

this fact a treatment for such poisoning when the poison and carbolic acid are given separately.

Sansom (*Beale's Archives*, vol. v. No. 17; *Cbl.* 1872, p. 383) recommends the sulpho-carbolates, especially that of soda, for internal use in zymotic diseases. The sulpho-carbolate of soda may be given internally in doses of 15-30-60 grains every three or four hours. The only unpleasant symptom from a dose of 60 grains was an inclination to dizziness. In the urine of a patient who had taken six drachms in the previous twenty-four hours, a considerable quantity of sulphate of soda was found, but no carbolic acid. The easily soluble lime salt is to be used only when there are indications for the introduction of lime into the system. The zinc and copper salts are suitable for external application.

Weiske (*Centralblatt*, 1871, p. 615; and 1872 p. 174) has made experiments on three goats which were fed for several weeks on hay washed with muriatic acid, sugar, casein and starch, one of them having in addition twelve grammes *phosphate of soda* and another twenty grammes of *chalk*. On analysis of corresponding bones, it was found that about the same amount of chalk, magnesia and phosphoric acid was found in all three.

Xylol.—Burkart (*Cbl.* 1872, p. 368) finds that xylol is of use in smallpox in so far that it diminishes the eruption of pustules in the throat and consequently the angina, so that the patients can swallow, at least, fluids. It is also a deodorizer. No other effect could be observed.

Phosphorus.—Köhler (*Centralblatt*, 1872, p. 476) gives the results of experiments made under his direction, in which oil of turpentine (not the chemically pure, but the commercial as containing more oxygen) was administered to animals poisoned by phosphorus. In ten experiments on rabbits and seven on dogs, he saved all the latter and three of the former, after doses of phosphorus which would otherwise have been undoubtedly fatal. The longest time after taking the phosphorus at which a favorable action of this antidote has been observed in man is eleven hours. Turpentine is supposed to act by forming in the intestinal canal with phosphorus a new crystalline compound, which is harmless and need not even be evacuated by an emetic, but is absorbed and eliminated unchanged by the urine. The turpentine may be given in excess without fear, and may be administered in capsules or by the stomach-pump.

Bamberger (*Wien. Med. Presse*, 1872, and

Cbl., 1872, p. 188) thinks that neither the clinical nor experimental facts justify the reputation of turpentine. Turpentine dissolves phosphorus and hastens its evaporation. The hypothesis of Köhler, just mentioned, he considers highly improbable. The compound spoken of only forms after several hours at a temperature of 30° R. (99½° F.).

The most rational treatment of phosphorus poisoning is by the soluble salts of copper. If the sulphate acts too rapidly as an emetic, the carbonate may be used, and afterwards dissolved slowly by acetic acid.*

Bibliographical Notices.

An Experimental Research on the Antagonism between the Action of Physostigma and Atropia. By THOMAS B. FRASER, M.D., Lecturer on Materia Medica and Therapeutics, at Surgeon's Hall, Edinburgh. From the Transactions of the Royal Society of Edinburgh, vol. xxvi., pp. 184, with plates. Edinburgh, 1872.

This monograph is an admirable illustration of recent methods of research undertaken for the purpose of determining the exact actions of drugs on men and animals. It is equally an admirable illustration of the legitimate use of experiments on living animals by which knowledge, important to human life and comfort, is obtained, that can be obtained in no other way. The empiricism of the past has left a rich legacy of clinical observation to the medical science of to-day; but in the long journey of the race, from Hippocrates to the nineteenth century, only scraps of exact knowledge of the *modus operandi* of drugs have been picked up. It will be the duty of the science of the future to supply this deficiency, and to build up, with slow and patient labor, an indestructible basis of exact knowledge, into which the precise relation of drugs to healthy and diseased structures and functions shall largely enter. In the performance of this task, science will derive a large amount of valuable assistance from the lower animals, from comparative experiment. Dr. Fraser, by his recent research into the mutual relations of physostigma and atropia, has shown us how

* Writers of papers on therapeutics will greatly aid in the preparation of these semi-annual reports if they will forward copies of their contributions, addressed to this JOURNAL.—EDS.

much can be done in this way ; and in doing so, has made a valuable contribution to scientific medicine.

