

India and elsewhere. It is hoped that these monographs will eventually provide a source of material to be used in the preparation of Indian botanical text-books.

The present volume deals systematically with the numerous common aquatic flowering plants of India, and in addition to descriptive matter provides keys for their identification at family, generic and species levels. The characteristics of the Indian climate are such that many plants which grow during the monsoon season could well be classed as aquatic plants, since the soil in which they grow is often immersed in some depth of water; however, in the interests of brevity the author has excluded both monsoon and mangrove plants from his treatise.

Although they contain much interesting information, on the whole the descriptions of the various species are somewhat dull; however, the book will no doubt be used principally as a work of reference. The text is sprinkled with numerous botanical terms, some of which are not in common usage, and the provision of a glossary might have been helpful. In providing morphological, anatomical and especially embryological information about the species described, where this is available, the author has drawn largely from Indian literature. The pharmaceutical and other economic uses of the plants are also given, where appropriate, and this information is interesting and sometimes surprising; aquatic plants are utilized in numerous ways, both as medicaments and in the manufacture of articles such as sun hats. A useful appendix supplies the chromosome numbers of many of the plants described.

This well-produced book is illustrated with many clear line-drawings and a few photographs; the latter are of rather indifferent quality and add little to the value of the text. The usefulness of the line drawings would probably have been increased by the provision of scales of magnification, which are supplied in only some instances. With a few exceptions, the text seems to be largely free from errors.

As a systematic work, the present volume appears to fulfil its purpose admirably; it will provide a very useful addition to Indian botanical literature, and to the literature of aquatic plants in general. No description of a Flora which can claim several representatives of such fascinating families as the Podostemaceae could fail to interest the morphologist as well as the systematist; it is to be hoped that this book will stimulate the further investigation of aquatic angiosperms in all their aspects.

ELIZABETH G. CUTTER

THE ROYAL ARMY VETERINARY CORPS

The History of The Royal Army Veterinary Corps 1919-1961. By Brigadier J. Clabby. Pp. 244 + 56 photographs. (London: J. and A. Allen and Co., 1963.) 50s.

THE history of the British Army Veterinary Services in the First World War (*History of the Great War: Veterinary Services*, by Blenkinsop and Rainey, London; H.M.S.O., 1925) is now succeeded by a history bringing the story up to 1961.

It is of interest to compare the outlook and methods in the two Wars, one before the mechanized age had got into its stride and the other after the general public had ceased to regard animals as of importance for military purposes except for food. Again, it is of interest to consider the recently issued history of the U.S. Army veterinary services (*Nature*, 198, 822; 1963.) It could be said that the British histories follow a rather typical, amateur-sounding trend, very enterprising and perhaps rather personal, and with some hankering after

the old days of the horse and even the camel. On the other hand, the American account is very impersonal, efficient, bustling and very well planned. The achievements of both countries in military veterinary service in the First World War were outstandingly good.

By 1939 cavalry had disappeared as such and the artillery services and most of the former pack transport had been mechanized; army veterinary officers had seen the red light and found civilian careers on a large scale. Actually horses and mules found a place in operations to a much greater extent than could be anticipated and were of much importance in certain spheres in Italy, Africa and Asia. Considerable numbers were captured from the Italians in Africa and taken over in the ensuing operations.

Bizarre new problems had to be met. Mules were dropped from aeroplanes by parachute. In Wingate's Chindit force mules were a serious handicap to his troops when penetrating enemy country because of their braying, which warned the enemy and was a danger to morale. At relatively short notice mules were 'devoiced' and dispatched as replacements. This involved a surgical operation on the vocal cords and a special scheme for the procedure on a large scale had to be devised hurriedly and without previous experience of what surgical interference was required to achieve the desired results.

Most of the book is devoted to detailed accounts of the work done and systems followed in the five widely separated theatres of war.

