

Reviews and notices of books : Les ptomaines, recherches cliniques, physiologiques et médico-légales, par I. Guareschi et A. Mosso.

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MACMILLAN AND CO., LONDON.

LES PTOMAINES.—*Recherches chimiques, physiologiques et médico-légales.* Par I. GUARESCHI et A. MOSSO, de l'Université de Turin. Première partie. 8vo. pp. 55. Rome, Turin, Florence: H. Loescher.

THE organic alkaloids formed by the decomposition of the nitrogenous constituents of animal bodies, and to which the name of ptomaines has been given, have become of great importance from a medico-legal point of view. Our increasing knowledge of vegetable poisons has increased the possibility of new alkaloids which cannot readily be detected, being employed for the purpose of criminal poisoning. As alkaloids are formed, however, by the natural decomposition of the body itself, it would be quite possible that an innocent person might be convicted of poisoning from an alkaloid being found in a dead body, although no such had been given; and on the other hand a guilty person might escape on the plea that the poison actually found was a ptomaine formed in the body and not administered at all.

In order to ascertain precisely the reactions and physiological actions of ptomaines, a committee has been appointed by the Italian Government to investigate the subject. The present work is the first-fruit of its labours, and the excellent way in which the subject has been worked out shows how wisely the committee has been selected. It would be here out of place to enter into the chemical part of the investigation, and we shall mention only those points that are of physiological interest. One of the first of these is the existence of organic alkaloids in different kinds of alcohol. E. Ludwig found trimethylamine in Austrian wine, and Krämer and Pinner found in alcohol a mixture of bases belonging to the picoline series, amongst others collidine. Guareschi and Mosso have also found in ordinary alcohol an organic alkaloid, probably either pyridine or a homologue of it. In amylic alcohol they found pyridine. It seems not impossible then that some of the injurious effects of amylic alcohol may be due to the action of organic bases contained in it.

From putrefied brain they obtained an extract which has an action on the motor nerves analogous to that of curara. It is, however, much less energetic. A much larger quantity of the substance is necessary to produce the same effect, and poisoning even when very complete lasts for a much shorter time than that of curara. Its action upon the heart is to render the pulsations stronger and slower. There is no period of acceleration, and the increase of energy lasts for a considerable time.

From putrefied fibrine they extracted a ptomaine which produced in frogs complete immobility, muscular relaxation and loss of reflex, even when the muscles and motor nerves still responded regularly to stimulation by a faradic current.

A curious point was the agreeable odour which the poisoned frogs exhaled, resembling that of orange flowers. A finch poisoned by the ptomaine vomited, trembled and showed diminished sensibility,

but soon recovered. A rat weighing 76 grammes exhibited no symptoms after the injection of 20 milligrammes of the extract of putrefied fibrine. The difference between the activity of this ptomaine and the ordinary organic alkaloids is very great, so that one may consider it as quite innocent in doses where coniine, nicotine or curara would be promptly lethal. Hydrochlorate of ptomaine obtained from fibrine paralyzes the motor nerves like curara, but probably acts also on the muscles. When the muscle of a frog poisoned by it is irritated at regular intervals, it does not respond to each irritation by a contraction as an unpoisoned muscle would do. The contractions are sometimes high, sometimes low, and sometimes are absent. The excitability of the muscle becomes rapidly exhausted. This condition corresponds exactly to that described by Harnack in poisoning by lead and some other metals.

The similarity of the action of ptomaine to curara leads the authors to discuss more particularly the action of curara itself, and they consider that the effect of this poison is not something *sui generis* but resembles the natural death of the organism. They found that the sciatic of an unpoisoned frog remains for a certain length of time at its normal level, and when it is irritated by opening shocks so feeble as to be hardly felt upon the point of the tongue a regular series of contractions is obtained from the muscle. This is the first stage. During this it is always easy to obtain regular contractions if the stimulus be sufficiently strong, but if the stimuli are very feeble, the contractions may neither be equal nor decrease regularly; they may be sometimes higher, sometimes lower, and even be wanting entirely.

In the second period, that of diminished excitability, this condition is still more marked, and in order to get regular contractions the stimulus must be increased in power. This second period may be observed in a frog which has been decapitated several hours previously or in one where the nervous excitability has been diminished by the influence of curara, of ptomaines, and of other nerve poisons. Whatever may be the poison employed, the result of poisoning by any drug which lessens the irritability of the nerves is exactly the same as that due to the natural death of the nerve. Under certain conditions Luciani has observed a curious irregularity in the beats of the heart which occur in groups, separated by intervals of quiescence. This takes place under the same conditions and is probably analogous to the irregularity in the contractions of voluntary muscles during the second state of dying, viz. that of decreasing excitability.

In the third period the nerve is no longer excitable by strong opening shocks which are isolated and separated by an interval of about a second, while it is still excitable by shocks which are more feeble but frequently repeated, like those of a Du Bois Reymond's coil.

