most puzzling and frequent use (one parenthesis to every two and a half lines) of the parenthesis, and some slight notion of the extreme Teutonic character of this valuable pamphlet will be obtained. JOSEPH JASTROW.

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*THE VENOMS OF POISONOUS SERPENTS.*

THE experimental work which forms the basis for this valuable contribution to science was carried on in the physiological laboratory of the University of Pennsylvania. The reputation of its authors is such as to make it a standard work of reference. It brings our knowledge of the composition and effects of the venoms of serpents up to the present time, and we surmise that many years will elapse before the results recorded will be modified to any great degree. The subject is one, which, while it is full of interest to the reader, must nevertheless have been one involving no inconsiderable danger to the experimenters. To have handled two hundred living venomous serpents, one of them eight and a half feet long, weighing nineteen pounds, and furnishing one and a half drams of venom, cannot have been a very delightful task; and those who were willing to undertake it must have been enthusiastic investigators, as indeed we know they were. The serpents upon which the experiments were performed included rattlesnakes (Crotalus adamantus and C. durissus), moccasons (Ancistrodon piscivorus), ground rattlesnakes, copperheads, and coral-snakes. The venom of the cobra was obtained from India, while all efforts to obtain the poison of the Indian viper (Dabsia Russellii) were unsuccessful. The authors started with the theory, long held by Dr. Mitchell, that snake-venoms are not simple in composition, but are composed of two or more poisonous substances, and that in the qualities and quantities of these agents would be found an explanation of the differences between serpent-venoms as to power to kill and mode of causing death. All fresh serpent-venoms are more or less alike in appearance, being fluids varying from the palest amber tint to a deep yellow. When a drop of the fresh venom of the C. adamanteus was examined under the microscope with a $\frac{1}{12}$ Zeiss. homog. immersion lens (amplification, 800 diameters), in addition to oval nucleated red blood-corpuscles, leucocytes, and club-shaped epithelial cells, certain colorless particles are seen, some larger and of an albuminous character, others smaller. Some of these particles resemble bacteria, but are not: they do not multiply in cultures nor stain with the aniline dyes. In addition to these, there are, however, bacteria in fresh venom of a micrococcus form. Although careful search was made for ptomaines, none were found. An insoluble precipitate was obtained, which does not seem to have been recognized, and, when injected into pigeons, produced no toxic effect. Certain globulins were also obtained from the venom, to which the writers have affixed the names of water-venom-globulin, copper-venom-globulin, and dialysis-venom-globulin, from the method by which they were obtained. In addition to the globulins, peptones were also obtained. The differences in the proportions of the various globulins and peptones in different venoms are of immense importance in affording an explanation of the physiological peculiarities exhibited in poisoning by different species of snakes. The proportion of globulins in Crotalus is over three times the quantity in the Ancistrodon, and nearly fifteen times that in the cobra. The investigation, which has continued over a period of several years, included a study of the effects of various agents on venom, the effects of venom when applied to mucous and serous surfaces, their effects on the nervous system, and a comparison of globulins and peptones as regards their local poisonous activity. The action of venoms and their isolated globulins and peptones upon the pulse-rate, upon arterial pressure, and upon respiration, was thoroughly examined. Elaborate experiments were made with filtered venom, and with cultures for the study of the morphology of the bacteria contained in the venom. The anatomical changes produced in the animals experimented upon were carefully studied and recorded. The conclusions to which the authors arrive, as the result of their patient and laborious investigation, are, 1°, that venoms bear in some respects a strong resemblance to the saliva of other vertebrates; 2°, that the active principles of venom are contained in its liquid parts only; 3°, that venoms may be dried and preserved indefinitely with but little impairment of their toxicity; 4°, that there probably exist in all venoms representatives of two classes of proteids, globulins and peptones, which constitute their toxic elements; 5°, that potassic permanganate, ferric chloride in the form of the liquor or tincture, and tincture of iodine, seem to be the most active and promising of the generally available local antidotes. The fact that the active principles of venoms are proteids, and closely related chemically to elements normally existing in the blood, renders almost hopeless the search for a chemical antidote which can prove available after the poison has reached the circulation, since it is obvious that we cannot expect to discover any substance, which, when placed in the blood,

*Researches upon the venoms of poisonous serpents.* By S. WEIR MITCHELL and E. T. REICHERT. Washington, *Smithsonian inst.*, 1886.

