Activities of the Medical Research Council.

PERUSAL of the report of the Medical Research Council for 1925–1926,[1] as usual, gives the reader a bird's-eye view of much of the research work which has been carried out in Great Britain on medical and allied subjects during this period. By the system of grants-in-aid to workers in university and hospital laboratories, etc., the Council is enabled to promote research on a much wider variety of subjects than would otherwise be possible; in fact, almost two-thirds of the Parliamentary grant of £135,000 was utilised in this manner, the greater part of the remainder being devoted to the expenses of the National Institute at Hampstead and of the farm laboratories at Mill Hill. Only a few of the more salient points of the report can be touched on in this short account.

Before referring to the scientific work, attention may be directed to certain events of the year which affected the Council. By an Order in Council in July the constitution of the Committee of the Privy Council for Medical Research was altered and the Committee now consists of the Lord President of the Council, the Secretaries of State for Home and Dominion Affairs, for the Colonies, and for Scotland, and the Minister of Health. A few months previously an alteration of the charter of the Medical Research Council had been approved; the amendments provided, *inter alia*, for an increase in the numbers of the Council from ten to eleven, of whom eight are appointed in respect of their scientific attainments, whilst the remaining three include a representative from each of the Houses of Parliament. Two of the former retire each year and are not eligible for immediate reappointment, whilst one of the latter group retires every two years but is eligible for immediate reappointment.

During the year also, the Committee of Civil Research was set up to provide for the discussion of problems which are common to more than one field of science, or to more than one part of the Empire. In addition, representatives of the Medical Research Council were appointed members of the Research Special Sub-Committee of the Imperial Conference and took part in the deliberations of this Committee.

PHYSIOLOGICAL AND BIOCHEMICAL INVESTIGATIONS.

Insulin.—Since the original discovery of insulin by Banting and Best, the problem of the fate of the sugar which disappears under its action from the blood has led to much speculation and stimulated numerous researches, without reaching a final solution until last year. It was known that in the diabetic organism, insulin produced a storage of glycogen in the liver, but in the normal animal the disappearance of sugar from the blood was usually accompanied also by a decrease in the glycogen of this organ; at the same time, examination of the respiratory exchange had shown that, although the metabolism became predominantly carbohydrate in type, yet the oxygen consumption was not sufficiently increased—it might even be decreased—to account for the combustion of all the sugar vanishing. A brilliant series of researches at the National Institute during the past year appears now to have solved this problem.

C. H. Best, in a preliminary investigation on artificially perfused limbs, was able to show that the skeletal muscles were the chief site of the disappearance of sugar. Working with J. P. Hoet and H. P. Marks, he then found that a large part of the glucose disappearing could be found as glycogen in the muscles; although the inorganic phosphate of the blood falls together with the sugar, no storage of phosphoric esters in the muscles was observed. Finally, Best, Dale, Hoet and Marks made a complete balance-sheet of the glucose exchange under the action of insulin. Under all conditions of glucose supply in relation to the dose of insulin, the total amount of glucose disappearing from the system—the decapitated eviscerated preparation—was equal to that burnt, as estimated from the oxygen consumption, together with that found deposited as glycogen in the muscles.

The loss of glycogen from the normal liver under the action of insulin is a secondary effect of the fall in the blood-sugar. In the diabetic with a high blood-sugar, insulin promotes glycogen deposition in the liver, but under its continued action, with a fall in the blood-sugar below a critical level, this glycogen will be transferred, as sugar, to the muscles. The liver glycogen acts as a carbohydrate reservoir, easily available if the blood-sugar falls; muscle glycogen, on the other hand, does not appear to have this function. The depression of the total metabolism under the action of insulin, mentioned above, is most easily explained on the assumption that insulin restrains the new formation of carbohydrate from protein, or fat (Burn and Marks), in the liver. It may therefore be concluded that the action of insulin is identical in both the normal and the diabetic organism.

A very interesting observation has been made by Hoet and Marks, as an incidental outcome of this work on insulin. It has been known for some time that animals dying from an overdose become rigid almost immediately. This also occurs when a rabbit dies after daily thyroid feeding for some weeks. In both cases there is almost complete exhaustion of the muscle glycogen; the *rigor mortis* sets in also whilst the muscles are still alkaline. It appears that the rigidity is due to a failure to reform the hexose-phosphate or 'lactacidogen,' from a shortage of the raw material, the glycogen. Under ordinary conditions the muscle enters into *rigor* only some time after death, and with an acid reaction; in this case the cause must be sought in the death of the synthetic mechanism.