This period is followed by the last, that of the death of the nerve, which completely loses its excitability, while the muscle still contracts on direct stimulation. Such is the course of the death of the sciatic nerve in the frog.

The action of poisons has nothing specific: they do not change the order of these four periods, they can only make them appear more quickly and accelerate the death of the nerve. The action of curara resembles natural death even in one point which has been supposed to be specific, viz., the continued sensibility of the sensory nerves after the motor nerves have lost their power. This condition is, however, produced, as the authors show, by simple compression of nerve trunks. When the lumbar nerves going to one leg of a frog are compressed for a short time by a small bulldog forceps, irritation of that leg will produce movement in the rest of the body, while the leg itself remains paralysed and motionless.

Weir Mitchell has noticed that in wounded nerves the motor power may be abolished, while the sensory function is little altered. Erb has often seen in contusions of nerves sensibility re-established, while voluntary motor power was lost for ever. Lussana says that one characteristic symptom of rheumatic neuralgia is paralysis of the muscles and exaggerated sensibility of the corresponding parts.

The authors believe that it is this great vulnerability of motor nerves, and not an anatomical reason which furnishes an explanation of the readiness with which paralysis of the facial and laryngeal muscles occur in man, while disturbances of sensibility are comparatively very rare. The difference between the vitality of motor and sensory nerves becomes clearly evident from the effect of compression of the radial nerve which is one of the most common causes of paralysis of the muscles of the arm and of the hand; the paralysis being often complete while sensibility is hardly altered, if at all.

A study of other poisons supports the author's theory of the action of curara. A number of substances have been shown to have an action like it. Rabuteau showed iodide of tetramethyl ammonium; and Bufalini tetraethyl ammonium to have a similar action. V. Meyer obtained a similar substance from beer, and Bocci obtained another from human urine. In lead poisoning also the voluntary movements of the extensor muscles are abolished while sensibility is preserved.

The action of anæsthetics, which at first seems to be in opposition to this hypothesis, really agrees with it: thus in poisoning by chloral the posterior extremities preserve their sensibility after they are paralyzed, and even after the forelegs or head are paralyzed, changes in respiration show that sensory impulses are still nervously transmitted. The same thing has been noticed by narcotising with chloroform or ether, or by injecting pyridine or alcohol into the abdominal cavity. Even when the respiration has become too feeble to show any reflex change, the sensory nerves may be still showed to preserve their properties, for the pupil dilates at every irritation of the extremities.

The authors are no doubt right to a great extent in their views with regard to curara; and they may be also right to a great extent in considering that motor paths are sooner paralysed than sensory.

But if this be so, we can hardly do otherwise than assume that sensory cells are sometimes rendered functionally inactive before motor, as otherwise it is difficult to understand the relief of pain by morphia or anæsthetics while motor power still remains. It seems probable, however, that some drugs affect sensory sooner than motor fibres, for Pratt having surrounded the sciatic nerve of a frog with a paste of theine and water found that irritation of the left foot caused no reflex action while irritation of the spinal cord caused motion in both feet alike.

The curara-like action of ptomaines is a subject of great practical interest. In a paper on indigestion as a cause of nervous depression (Practitioner, vol. 25, pp. 265) the reviewer pointed out the resemblance between the symptoms of poisoning by paralyzing agents, and the muscular weakness and languor which occur in certain forms of indigestion, and drew attention to the fact that these symptoms of poisoning in indigestion might be due to substances absorbed from the intestine. At that time he was inclined to attribute these symptoms to peptones which have been shown to have a poisonous action, but the researches of Guareschi and Mosso appear to show that it may not improbably be due to ptomaines which have a curara like action. This seems all the more likely because not only has Bocci, as already mentioned, found a substance in the human urine which paralyzes frogs, but Bouchard, Rev. de Med. 1882, No. 12, has found ptomaines both in the urine of patients suffering from infectious diseases and in normal urine. He has also found them in large quantities in the fresh fæces of healthy persons as well as in diarrhoea and typhoid stools. The proportion of ptomaines in the urine to that in the fæces is as 1 to 40 or 50. These ptomaines he thinks are probably formed in the intestinal canal and absorbed into the blood. These researches afford an explanation of the acknowledged utility of purgation in nervous depression and especially of the utility of calomel which will not only remove ptomaines from the intestinal canal by its purgative action but will tend to prevent their formation as Wassilieff (Zeitschr. f. physiol. Chem. VI.) has shown it to possess a very considerable power of arresting fermentation and destroying micro-organisms.

T. LAUDER BRUNTON.

De la Démence Mélancolique (On Dementia Melancholica. A Contribution to the Study of Periencephalitis, Chronic and Localized, and to the Study of Psychic Cerebral Localization).
—By DR. A. MAIRET, Professeur Agrégé of the Montpellier Medical School. 296 pages and xi. planches lithographiées. Masson, 1883, Paris.

THE general idea contained in this book is the following:—Is it not possible to ascribe certain psychical symptoms which one may conveniently call *Dementia melancholica*, to functional disturbances





