

of the important linen flax districts of Otago. During the year a Building Research Committee was established by the Department which is giving consideration to the numerous problems which will arise and require investigation in connexion with materials necessary for the construction of houses after the War. The Department's activities have been closely associated with similar activities in Great Britain, in other Dominions, and in the United States of America.

The report of the Dairy Research Institute refers to continued work on problems designed to reduce the damage done through bacteriophage entry into both single strain and mixed strain starters used in cheese factories, as well as on the control of cheese mites, for which purpose ethyl bromide proved a satisfactory fumigant without detriment to the flavour of the treated cheese. Dried butter fat has also been produced. Under the Food Cold Storage Research Committee, work has continued on the refrigerated gas storage of apples, the effect of fertilizers on cold-storage quality, and on the orchard storage of apples. Other work under the Fruit Research Advisory Committee included long-term manurial investigations on apples, minor element studies and further successful trials with modifications of the normal spray programmes.

The Leather Research Association has commenced an investigation on the flexibility of sole leather. The Shoe Research Association has also been concerned with investigations on adhesives. The Cawthron Institute has continued investigations on the mineral content of pastures, while among the activities of the Mineral Resources Committee may be mentioned those on refractories and oil shale, and the preparation for publication of a full report on the geological survey of Chatham Island peat deposits and the chemical investigation of the wax. The Wool Manufacturers' Research Association has given much time to the introduction of the wet chlorine process of producing unshrinkable woollen garments, and to the examination of new unshrinkable processes, as well as to the influence of hairiness on processing.

Under the Plant Research Bureau the Agronomy Division has continued its investigations on linen flax, including the mite infestation of flax seed in store, for which purpose a dressing of 'Ceresan' has given good protection. The Botany Division, Wellington, has continued work on seaweed utilization, medicinal plants, rubber plants, and fibre plants. Good progress has been made during the year in the establishment of hard-wearing turfs for aerodromes, while the Plant Diseases Division has continued its work on vegetable diseases and pests, particularly the control of the carrot rust fly, late blight of tomatoes, and downy mildew of onions. Under the Timber Protection Research Committee the State Advances Corporation has continued field investigations of timber-infesting insects and fungi, the field application of termite control and the field application of wood preservatives.

The report also includes a summary of the more important results emerging from the 1942-43 season's work of the Tobacco Research Advisory Committee. Entomological investigations at the Canterbury Agricultural College have included sheep-dipping experiments and work on insect pests of wheat and of cocksfoot. Animal production research has included studies of the nutritive value of New Zealand mutton and lamb, and the preparation of

hormones. Work at the Wool Metrological Laboratory has been considerably curtailed, but the analysis of survey data collected during 1941-42 has been continued. The Massey Agricultural College has continued its experiments on sheep nutrition, drainage research, root development studies, and on sheep-breeding methods, as well as on pig research.

The report of the Dominion Physical Laboratory refers to investigations on pyrometric control, the chromium plating of gauges and tools, surface metallizing of mirrors, high-speed cross-bearings, measurement of low illumination, repair of lightning arresters, mould on wallboard, and on physical problems in the linen flax industry.

RESEARCHES ON PENICILLIN

SO much has been written about penicillin, the bacteriostatic substance extracted from *Penicillium notatum*, that one hesitates to add more at a time when its properties, which are so remarkable that they seem to be almost magical, are still being investigated in Great Britain and elsewhere. It is clear that everything possible is being done to make this beneficent substance available in quantities as large as possible and to investigate to the full its possibilities.

E. Chain, H. W. Florey, M. A. Jennings and T. I. Williams (*Brit. J. Exp. Path.*, 24, 108; 1943), working in Oxford, where already so much pioneer work on penicillin has been done, have continued the work of W. H. Wilkins and G. C. M. Harris (*Brit. J. Exp. Path.*, 23, 166; 1943) and report the isolation in a crystalline state of helvolic acid, which, like penicillin, is especially active against Gram-positive organisms and is chiefly bacteriostatic rather than bactericidal. It is soluble in most organic solvents, but is insoluble in water, although its sodium salt is readily water-soluble. Leucocytes are not affected by dilutions of it of more than 1 : 1,600 and tissue cultures can be exposed to dilutions of 1 : 2,500 for forty-eight hours. It is excreted in the urine and bile. A high antibacterial titre can be maintained in the blood, but repeated injections of it damage the liver.

Another worker is briefly noted in the *Journal of the American Veterinary Medical Association* (102 385; 1943). The only reference given to the source of this note is that it is abstracted from *Science Digest* of an unstated date. The reference is to a substance which has been called 'penatin', discovered by W. Kocholaty at the University of Pennsylvania. It is claimed that penatin has an even higher 'microbicidal' power than penicillin (penicillin does not kill bacteria; it inhibits their multiplication) and a wider range of application. It is claimed that "50 pathogenic and non-pathogenic species yielded to its action in dilutions as high as 1 : 400,000,000". Anthrax, diphtheria, typhoid, paratyphoid, brucellosis, pneumonia and pus-forming micro-organisms were 'killed' with dilutions of 1 : 12,500,000. Its action was not lowered in 90 per cent serum, and rabbits and guinea pigs suffered no obvious ill-effects from "large intravenous injections".

Readers who wish for further references to the properties of penicillin will find useful the article by M. E. Florey and H. W. Florey (*Lancet*, 387; March 27, 1943) on its general and local administration and the leading article in the *Lancet* (106; July 24, 1943) entitled "Penicillin in America". The latter article gives further references. J. Mackintosh and F. R.

