In the second study, "Trade Relations between Free-Market and Controlled Economies"*, Prof. J. Viner analyses the difficulties which in the nineteen thirties confronted countries maintaining a substantially free trading system and relying primarily on the tariff method of trade regulation; it supplements a critical appraisal of the attempts made to meet these difficulties with constructive proposals for the future. There may be, from the national point of view, a case for national resort to direct foreign trade controls under conditions of world-wide depression, of over-valued and unstable currencies, of collapse of international credit facilities, of imminent threat of war, of the prevalence of similar controls in many other countries, and of the absence of any promise of effective concerted action to obtain relief from these evils; but Prof. Viner regards these direct methods as in general injurious to world prosperity and as barriers to international economic collaboration and harmony. Their substantial elimination is a prerequisite for the attainment of a peaceful and prosperous world.

Against all three major types of direct government regulation of foreign trade—exchange controls applied to commercial transactions, import quota systems, and government monopolies of foreign trade—six charges may be made, in different degrees. They 'tie up' diplomacy closely with the detailed conduct of foreign trade and thus promote international controversy and facilitate the injection of political and military considerations into trade relations. They lend themselves more effectively than ordinary import duties to the application of monopolistic methods to foreign trade, to the economic injury of the world as a whole. They promote bilateralism in foreign trade at the cost of multilateral trade and of the suppression of profitable foreign trade. They lend themselves to discriminatory treatment of the trade of different countries for economic or political purposes. They promote or require the development of internal monopolies and the restriction of the field for private enterprise, and especially small-scale enterprise. Finally, by placing other countries not following similar practices in a position of relative disadvantage in trade-bargaining, they tend to spread these practices to other countries.

Hope for better results from future attempts to obtain reform in this field must depend in part on the attainment, through provisions for collective security, of a reasonable expectation of a peaceful world. It must also depend on reduction of the levels of ordinary import duties in high tariff countries, on the attainment of substantial stabilization of currencies, on the establishment of procedures for concerted action to deal with mass unemployment and on provision of reasonable facilities for international credit. Rapid progress in the elimination of direct controls by bilateral negotiation cannot be expected unless greater success is attained in formulating and obtaining acceptance of unambiguous, rational and easily enforceable criteria for determining the absence or presence of discrimination and of the illegitimate use of monopoly power in trade relations; and unless there emerges from the bilateral negotiations a common pattern of policy with respect to relations with countries which continue to adhere to rigorous direct controls of their foreign trade. Equally the participating countries in their bilateral negotiations must also consider not only the protection of

of their own export trade from discrimination or from monopoly pressures, but also the need for refraining from pressing for, or from accepting, concessions which involve discrimination against innocent third countries.

Prof. Viner sees brighter prospects of success in an attempt to deal with the problem in a multilateral conference. Such a conference would have as objective multilateral agreement binding the participating countries to move towards the elimination of direct controls on a mutually agreed time-schedule; to define the practices which would not be permissible in their trade relations with one another; to formulate the procedures to be followed in trade relations with non-participating countries adhering to direct controls; and to participate in the establishment of an international agency, to which questions of violation of the convention, of revision of its terms, and of admission of new countries could be referred. The technical difficulties of framing and administering a multilateral agreement of this kind would be comparatively moderate if wide acceptance could be obtained for definite and unqualified outlawry of the questionable practices, at least after a transition period had elapsed. Further progress in obtaining significant agreement in this field may be impossible except as international agreement is reached in other fields of international economic relations, notably in limiting the heights of ordinary tariffs, in establishing international credit facilities for monetary stabilization and for long-term investment purposes, and for collaboration in dealing with the problem of the business cycle and of mass unemployment. Slow progress need not be fatal, provided there is early agreement on the direction in which movement shall take place, and on procedures of negotiation which will assure that the achievement of one stage of reform will lead promptly to endeavours to accomplish the next stage.

INDUSTRIAL POISONS

THE delivery by Dr. Donald Hunter of the Croonian Lecture of the Royal College of Physicians for 1942 was prevented by the War: but it is now printed (*Quart. J. Med.*, 12, 185; Oct. 1943). Remarking that the medical man of to-day must know something of the dangers of working in chemical, metallurgical, aircraft, munitions, ceramics, textile, cellulose lacquer and moulded plastics industries, Dr. Hunter points out that new materials for industry are frequently being discovered and used, and that their dangerous properties may not be realized until some workman loses his life or becomes severely ill. The medical man practising in an industrial area may have to deal with symptoms produced by substances which even the chemists may not fully understand. Such substances may attack the workman through his skin or lungs; some of them attack the liver, kidneys, blood or bone marrow. The toxicologist has to add to his medical equipment a considerable knowledge of chemistry and of the processes of various trades as well.

Dr. Hunter discusses the effects of lead, arsenic and mercury among the metals; among aromatic compounds he deals with benzene and its amino- and nitro- derivatives and also tri-*ortho*-cresyl phosphate; he concludes with the chlorinated hydrocarbons and substances of the glycol group. It is, of course,

* League of Nations, II, A.4; 1943. Pp. 92. (London: George Allen and Unwin, Ltd.) 4s. 6d.

impossible in a short article to summarize the results of experimental work and the wealth of other information contained in this lecture, which tells us many interesting things about industry as well as about toxicology.