This is an arresting book which will be of interest to all concerned with riding, draft and pack animals in particular and with all aspects of animal life. In war, animals have, unfortunately, increased dangers from many sources, and cruelty and even pain not related to cruelty. The army veterinary services are very active in measures to prevent unnecessary suffering. A hazard to the animal that has always accompanied war is when persons unaccustomed to animals are drafted to animal units; in the Second World War this was a very common occurrence because, by then, so few persons had experience with horses. Many loved the job and did it well, but others were probably disappointed in a non-mechanical duty and not very efficient. Mules reported to be vicious were found on occasion to be underworked and overfed: in any event for a tyro to be placed in charge of an army mule could be described as an experience.

A surprise was that the Japanese did not understand surra in horses; it is not serious in cattle, but they are carriers of the trypanosome concerned, and they thought that it could be ignored in the horses. From their known interest in Burma before the War it would not have been expected that their observers had slipped up in such a fashion.

War dogs really came into their own in the Second World War. It is a serious failure that their value was not recognized in earlier days. There was plenty of evidence of the reliability, after the right training and in the right hands, of suitable dogs for certain very intricate work. Survival of a medieval outlook may have tempered the judgment of war lords. As infantry patrol aids, guards, messengers in certain types of country, for finding casualties and even for finding buried caches of arms and for mine detection they have value. An illustration shows a dog with a rifle that it had found in a concealed position.

In modern war there is important linkage with civil services, air raid and bomb precautions. Animals of all kinds require service, as hazards to the human population, as well as for veterinary attention. With the importance of war gases, missile damage, fall-out, etc. the animal side requires special attention and the army veterinary services are trained accordingly.

The book is full of interesting illustrations and is well written and produced.

W. A. POOL

European Brewery Convention

Report of the Barley Committee: Trials, 1961. Pp. 136. (London: Institute of Brewing, 1963.)

THIS twelfth report of the series compares the agricultural and malting performances of various new barley varieties in fifteen European countries. In addition to details of sowing, ripeness, yields, quality characteristics such as nitrogen-content, grain size and dormancy, the volume contains a wealth of tabulated data on the lay-out of the individual trials, their location, soil analysis, fertilizer treatment, field observations such as those relating to disease resistance, meteorological data and statistical evaluation of yields. Moreover, samples of the barleys were converted into malts by small-scale methods and, here also, the newcomer to this field will perhaps be surprised both by the variation in the results and by the multitude of malt properties which have to be brought into view to provide an adequate comparison.

It will be clear that this is a specialized publication of particular importance to those concerned to see that with this quantitatively and economically outstanding crop the varieties grown shall best meet the rather different needs of the farmer and the maltster. It has, however, a wider lesson to teach by revealing how complex a problem is posed by this seemingly simple objective. Thus not only are the barleys subject to almost unavoidable variations in methods of cultivation and uncontrollable differences of weather, the malts also vary widely. The latter circumstance is in part due to the fact that different regions often prefer malts of quite different character, but is also the result of malting plants apparently giving different qualities of product even when much care is taken to standardize the procedure employed. These considerations are additional to more familiar ones such as the adequate botanical description, identification and stability of the new varieties. The present volume, therefore, both summarizes clearly the results of a phenomenal number of hours of endeavour and provides a valuable guide to those who may be concerned with similar evaluations of other crops on a wide geographical basis. A. H. COOK

Advances in Astronautical Propulsion

Proceedings of a Seminar held in Milan by Istituto Lombardo Accademia di Scienze e Lettere in collaboration with the Advisory Group for Aeronautical Research and Development of Nato, 8-12 September 1960. Edited by Corrado Casci. (International Series of Monographs in Aeronautics and Astronautics. Division 9: Symposia, Vol. 11.) Pp. xxvii+366. (London and New York: Pergamon Press; Milan: Editrice Politecnica Tamburini, 1962.) 100s.