The antagonism of the physiological action of drugs has long been suspected, but never proved till recently. Medical journals of the past few years have made us familiar with the real or supposed antagonism of opium and belladonna. Dr. Norris tells us, in an excellent article upon the subject, that three centuries ago, in the year 1570, opium was given to remedy the ill effects of belladonna. Dr. Harley, in his late book on the Old Vegetable Neurotics, has shown that, though this antagonism exists, it is partial, not general, and cannot be relied on in the treatment of poisoning by either of these drugs. Antagonism has been suspected, and to some extent proved between the actions of atropia and Prussic acid ; between those of strychnia and curara ; of strychnia and bromide of potassium ; of strychnia and chloroform ; but in none of these instances has the extent and character of the antagonism been demonstrated. Dr. Fraser's laborious researches have shown that, between atropia and physostigmia, "the reality of a lethal antagonism may be readily and certainly established by experiment."

Rabbits and dogs, chiefly the former, were the subjects of the observer's experiments. The work was done in the Materia Medica Laboratory of the University of Edinburgh. Some idea of the amount of labor performed may be gathered from the statement that, in all, four hundred and ninety-two experiments were made. Only those who have undertaken investigations of the character we are considering can appreciate the amount and quality of the work which that statement implies.

The method of experimentation was alike simple and satisfactory. First, the minimum lethal dose for rabbits or dogs, as the case might be, of physostigmia and of atropia was determined by a series of preliminary experiments. This was done so accurately, that Dr. Fraser was able, by ascertaining the weight of an animal, to state in advance of experiment the precise minimum dose that would kill it. Having obtained this knowledge, the second step was to administer doses of physostigmia equal to minimum fatal ones, or in excess of them, and in combination with them to administer atropia. Thirdly, when recovery follows the administration of the agents together, the animal was allowed to recover completely from the effects of the experiment. As soon as complete recovery was

established, the same dose of physostigmia that had previously been given with atropia, and from which the animal recovered, was repeated, but without atropia. In every such instance, the dose proved fatal. Such results warrant the conclusion of the observer, that, "therefore, when the administration of atropia prevented an otherwise fatal dose of physostigma from causing death, a perfect demonstration was obtained of the power of atropia to produce some physiological action or actions, that counteracted some otherwise lethal action or actions of physostigmia."

The experiments disclosed a number of interesting and instructive physiological facts. The minimum lethal dose of sulphate of atropia for rabbits was found to be 21 grains for every three pounds weight, or 7 grains per pound. Dogs are more susceptible to it than rabbits. Fifteen grains killed a dog weighing sixteen pounds—less than a grain to a pound. A man of the average weight of 150 pounds is most sensibly affected by $\frac{3}{16}$ of a grain, and would probably be killed by $\frac{1}{4}$ of a grain of sulphate of atropia. This makes a fatal dose for a human being $\frac{3}{16}$ of a grain per pound weight ; and $\frac{1}{16}$ of a grain per pound weight, a dose that produces most unequivocal effects. The scale of fatal doses is 7 grains per pound for rabbits, 1 grain per pound for dogs, and $\frac{3}{16}$ of a grain per pound for man. What a curious field for speculation and investigation these facts disclose. Rabbits do not tolerate physostigmia as they do atropia ; the minimum lethal dose for them of the extract of physostigmia being 0.4 of a grain per pound weight, or 1.2 of a grain for a rabbit weighing three pounds. Another curious phenomenon is the range of counteraction. Atropia counteracts in rabbits the lethal action of physostigmia only within certain limits, both of dose and time. Not more than three and a half times the minimum lethal dose of the latter can be antagonized by the former ; that is, a rabbit weighing three pounds will not be killed by a quantity of the extract of physostigmia varying from 1.2 grains to 3.5 grains, provided an appropriate amount of atropia is also administered. More than 3.5 grains cannot be antagonized. The limits of the counteracting doses vary slightly, as one agent is given simultaneously with the other, or five minutes before or five minutes after the other. In like manner, it was shown that if too little or too much atropia is given for a definite quantity of physostigmia, death will not be prevented. Thus, a

quantity of the sulphate of atropia varying from $\frac{1}{10}$ of a grain to 3.3 grains will prevent the lethal action of three grains of extract of physostigma; but less than $\frac{1}{10}$ of a grain and more than 3.3 grains will not do so.