Selbie (*Lancet*, 793; June 26, 1943) compare the action of penicillin with that of some of the sulphonamides and compounds of the flavine type on anaerobic infections of wounds, and a leading article in the *Lancet* (78; June 19, 1943) discusses the evaluation of wound antiseptics, with further reference to the literature of this subject. Sir Henry Dale, in his Frederick Price Lecture (*Brit. Med. J.*, 411; Oct. 2, 1943), briefly deals with penicillin and with the training, by cultural restriction, of a soil bacillus to produce gramicidin, which acts chiefly on Gram-positive cocci. It is clear that the Gram-positive organisms especially, and a good many others as well, are in for a pretty bad time in the years ahead.

Since this note was written the following important further articles on penicillin have appeared: "Progress with Penicillin" (*Lancet*, 546; Oct. 30, 1943); "Penicillin in the U.S.A." (*Brit. Med. J.*, 582; Nov. 6, 1943), both of which deal with American work, and the interesting paper by G. J. Harper (*Lancet*, 569; Nov. 6, 1943) on the destruction of penicillin by the penicillinase produced by certain bacteria.

WOOD UTILIZATION

THE Utilisation Branch of the Forest Research Institute at Dehra Dun, India, continues its issue of practical war research investigations in the Bulletin and Leaflet series of the Institution's publications. *Ind. For. Bulletin* No. 118 (For. Res. Inst., Dehra Dun, published 1943) discusses "Studies in Fire Resistance" of some Indian timbers. Experiments have been carried out on the rate of burning of fifty-two species of Indian timbers, and the influence of various factors like the structure of the wood, physical properties and so forth on the natural fire-resistance of wood is discussed by the writers of the bulletin, D. Narayanamurti and R. Gopalachari. In the present time when the public have come to regard iron and concrete as the chief materials in building construction, it may cause surprise to read the following recorded opinion of the investigators. It merits consideration and further investigation, when in Great Britain there is so much rebuilding and new building to be undertaken.

Wood, despite its many favourable properties, is held by many to be less valuable than iron or concrete because of its inflammability. Combustibility is not always the only criterion to be considered in a material of construction, and even when it is important careful investigation shows that wood behaves better than the other materials when exposed to fierce fires. Natural stones burst even on slight warming, and iron even at 500° C. loses half its strength. The loss of elasticity in heated iron leads to changes of form and shape so that sudden collapse without warning is unavoidable. With wood, in the early stages of fire, any small loss of strength due to the surface burning is compensated for by a loss in moisture content which increases its strength. Another defect of iron is its high thermal conductivity, which is more than two hundred times that of wood. For fire-fighting services also a wooden structure is less dangerous, and the clearing up of wooden wreckage is also easy. By proper methods of construction and suitable chemical treatment wood can be made very fire-resistant. The bulletin is written mainly for India; but the position of wood

vis-à-vis iron and concrete is well worth a close consideration in the great building schemes facing Britain.

In *Ind. For. Leaflet* No. 42 (Res. Inst. Press, 1943) on "Preliminary Studies on Improved Wood", by D. Narayanamurti and Kartar Singh, the importance of wood from time immemorial for construction and fabrication is noted. 'Availability' and 'low cost' are two of the reasons given. In some parts of the world, however, neither of these statements is correct, notably in Britain. The leaflet discusses the results of experiments to improve the properties, in other words the resistance, of wood by impregnation with synthetic resins and other materials. Impregnation with resins is found to increase the density and compressive strength. Under suitable conditions it is possible to increase the compressive strength per unit specific gravity considerably—but attention is directed to the limitations of the process.

An *Indian Forest Leaflet* (No. 37; 1943), "How to Identify Timbers", Part 3, is a continuation of this subject. The author, K. A. Chowdhury, states that Part 1 of the series should be read in conjunction with the present one. The importance of the investigations dealt with in Part 3 lies in the fact that the timbers investigated in the Wood Technology Section have been those thought to be most suitable for motor-lorry bodies. It is well known that in the provision of equipment for the great armies in India that country has become inevitably more and more self-supporting. The leaflet gives a key for the field identification of important Indian timbers used for motor-lorry bodies. Short anatomical descriptions of these timbers have also been included. The importance of this type of information available to the local forest officer in the field is scarcely realizable to the layman. But anyone who has examined a great raft of logs consisting of the whole boles of the trees after floating down several hundred miles of a tropical river, with the object of identifying the botanical species of the logs, will have little difficulty in appraising the importance of this type of research.

PHYSIOLOGICAL BASIS OF CAMOUFLAGE

THE methods of camouflage and of reconnaissance in modern warfare are, to a great extent, conditioned, and even limited, by the potentialities of our visual and acoustic perceptions. Military experts are little acquainted with the scientific side of the problem of human senses and perceptions, while physiologists and psychologists have not yet paid sufficient attention to the application of their knowledge to the evaluation of the 'human factor' in war.

The recently created laboratory for the study of perceptions at the Institute of Psychology of the University of Moscow has, therefore, commenced the publication of a series of books and pamphlets on perception, observation, memory, emotions, etc., under war conditions, and the first booklet, by Prof. K. Kh. Kukcheev, deals with the psychophysiology of camouflage and of reconnaissance.

Detailed scientific data are given on such subjects as the sensitiveness of contrast vision; stereoscopic vision; estimation of distances; perception of movement of different velocity; colour vision; visual perception at low light intensities in connexion with night reconnaissance; physiology of sound perception; sound 'camouflage'; tactile perception