It is interesting, for example, to note that the substitution of machine for hand labour has abolished lead poisoning among some kinds of lead workers and that, since 1899, the lead manufacturers of Great Britain have spent more than £200,000 on measures designed to provide healthier conditions for their employees. On the other hand, new methods and new industries have introduced new causes of lead poisoning. Motorists will note that spray painting of cars with leadless cellulose paints has reduced the incidence of lead poisoning in this trade, but the use of a lead and tin solder to strengthen steel motor-car bodies has created a new hazard. There is little risk of poisoning by the exhaust gases of car engines using petrol to which tetra-ethyl lead has been added, although it must not be used for cleansing the skin. Householders will be glad to know that aniline colours are now generally used to colour wall-papers, so that there is little risk of the symptoms once produced by living in rooms papered with wall-papers containing cupric arsenite. The mould *Penicillium brevicaulis*, growing in the paste of such wall-papers, liberated dimethylarsine from the arsenical compounds used in the colours. It is worth noting, however, that, so late as 1931, a child died in the Forest of Dean from inhalation of dimethylarsine from the mouldy walls of a damp house, the arsenic having come from coke breeze used in the plaster of the walls. For this reason the use of concrete blocks containing coke breeze and the addition of arsenious oxide to cements to make them harden more quickly are not desirable.

It is in the field of the coal-tar derivatives that the toxicologist is hard put to it to keep pace with the chemist who produces them. Benzene, which must be carefully distinguished from benzine, is of outstanding importance, because of its destructive effect on the bone marrow.

Dr. Hunter states that medical workers all over the world are urging the abandonment of its use as a solvent. The same advice has recently been given by Drs. Hamilton-Paterson and Ethel Browning (*Brit. Med. J.*, March 11, 1944, p. 349). After two years of work on the effects of the inhalation of benzene used in rubber solutions in thirteen British factories, these authors conclude that some other solvent, such as solvent naphtha, should be substituted for benzene, which can cause permanent damage to the bone marrow; they recommend, among other precautions, that the blood of workers using benzene should be examined every six months. Further details about the effects of benzene are given by Dr. Hunter, who deals also with the dangers of the use of other coal-tar derivatives employed in industry.

It is interesting to learn that German factory workers at Münster, who were suffering from a shortage of fats, took home from their place of work a fat substitute and used it for frying potato pancake; they suffered from poisoning by tri-*ortho*-cresyl phosphate. In 1931, Continental women seeking abortion were poisoned by this substance, occurring as an adulterant of apiol, and in 1937 its presence in soya bean oil used for cooking caused other cases of poisoning in Natal. Many will remember the poisoning of some 15,000 people in the United States in 1930, when they took

samples of a drink called Jamaica Ginger ("Jake") adulterated with tri-*ortho*-cresyl phosphate.

The chlorinated hydrocarbons will interest the general public because of their extensive use as refrigerants, fire extinguishers, cleaning agents and so on. Many of them are liver poisons. Carbon tetrachloride, which is the least harmful of them in practice, is used in fire extinguishers, in dry shampoos and as a household cleaning agent; it is also a valuable anthelmintic. The most dangerous of them is tetrachlorethane, which is also used in fire extinguishers, and as a dry cleaner and parasiticide. Its use for making waterproof coatings for aeroplane wings has been discontinued since 1917; in 1914 it caused poisoning of workers in this trade.

Dealing with substances of the glycol group, Dr. Hunter points out that, since 1925 or so, a great new aliphatic chemical industry has grown up, which is bigger than the coal-tar or aromatic industry, and this has produced a host of new solvents used in the textile, artificial silk, lacquer and celluloid industries, and in dyeing and dry cleaning and the making of paper, linoleum, polishes, cements and glues, cosmetics and other things. One substance of this group, dioxan, has a particular interest to laboratory workers, who may use it during the process of embedding material for section-cutting.

A bibliography extending to six pages adds greatly to the value of this detailed and very interesting paper. Apart from its value to industrial medicine, it should be read by the chemist, the manufacturer, the biologist and the social worker as well.

G. LAPAGE.

SMALL ERMINE MOTHS IN IRELAND

BRYAN P. BEIRNE has recently published an illustrated article* on certain species of these moths which belong to the genus *Hyponomeuta*. All stages of the three species, *H. padella* L., *H. cognatella* Hübn. and *H. evonymella* L., are distinguished; but the paper is mainly concerned with the biology and control of the first-named. In an outbreak of *H. padella* on hawthorn in Co. Dublin, an average of more than 95 per cent of the larvæ were destroyed by birds including starlings and other kinds. Of the remaining larvæ and pupæ about 50 per cent were killed by other enemies, including a species of *Gregarina*, which was found to be the most important single enemy of the larvæ after birds. Some 10 per cent and probably more were accounted for by this protozoan. An average of 3 per cent were destroyed by the well-known polyembryonic Chalcid parasite *Ageniaspis fuscicollis* Dalm.—the number bred out from individual *Hyponomeuta* larvæ ranging from 35 to 87. Some 3 per cent of the larvæ were also killed by the ichneumon *Angitia armillata* Grav. Less than 1 per cent were killed by other parasitic insects, including another species of *Angitia*, a species of *Apanteles* and what appeared to be Tachinid larvæ. A large proportion of the pupæ of the *Hyponomeuta* were killed by the predaceous larvæ of a sarcophagid fly, apparently *Agria mamillata* Pand. The ichneumon *Herpestomus brunnicornis* Grav. killed 8 per cent of the pupæ and *Pimpla turionellæ* L. 2 per cent of them. The immature stages of the parasites and predators are described and figured, together with

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