benzol, carbon tetrachloride, carbon disulfide and carbon monoxide.

The material for the book was gathered in a clinic which for 25 years has offered medical and surgical industrial service and which evidently is a consultative center for a large part of California, handling some 11,000 patients a year. It was opened soon after the passage of the Workmen's Compensation Act, which covered diseases of occupation as well as accidents, and thus, from the first, this aspect of industrial medicine was of great importance and recurs again and again in the discussion of individual cases. Dr. Johnstone's attitude toward the medico-legal problems is eminently fair, free from over-indulgence but equally free from a hard-boiled scepticism. It is evidently the result of long experience on a mind free from prejudices and is perhaps most clearly shown in the section on neuroses and malingering.

A mild criticism might be made of one or two subjects. Nitrous fume poisoning is rather too briefly handled, considering its great importance in the production of high explosives and in welding. The diagnosis of lead poisoning, based on history of exposure, clinical symptoms and laboratory findings, is very well dealt with, but the picture given under the heading "Suggestive evidence of incipient intoxication and inactive or arrested plumbism" would by many physicians be called "definite and active plumbism," requiring suspension from lead exposure, even if no disability is found. It seems to this reviewer that the connection between chronic plumbism and peptic ulcer, nephritis and vascular damage is dismissed too lightly in view of the available evidence.

There are indications of rather hasty preparation in some places (talc is included among the silica-containing dusts on page 307, but correctly classed as hydrated magnesium silicate on page 305) and the proofreading is surprisingly faulty for a Saunders book; "consistency" for "constituents," "ascribed to" for "described," and one whole line misplaced on page 335.

One very good feature of the book remains to be mentioned, the sections on treatment, which are detailed and clear, not general and vague as is too often true in books of this kind.

ALICE HAMILTON

DIVISION OF LABOR STANDARDS,
WASHINGTON, D. C.

REPORTS

GRANTS MADE BY THE BANTING RESEARCH FOUNDATION

THE Banting Research Foundation reports that grants made to individuals working on medical problems in different parts of Canada last year were instrumental in furthering research of considerable interest in several fields. Following are brief summaries of work performed by those holding grants during part or whole of last year.

To test the accepted hypothesis that oxidation of α-estradiol to estriol, or hydration of estrone to estriol, takes place in the uterus under the influence of progesterone, W. S. Bauld, of Dalhousie University, working with Dr. R. D. H. Heard, showed that in the rabbit this transformation occurred.

W. H. Feindel and Dr. C. B. Weld, at Dalhousie University, studied the permeability of the eye membranes in dogs to the sugars xylose, glucose, sucrose and raffinose. It was found that their penetration into the aqueous humor was inversely related to their molecular size, and that raffinose represents the approximate limit of the size of the molecule which passes through the membranes.

Dr. K. C. Fisher, of the University of Toronto, extended his investigation of the mechanism of the action of anesthetics to include a broad variety of narcotic agents and cells. The initial interpretation, namely, that the metabolism of a cell is separable into two independent parallel fractions, has been fully borne out.

A. G. Gornall, of the University of Toronto, found that in ureasynthesis studies the accumulation of citrulline occurred in liver slice saline containing $NH_3 \cdot CO_2$, lactate and ornithine. This research forms an important step in our knowledge of the means by which urea is formed in the body.

Dr. Mavis Gunther, of the University of Toronto, has made a survey of the progress of lactation in a series of women. She has accumulated statistics of when and why infants are weaned and has analyzed the causes of women being unable to nurse satisfactorily.

M. M. Hoffman, of Dalhousie University, working with Dr. R. D. H. Heard, has furnished experimental confirmation of the hypothesis that the urinary oestrogen, oestrone, arises in the body from the ovarian follicular hormone, α-oestradiol. The metabolism of the corpus luteum hormone was also investigated and it was found that in the rabbit, as in the human, pregnane-3 (α), 20 (α)-diol is the main excretory product and the conversion in the rabbit is not appreciably affected when the uterus is removed.

A. F. McKay, of Dalhousie University, working with Dr. R. D. H. Heard, continued investigations dealing with the degradation of cholesterol to Ring B substituted androgens, with the object of elucidating

the structure of certain isomers of androsterone excreted during pregnancy in the mare.

