such as 'lethane' or 'thanite'), toxicity depends on (1) contact activity of the toxicant carrier liquid phase, and (2) fumigant activity of the toxicant phase; (2) is relatively independent of (1).

Some rather 'aberrant' results may be obtained when spray chambers are used for the evaluation of insecticides in which different toxicants and carriers are present. For example, the toxicity of an insecticide consisting of a solution of pyrethrins in heavy oil *increases* on dilution with a kerosene spray base owing to an increase in carrier activity (*cf.* systems 2*B*, 2, 3). On the other hand, variation in carrier activity produces only a slight variation in toxicity of sprays containing lethane or thanite, since fumigant toxicant activity is an important factor in gross toxicity. In other words; for given initial toxicant concentrations the relative toxicities of pyrethrum–oil, lethane–oil, and thanite–oil sprays may vary within wide limits simply by appropriate 'adjustment' of carrier activity. Two per cent thanite–oil sprays which show a higher official Peet-Grady rating than *O.T.I.* show a considerably lower rating when tested by the *I.C.T.* coefficient rating (System 3), since fumigant activity is no longer a limiting factor in bio-assay.

(3) With decrease in chamber size, the disturbing influences of fly distribution and spray distribution factors on individual fly dosage diminishes, since it is possible to attain more uniform and higher initial spray concentrations than is practicable with larger chambers of the Peet-Grady type. This is shown by the relatively high initial rates of knock-down produced in the smaller chambers, especially where the toxicants used exert fumigant activity. Similar results have been obtained independently by other investigators[7].

(4) Where the spray storage capacity of the floor of the spray chamber is small, secondary transmission of insecticide from the floor of the chamber to the test insects may be an important factor in gross dosage-mortality relations, since the bulk of the spray is eventually deposited on the floor (*cf.* System 3). The adhesion of finely atomized oil spray droplets to vertical surfaces in the chamber is relatively small. Where the floor of the chamber is lined with an absorbent surface or substrate of high spray storage capacity, film activity is slight and toxicity is mainly influenced by initial spray administration and residual 'mist action'.

It is clear that the physico-chemical factors which influence the dosage–biological activity relations in fly spray chamber methods of insecticidal bio-assay are extremely complex and only become apparent after comparison with much simpler systems of the types 1, 2 and 3. Careful arbitrary standardization of unknown variable factors in the Peet-Grady method is of doubtful significance where variation in carrier activity may obscure variation in toxicant activity. In fact, the use of a standard reference insecticide such as *O.T.I.* as a basis for the evaluation of pyrethrin content in samples of unknown composition is only valid for a restricted range of insecticides in which carrier activity is of a similar order to that in the standard. Where the unknown samples contain toxicants other than pyrethrins, bio-assay provides an index of a gross summation of effects which are characteristic of the particular test chamber and do not necessarily hold in other chambers or under practical conditions of test where, for example, fumigant activity is negligible. Caution is also necessary in the correlation of the biolcgical activity of a spray with some relatively simple factor such as particle size distribution, for kinetic factors are also involved in the transmission of the spray droplets to the insects. High viscosity oils, even when finely atomized, are ineffective under practical conditions owing to dispersion factors, and droplets of less than 17 microns seldom strike the object towards which they are sprayed[8].

It is hoped that the principles which have been illustrated in the present article may serve as a guide to other investigators in the field of insecticidal research, especially those who are primarily concerned with the bio-assay of insecticidal preparations of unknown composition and physico-chemical properties. It is only from the scientific analysis of the limiting factors which influence the biological activity of an insecticide in a selected range of controlled test conditions that the ultimate efficiency of the insecticide under more variable field conditions may be assessed with any degree of accuracy.