The range of time relation is not less curious or less important than that of doses. "The fatal effect of one and a half times the minimum lethal dose of physostigma (3 grains of the extract) can be prevented by any dose between $\frac{1}{10}$ of a grain and $2\frac{1}{10}$ grains of sulphate of atropia, if it be administered within ten minutes afterwards; and by any dose between $\frac{1}{10}$ of a grain and one grain of sulphate of atropia, if it be administered within fifteen minutes afterwards." Beyond this interval, successful antagonism does not occur. Another fact, not less extraordinary than inexplicable at present, which Dr. Fraser's experiments have brought to light, is this: a non-fatal dose of physostigma combined with, or rather given simultaneously with a non-fatal dose of atropia, will be fatal. This is very odd, when we remember that if the doses of the agents are increased a fatal result is prevented.

There are other curious phenomena, described in this monograph, which it would be pleasant to mention and discuss, but our space forbids it. We must refer the student of physiological therapeutics, who is interested in these most fascinating inquiries, to the original work. Its concluding paragraph forms an appropriate conclusion to this imperfect notice. Speaking of the way or mode by which atropia counteracts the lethal action of physostigma, the author says: "In presence of the many obvious proofs to the contrary contained in this paper, I have considered it superfluous to enter into any discussion of the possibility of this counteraction being the result either of some chemical reaction between atropia and physostigma, or of an increased rapidity in the elimination of the one substance produced by the action of the other. The conditions of the experiments, and the symptoms that were observed, render it certain that atropia prevents the fatal effect of a lethal dose of physostigma by so influencing the functions of certain structures as to prevent such manifestations from being produced in them by physostigma, as would result in death. The one substance counteracts the action of the other; and the result is a physiological antagonism so remarkable and decided, that the fatal effect even of three and a half times the minimum lethal dose of physostigma may be pre-

vented by atropia. The existence of such an antagonism encourages the hope that the power of directly counteracting disease is far from unattainable, and it supplies a strong incentive to efforts designed to determine the conditions of disease and the actions of remedies with an exactitude sufficient to show how the remedial action may be applied as a counteracting influence to the diseased condition." E. H. CLARKE.

Clinical Observations on the Dementia and the Hemiplegia of Syphilis. By M. H. HENRY, M.D., New York: F. W. Christern. 1872. Pp. 15.

THIS excellent little article is a reprint from the *American Journal of Syphilography and Dermatology* for January, 1872, and emanates from the prolific pen of the energetic editor of that journal. It comprises accounts of two interesting cases of disease of the brain originating in syphilis. In these days of Contagious Diseases Acts, our knowledge of the varied manifestations of the syphilitic poison should keep pace with the increasing general interest in the subject, and this knowledge can only be attained by careful study of honest and accurate clinical observations. We would particularly call attention to Dr. Henry's most just views with regard to very large doses of iodide of potassium. We are confident that many patients linger uncured for months, if not years, taking small doses of the drug the whole time and that without marked benefit, who might have been speedily restored to health by a bolder and more energetic course of treatment. W.

Fireside Science. By JAMES R. NICHOLS, A.M., M.D. New York: Hurd & Houghton. 1872. Pp. 283.

THIS volume includes a series of popular scientific essays upon subjects connected with every-day life. Most of them have appeared before in the *Boston Journal of Chemistry*.

The book is another addition to a class of works whose aim is to interest the general reader, and at the same time to convey, in a popular form, scientific facts relating to subjects which are constantly brought before the notice of even those who claim to care nothing for anything scientific. There are, also, several chapters containing a great deal of information on subjects about which little is generally known; not, however, because the public feel no interest in the subjects alluded to, but because they are rarely to be found in books intend-