will destroy the deadly principles of venom without inducing a similar destruction of vital components in the circulating fluid. The outlook, then, for an antidote for venom which may be available after the absorption of the poison, lies clearly in the direction of a physiological antagonist, or, in other words, of a substance which will oppose the actions of venom upon the most vulnerable parts of the system. The activities of venoms are, however, manifested in such diverse ways, and so profoundly and rapidly, that it does not seem probable that we shall ever discover an agent which will be capable at the same time of acting efficiently in counter-acting all the terrible energies of these poisons. The monograph closes with a complete bibliography of the subject, and a number of colored lithographs, which serve to illustrate in a most perfect manner the lesions caused by the venoms.

## *McLENNAN'S STUDIES IN ANCIENT HISTORY.*

THE first edition of McLennan's 'Primitive marriage' was published in 1866. The novelty and striking character of the theories propounded in it, the accumulation of interesting facts, and the clear and attractive style, aroused attention, and led to much discussion. Many writers of note — Sir Henry Maine, Sir John Lubbock, Mr. L. H. Morgan, Professor Bachofen — took part in the controversy. Darwin himself entered the arena. Ten years later, to meet a pressing demand, the work was reprinted by the author, with additions, under the title of 'Studies in ancient history.' That the interest awakened in the subject has remained unabated is evident from the fact, that, since the author's lamented death, his brother has found it necessary to issue a new edition of this volume, with some notes of his own, designed to clear up doubtful points, and to indicate certain changes of view which the author had announced. The publication will be welcome to all who take an interest in the study of the primitive history of our race, and who have not had an opportunity of procuring the earlier editions. Few works on the subject can be read with greater satisfaction, even by those who do not yield assent to the author's views. The grace of diction, the profound scholarship, and the stimulating originality of thought, displayed in the work, combine to make it one of the classics of modern science.

Twenty years, however, have not sufficed to establish the views put forth with so much confidence, and maintained with so much ingenious reasoning. On the contrary, antagonistic theories have sprung up on every side. To some extent, indeed, the author, as his brother intimates, had changed his views; and it is not easy to determine what were the precise conclusions at which he had arrived on some important points. The view, for example, which represents the earliest tribes of men as living in a state of 'communal marriage,' or, in other words, of promiscuous intercourse, is maintained throughout his first publication. This view was subsequently adopted by Lubbock in his 'Origin of civilization,' and by Morgan in his 'Ancient society.' But it was contested with overwhelming power of argument by Darwin, in his 'Descent of man.' He showed that the nearest congeners of man, the anthropoid apes, are all pairing animals, and, like other pairing animals, fiercely jealous. That human beings, on their first appearance, should at once have sunk in the social scale below the apes, and even below the sparrows, and should only have emerged from this condition of more than brutal debasement by a long succession of struggles and experiences, is of all suppositions the most improbable.

This consideration seems to have impressed Mr. McLennan, and to have produced a remarkable change of opinion. One of his essays, added in this volume to the original treatise, comprises a severe and destructive criticism of Sir John Lubbock's scheme, which makes 'communal marriage' the starting-point of human society. With equal force of logic, the author disposes of Morgan's 'classificatory system' and Bachofen's 'mother-right,' both of which are founded on the same fanciful basis, thus demolished by him. Yet, strangely enough, he fails to see that his own theory of 'marriage by capture' rests on the same unsafe foundation, and must fall with the others. His view, as presented in his earliest publication, and not subsequently retracted, is that in the first stage of tribal society 'utter promiscuity' prevailed; that with this was connected the practice of female infanticide, the male children being preserved to add to the strength of the tribe, while females were regarded as a source of weakness; that the scarcity of females in a tribe led to the custom of capturing them from other tribes, and this custom finally became the law of the tribe. Thus marriage arose, at first exogamous (that is, restricted to women of other tribes or kindreds), and afterwards, as society advanced, either endogamous (that is, restricted to the clan) or general, as in civilized nations. As the author himself, in his later essays, has taken away the main substructure on which his ingenious theory was built, it is not necessary to refer at any length

*Studies in ancient history, comprising a reprint of Primitive marriage.* New ed. By the late JOHN FERGUSON MCLENNAN. London and New York, *Macmillan*, 1886. 8°.