[1] Hurst, H., NATURE, **145**, 462 (1940); **147**, 388 (1941); **152**, 292 (1943).
[2] Gnadinger, C. B., "Pyrethrum Flowers", 2nd ed. (Minneapolis, 1936). Shepard, H. H., "The Chemistry and Toxicology of Insecticides" (Minneapolis, 1940). Campbell, F. L., *Soap and San. Chem.*, **18**, 119 (1942).
[3] Rideal, S., and Walker, J. T. A., "Approved Technique of the Rideal-Walker Test", pp. 12 (London, 1921). Ruele, G. L. A., and Brewer, C. M., *Soap and San. Chem.* Blue Book, 117 (1942).
[4] Anon., *Soap and San. Chem.* Blue Book, 184 (1942).
[5] Ford, J. H., *Soap and San. Chem.*, **17**, 91 (1941).
[6] Murray, C. A., *Soap and San. Chem.*, **16**, 111 (1940).
[7] Kearns, C. W., and March, R. B., *Soap and San. Chem.*, **19**, 101 (1943).
[8] Searls, E. M., and Snyder, F. M., *J. Econ. Ent.*, **29**, 1167 (1936). Searls, E. M., *Soap and San. Chem.*, **18**, 97 (1942).

THE BIOLOGICAL SECTION OF THE UKRAINIAN ACADEMY OF SCIENCES

By NIKOLAI GRISHKO

AT the present time the Ukrainian biologists are working in the sister republic of Bashkiria, where the Ukrainian Academy of Sciences was evacuated from its home in Kiev.

The Institutes of the Academy are continuing their valuable research work on the development of theoretical subjects in various branches of biology, and at the same time have included in their programmes of work a number of practical problems connected with war surgery, therapy and general war medicine, and problems connected with the maximum utilization of the natural resources of the country and the increase in the output of agricultural products.

Several of the Institutes' laboratories are working on problems connected with the more rapid healing of wounds, the knitting of fractured bones, problems connected with relieving the sufferings of the wounded and ensuring their more rapid return to the ranks.

Prof. A. Bogomolets, director of the Institute of Clinical Physiology, has proved that the employment of the anti-reticular cytotoxic serum is very effective in speeding up the processes of healing flesh and knitting broken bones.

This new treatment is already widely used in the hospitals and clinics of the Soviet Union. It is one of the results of many years research by Prof. Bogomolets and his pupils into the part played by

connecting tissues in the organism, research work which is being successfully continued to-day.

Prof. Nina Medvedova, one of Prof. Bogomolets' colleagues, has discovered new functions of the cortex of the suprarenal glands—functions which regulate carbohydrate metabolism. She has succeeded in producing, in the form of an extract, the hormone of the cortex of these glands, which she has named 'corticalin'. Corticalin is a hormone regulating the recreative phase of carbohydrate metabolism and is therefore known as the 'rest hormone'.

Profs. Fyodor Primak and Vassily Vasilenko, of the same Institute, working under the direction of Prof. Nikolai Strazhesko, are studying a number of clinical problems in war medicine, in particular the working out of methods of oxytherapy. They are successfully continuing their study of the process of re-establishing the role of the hæmato-parenchymatose barrier in the human organism.

The Institute of Biochemistry has achieved very important results since the War began. The researches of Prof. Alexander Palladin, director of the Institute, into problems of the biochemistry of vitamins and the biochemistry of foodstuffs in general are of very great importance.

The Institute of Biochemistry is also carrying out research into the biochemistry of the nervous system and the biochemistry of muscular action in connexion with problems raised by clinical medicine, including the problem of the struggle against fatigue.

The Institute of Botany has been working since war began on the cataloguing and utilization of wild plants for defence purposes, and on increasing the output of agricultural products, both foodstuffs and industrial raw materials, to cover the needs of the army at the front and the people behind the lines.

The wild plant life of the Republic of Bashkiria, which is very rich in medicinal herbs, is being studied under the direction of Dr. Mikhail Kotov. A number of leaflets and pamphlets on the "Medicinal Herbs of Bashkiria" have been published. A number of wild-growing food and industrial plants are being utilized as the result of an Academy expedition.