Histamine.—Since the discovery by Dale, Laidlaw, and Richards that histamine, whilst

[1] Committee of the Privy Council for Medical Research. Report of the Medical Research Council for the Year 1925–1926. Pp. 161. (London: H.M. Stationery Office, 1926.) 3*s.* 6*d.* net.

stimulating smooth muscle, relaxes the walls of the capillaries, leading to a marked fall of blood pressure, interest in this substance has been maintained, more especially since it was probably responsible for many of the cases of 'shock' seen during the War. More recently it has been suggested that it may have therapeutic applications. It has been known for many years that extracts of most tissues cause a fall in the blood pressure; recently a liver extract has been advocated as a therapeutic measure in high blood pressure in man. Best, Dale, Dudley and Thorpe have succeeded in identifying the active principles of liver extracts and have found them to be histamine and choline. In addition, large amounts of histamine have been extracted from fresh lungs, *e.g.* 0·3 gm. from 10 kgm. of lung. It must be remembered in connexion with these quantities that 1 part in 250 million parts of water can produce contraction of the smooth muscle of the uterus.

The physiological function of histamine in the body is still a subject for research, but it may be suggested that it plays a part in the chemical control of the capillary circulation, perhaps as an antagonist to adrenaline. This suggestion is supported by the work of Sir Thomas Lewis and his colleagues; they have found that the local reaction of the skin blood-vessels to irritation or injury can be exactly imitated by the injection of minute amounts of histamine.

Bacteriological Investigations.

Cancer.—The work of Gye and Barnard on the filter-passing virus of cancer has been continued. It will be remembered that Gye, working with the Rous chicken sarcoma, found evidence which he believed could only be explained on the hypothesis that the cell-free filtrate from the tumour contained two factors, either of which alone was innocuous. One was a thermolabile substance, specific to the species from which the material was derived: the other was a filter-passing virus, which could be obtained also from mammalian tumours. Gye's recent work has confirmed his original observations; thus he has been able to destroy the virus by using antiseptics like acriflavine or cyanides, instead of chloroform, leaving the specific factor intact in the solution. Some parts of his work have been confirmed by other investigators, other parts are unconfirmed or the validity of his evidence denied. Only further experiments can settle the conflict of testimony.

Dog Distemper.—P. P. Laidlaw and G. W. Dunkin have continued their investigations into canine distemper; the work is greatly aided by the fund collected by the *Field* newspaper. It is now quite certain that the disease is caused by a filter-passing virus; unfortunately, no means have yet been discovered of cultivating it *in vitro.* It can, however, be transmitted to ferrets and back again to dogs at will. The ferret can be immunised by inoculation with formalin-treated virus and is then usually protected against what is an almost invariably fatal disease in this animal. On the other hand, attempts to immunise dogs have been less successful; but it is hoped that a primary inoculation of dead virus followed by a mild distemper infection while the animal is refractory to the disease, will develop sufficient resistance to protect the animal against chance infections.

Chemotherapeutics.—In conclusion, attention may be briefly turned to one or two chemotherapeutical investigations. S. R. Douglas has shown that sanocrysin (sodium gold thiosulphate) has not a specific action on the tubercle bacillus, but so affects the cells of the tubercular lesions as to give indirect damage to the infecting organisms; in rabbits, S. L. Cummins has found that mild infections can be eliminated by this drug, but heavy or virulent infections cannot be cured. In another direction Dobell and Laidlaw, utilising their method of cultivating entamœbæ *in vitro*, on media containing solid rice-starch, have shown that emetine and cephæline are specifically poisonous to *E. histolytica,* the causal organism of amœbic dysentery in man. Minute quantities inhibit its growth and ultimately destroy it, but relatively strong concentrations are necessary to kill it at once. The importance of this time factor in the treatment of the human disease is obvious.

Obituary.

Dr. A. W. Crossley, C.M.G., C.B.E., F.R.S.

Dr. Arthur William Crossley, who died at his residence, Thorngrove, Alderley Edge, Cheshire, on Saturday, Mar. 5, at the relatively early age of fifty-eight years, was the son of the late Richard Crossley and was born at Accrington on Feb. 25, 1869. His early education was obtained at Mill Hill School, from whence he proceeded to the Owens College, Manchester, then part of the federated Victoria University, where he graduated in the honours school in 1890. It is evident that thus early in his career his tastes inclined towards the organic side of chemistry because, after graduating, he went to Würzburg to work under Emil Fischer, then well on the way towards the zenith of his fame, and from there published his first paper, a short note on the optical behaviour of dulcitol, in 1892. He graduated Ph.D. at Würzburg in 1892 and then followed Fischer to Berlin, from which University he published his second paper, on the oxidation of mucic acid, in 1894.

In the autumn of 1894, Crossley returned to Manchester to work with the younger Perkin, who had two years previously succeeded Schorlemmer in the chair of organic chemistry and had started the Manchester school of organic research, which was afterwards to become world famous. He was awarded a Bishop Berkeley fellowship, which, however, he relinquished in the following year on his appointment as lecturer in chemistry at St. Thomas's Hospital; nevertheless, during his short stay in Manchester, he completed an important paper on the substituted pimelic acids, which he published