Miss M. M. MacKenzie, of the University of Western Ontario, studied the relation of age of rats to susceptibility to cancer induced by benzanthracene. She found younger rats more susceptible than older ones, but the strain of the rat was found to be much more important than its age or sex.

Miss D. B. Mundell, of the University of Toronto, has devised a simple method for the purification of tissue cholinesterase from dog pancreas. One milligram of the purified esterase hydrolyses 4–5 grams of acetylcholine per hour. This degree of purity is about 100 times greater than that obtained by Stedman.

Dr. L. T. Newman and Messrs. W. A. Ladd and J. H. L. Watson, of the University of Toronto, worked on several applications of the electron microscope to medical research. With Dr. D. Irwin, a study was made of the size of the particles of mine dust, and it was found that particles 0.03–0.20 microns in diameter were much more numerous in drilling than in blasting dust. With Dr. J. Craigie, School of Hygiene, University of Toronto, several hundred photomicrographs of vaccina virus, typhoid bacillus, rickettsia and bacteriophage were taken.

Miss H. M. Perry, of the University of Toronto, performed experiments which showed that the lessened carbohydrate stored in scorbutic conditions was due to inanition and not to the deficiency of vitamin C. A peculiar condition of fat storage in vitamin C deficiency was substantiated, but fatty or cirrhotic livers were not observed. Experiments also showed that the capillary fragility is not a good index for the clinical estimation of either vitamin C or P deficiency.

H. C. Read, of Dalhousie University, found that the X-zone of the adrenal glands of the mouse degenerate during pregnancy and will regenerate after pregnancy but that regeneration is delayed by lactation. In immature animals the X-zone can be made to disappear by injections of oestrone, testosterone, A.P.L. and P.M.S. hormones.

Dr. K. Sternbach, of the University of Toronto, tested the activity of 104 new compounds of the sulfanilamide type, prepared by Dr. Schnitzer, against meningococcus infection. Ten showed definite activity but no more than that of drugs already known. Of a smaller series of drugs prepared by Dr. Siebenmann, two were found which were as efficacious as sulfanilamide with regard to meningococcus infection and were decidedly less toxic. Dr. Sternbach has also obtained a method of infecting animals with gonococci, so that sulfanilamide compounds could be tested against this type of infection in animals.

Dr. P. G. Weil, of the Royal Victoria Hospital, Montreal, has made further studies with regard to the histamine content of blood and tissues in shock. He has also investigated the value of certain substitutes for whole fresh blood in the treatment of the condition.

The trustees wish to point out that in addition to financially assisting the above-described individual researches, the foundation gave a block grant, amounting to almost half the income of the foundation, to the Banting and Best Chair of Medical Research, University of Toronto.

The trustees wish to remind medical research workers in Canada that funds are available each year to financially assist individuals who submit problems which meet with the approval of the trustees. Meetings at which applications are considered are usually held in May, August and December.

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SPECIAL ARTICLES

THE EFFECT OF COLORED IONS ON THE PHOTO-INACTIVATION OF INVERTASE

AGULHON[1] showed that invertase is inactivated directly by ultraviolet light of wave-length shorter than 3022 Å, while longer wave-lengths have no effect. However, von Tappeiner[2] had shown that the addition of fluorescent dyes to solutions of invertase preparations sensitized the enzyme to the action of sunlight. It seems apparent from these experiments that the radiant energy absorbed by the dye is in some way transferred to the enzyme molecule where it inactivates the prosthetic group. However, the task of proposing a theory of actual mechanism of energy transfers of this type is greatly complicated by the polyatomic nature of the dye molecule, for at least two possibilities exist: (1) the free dye molecule might be activated by light and transfer energy to the enzyme molecule in a collision process; or, (2) the dye molecule and enzyme molecule might form a complex which absorbs light energy, inactivating the enzyme and possibly freeing the dye molecule which may then take part in further inactivations. In a detailed discussion of the available evidence Blum[3] favors the latter mechanism.

[1] H. Agulhon, *Compt. Rend. Acad. Sci.* (Paris), 152: 398, 1911; *ibid.*, 153: 979, 1911; *Ann. Inst. Pasteur*, 26: 38, 1912.

[2] H. von Tappeiner, *Ber.*, 36: 3035, 1903.

[3] H. F. Blum, "Photodynamic Action and Diseases Caused by Light," p. 82, Reinhold Publishing Corp., New York (1941).