The Agrochemical Section of the Institute of Botany has rendered great war-time service. Prof. Pyotr Vlasiuk has worked out methods of fertilization and farming processes for the cultivation of sugar beet and kok-saghyz, both of which are new crops in the eastern districts of the Soviet Union.

Prof. Nikolai Grishko, director of the Institute of Botany, is continuing his research into the sex genetics of hemp, employing the bi-sexual forms which he has produced in which male plants turn into female at the end of the vegetation period. The improvement of a sort of hemp which he produced earlier is being worked on. This sort is bi-sexual, both sexes reaching maturity simultaneously, making it possible to reap the crop entirely by mechanized methods.

Prof. Andrei Sapegin, who produced new sorts of winter wheat and barley which before the War were sown on 3,750,000 acres, is studying genetic processes of the reproductive organs of cultivated plants.

The laboratories of the Institute of Botany are working on new methods of the selection of hybrid pollen-bearing plants, in particular maize, and studying a number of problems in the cyto-embryology of plants. All this work aims at an increase in the output of agricultural products and an increase in war harvests.

OBITUARIES

Lady Lockyer

AFTER a long and active life devoted to wide social and scientific interests, Lady Lockyer, widow of Sir Norman Lockyer, died at Sidmouth on September 9, following a few days illness. She was ninety-one years of age, and her earthly body now rests in the little churchyard of Salcombe Regis close to that of her husband, who was buried there twenty-three years ago. The Norman Lockyer Observatory on the summit of Salcombe Hill is an outward and visible sign of the exaltation of their spirit to the skies.

Lady Lockyer was the younger daughter of Mr. S. W. Browne, and she with her sister, the late Miss Leigh Browne, became associated with Sidmouth from their childhood days through prolonged visits to their grandparents, Captain and Mrs. Carslake. When living in London they were students at Queen's College, which was founded in 1848 by F. D. Maurice, Henry Morley and other men of "light and leading" to provide scholarly training for girls. The two sisters took an active part in social work in Whitechapel associated with Canon and Mrs. Barnett at Toynbee Hall, and in other public affairs and women's movements. They were the prime movers in the establishment of the first hall of residence for women students in London. An appeal was made for funds to provide such accommodation for women students at University College and the London School of Medicine for Women, and in 1882 the Misses Browne took the lease of a house in Bloomsbury for a term of twenty-one years and placed it at the disposal of a committee appointed to carry out the project.

The first student to come into residence was Miss Cicely Ullman (later Mrs. Sidgwick), and the house was soon full. It became clear that a real need had been met and that further accommodation was required. Two adjoining houses were afterwards leased, but when the lease terminated it was decided to build a College Hall in Malet Street on a freehold site and large enough to accommodate 112 students. The foundation stone of this Hall was laid in October 1931, when Lady Lockyer gave an address on its origin and growth. The new Hall was opened by Queen Mary in 1932 and became the chief residential centre for nearly two hundred women university students in London, until it suffered very severe damage from enemy action during the present War.

Lady Lockyer was the widow of Mr. B. E. Brodhurst, F.R.C.S., when she and Sir Norman were married in 1903. In the same year Sir Norman was president of the British Association, and her gracious presence will be remembered by many members who attended the Southport meeting. Later, they left their London house and occupied one built for them facing the sea on the picturesque slopes of Salcombe Regis. After taking up residence in this house, Sir Norman decided that the summit of Salcombe Hill was admirably suited for an astronomical observatory, as it possesses an unbroken horizon in every direction. With characteristic energy he set about constructing an observatory on this site in 1912. About seven acres of land were presented for the site by Sir Norman and Lady Lockyer, and a number of their friends made generous gifts to build and equip this Hill Observatory, as it was first named. In 1916 the Observatory was formed into a corporation to promote its development, and all the lands, buildings and equipment