THE papers which compose this volume are concerned with most aspects of astronautical propulsion and a few other closely related subjects. The book begins with a useful introduction to the various methods of electrical propulsion, by the late Theodore von Kármán. Then comes a fine survey of the mechanics of space propulsion by L. Crocco (in Italian), covering the dynamics of high- and low-thrust systems and the properties of transfer orbits. There follow four contributions on conventional rocket propulsion, including a passionate plea for solid fuels from J. Buchanan, and a pleasing discourse on liquid-fuel rockets by A. O. Tischler. Nuclear rockets form the subject of two papers, a practical survey of fission rockets by R. W. Bussard, and a forward-looking review by E. Sänger, covering such topics as photonic fission rockets and intermittent water plasma fusion rockets. Other papers deal with magnetohydrodynamics and power generation in space. The dynamical and heating problems of atmospheric re-entry are admirably discussed in three papers by A. Ferri, L. Broglio and P. A. Libby. Finally, H. L. Dryden outlines some of the future United States plans and also "dips into the future far as human eye can see".

The papers (though not all well written) together constitute an excellent review of the subject. But the book is marred by printing errors so numerous and glaring that they often distract the reader's attention and sometimes obscure the meaning. D. G. KING-HELE

Thermodynamic Properties of Helium to 50,000° K

By Wilbert J. Lick and Howard W. Emmons. Pp. 122 (including charts). (Cambridge, Mass: Harvard University Press; London: Oxford University Press, 1962.) 24s.; 2.95 dollars.

THE authors give an excellent and precise account of the methods used in the preparation of these tables, although the preceding introduction is a discouragingly vague attempt to justify their existence. In contrast to many other similar compilations, it is indeed welcome to find an extremely graphic physical discussion of the type of atomic model and particle interactions assumed in the analysis. The partition functions for electronic excitation and ionization are based on Unsöld's treatment, and thus allow for a density-dependent cut-off of levels and reduction in ionization potential due to particle interactions. The justification and validity of this approach is discussed clearly and at length. There are 108 pages of thermodynamic data—including sound speed—for equilibrium mixtures from 3,000° to 49,800° K and from 10^{-4} to 10^3 atm., listed in steps of 200° K for each ten-fold pressure increment. The chemical species considered are He, He⁺, He⁺⁺, and e; the molar constituents of these are similarly tabulated. The data is also conveniently presented in the form of two splendidly large and clear Mollier charts. This will be welcome to those concerned with the use of helium in high-enthalpy electrically driven shock tubes, although an order extension in pressure would be useful in this respect. The extreme range covered will be more than adequate for those interested in its use in plasma-arc and space propulsion facilities.

IAN R. HURLE

Plant Hairs

By Prof. J. C. Th. Uphof. Die Verbreitung der Haartypen in den Natürlichen Verwandtschaftsgruppen. Von Dr. Karl Hummel und Karin Staesche. (Handbuch der Pflanzenanatomie, Band IV, Teil 5). Pp. xi+292+5 plates. (Berlin-Nikolassee: Gebrüder Borntraeger, 1962.) 96 D.M.

THE long article by Uphof looks like a general essay on hairs and emergences, but is really a pure compilation. The author, on the evidence of his own bibliography, has not been personally active in this field of research, and does not deal with the plants themselves, but only with the literature concerning them. Furthermore, his scale of values is antiquarian rather than botanical. Nothing can disguise the intrinsic sterility of such a treatment. The botany expounded here is one in which iodine is the principal histological stain, and in which the electron microscopy of the cotton fibre is firmly subordinated to the "faint reticulation" which appeared on staining with Congo red in 1925.

The shorter contribution by Hummel and Staesche is a statement of the distribution of the principal hair-types (unicellular, uniseriate, stellate, etc.) among the angiosperms. The only conceivable objection to it is that the material might just as well have been tabulated in a fraction of the space.

At this price the purchaser is entitled to a professional standard of book-production. He does not get it. The English text reads like a bad translation, misprints abound, and Hummel repeats both his own statements and Uphof's to an extent which borders on the farcical. In all, this is a serviceable classified guide to a scattered literature, giving enough detail to obviate in many cases all need for reference to the originals. From every other point of view, it represents a lost opportunity.

K. J. DORMER