; F. B. Sumner, La Jolla, California; M. J. Elrod, Univ. of Mont.; F. J. Lewis, Univ. of Alberta; John Davidson, Univ. of Br. Columbia; G. B. Rigg, Univ. of Washington; F. Ramaley, Univ. of Colo.; G. A. Pearson, Flagstaff, Ariz.; G. W. Goldsmith, Univ. of Nebr.; J. R. Watson, Univ. of Fla.; J. W. Harshberger, Univ. of Pa.; W. L. Bray, Syra-