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STEREOCHEMISTRY.

Stereochemistry. By Dr. A. W. Stewart. Pp. xx+583. (Text-Books of Physical Chemistry. Edited by Sir William Ramsay, K.C.B., F.R.S.) (London: Longmans, Green, and Co. 1907.) Price 10s. 6d.

THIS book is practically a complete and in many cases a detailed account of the subject of stereo or space chemistry since the foundations of this exceedingly fruitful branch of chemical science were laid by Pasteur and Wislicenus. It is not an historical summary, but a carefully thought out treatise, and one which chemists who have to lecture or teach the subject will find of the greatest use.

The book commences with a short historical introduction. Part i. deals with optical activity, the first section describing the asymmetry of the carbon atom. The author's idea of explaining the effect of polarisation on light by means of a paper-knife and two books is distinctly good. The next chapter deals with inactive compounds, and from this we are led up to the active compounds and the determination of configuration.

Chapter viii., on "other active elements," is a review of the work done upon nitrogen compounds, and also deals with the isolation of active compounds of sulphur, selenium, and tin by Pope and his coadjutors. The first part of the chapter is a survey of cases in which nitrogen is known to show isomerism; the second part is a consideration of the various theoretical explanations put forward upon the configuration of nitrogen compounds. This complex part of the subject would perhaps have been more easy to follow if the author had been able to devote a little more space to the consideration of these theories, but as the references are ample and the book is by no means short, even as it is, Dr. Stewart must be left as the best judge of how much space to devote to each portion of the work. As the author himself says in his preface, stereochemistry is much easier to follow if one has a set of models to work with. It is, in fact, very difficult to study the subject from a book alone, and in Appendix B directions for the construction of stereochemical models are given, one of the simplest methods for making tetrahedra being to cut them out of hard yellow soap, needles being used for bonds.

Steric hindrance is a subject which is very much to the fore at the present time, and one rarely visits a meeting of the Chemical Society without hearing it mentioned. For this reason the chapter on steric hindrance in this book is of particular interest. To a certain extent also interest is added because the author, in connection with his work with Baly upon absorption spectra, has come across facts which in the opinion of the authors are a contradiction to the theory of steric hindrance, Stewart and Baly holding that in the case of the carbonyl group the reactivity is not inherent in the group itself, but depends upon the "nascency" of the radical, this "nascency"

being governed by the action of the adjacent groups upon the carbonyl radical. Could not some rather more euphonious name be chosen for the activity of the group than "nascency"? One can perhaps hardly talk about the atomic character of a group; would not activity itself do? It is not unusual to speak of hydrogen, at the moment of its liberation, being in the active form, but one never talks of the "nascency" of hydrogen. Or one might borrow an electrochemical term, and speak of the potential of the group. Thus the potential of hydrogen is high or low, depending upon the surface and character of the electrode from which it is liberated, and the tension or potential of the carbonyl group might be high or low, depending upon the character of the adjacent groups.

Appendix A deals with the relations of stereochemistry to physiology. That the configuration of the groups should affect the physiological action is certainly interesting. Thus when given to rabbits in various ways it was found that in the case of the three arabonic acids more of the *lævo*- than of the *dextro*-variety was acted upon, and in the case of the mannoses the *dextro*-variety appears to be best suited for nourishment. The taste, at any rate to some extent, depends upon the stereoisomeric form; thus in the case of glutaminic acid the *dextro*-form is sweet, but the *lævo*-form is tasteless. Furthermore, the toxic action in some cases varies considerably with the different isomeric modifications. For example, *l*-hyoscyamine is almost twice as active in its effects upon the pupil nerve-endings as *dl*-hyoscyamine. This branch of the subject is of great interest, and doubtless the gathering together of these facts will serve to stimulate investigation in this valuable practical part of the subject.

The illustrations are good, some of the half-tone reproductions of models being excellent, and the book itself is well got up. It is decidedly one of the most useful of the series, and Dr. Stewart is to be congratulated upon the completion of a very painstaking work.

F. M. P.

ORIENTAL PLAGUE.

Studies in the Bacteriology and Etiology of Oriental Plague. By Dr. E. Klein, F.R.S. Pp. xv+301. (London: Macmillan and Co. Ltd., 1906.) Price 12s. net.

THE appearance of this book at the present time is opportune, for plague is ravaging our Indian Empire, some 900,000 deaths having been recorded there from January 1 to May 31 this year. The work is based on Dr. Klein's large experience of the bacteriological examination of cases which clinically and epidemiologically were under suspicion of being plague. Many epizootics among rats on shipboard were also investigated by Dr. Klein, and the results of his examinations are included. The data so obtained, and published in many scattered papers, are thus brought into a convenient form for reference.

In chapter i. a good account is given of the histology of plague lesions and of the distribution of the plague

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NO. 1981, VOL. 76]

bacillus in the tissues; in chapter ii. the characters of the plague bacillus are described with great fullness, and many valuable hints on staining, &c., will be found here. Dr. Klein believes to be erroneous the view of Calmette that passage of the plague bacillus through a series of animals of a species, while increasing its virulence for that species, diminishes the virulence for other species. The statement is made at p. 29 and again at p. 47 that Hankin described long filamentous modifications of the plague bacillus when the organism is grown on salted media, an observation for which Dr. Klein claims priority. But surely what Hankin did describe was the occurrence of large spherical, spindle- and pear-shaped involution forms on salted media (see *Centr. für Bakt.* xxii., p. 438). Here and in some other places references are omitted, and authors' names are sometimes wrongly spelt, e.g. Tidswell for Tidswell, and Simmonds for Simond (p. 154). Chapter iii. deals with the bacteriological analysis of plague material, many valuable practical hints being incorporated, and chapter v. with microbes simulating the plague bacillus. Notable among these are the *Bacterium bristolense* and the *B. myxoides*. The former was isolated from dead rats found on a ship unloading at Bristol, which had come from a plague-infected port. It caused the death of guinea-pigs with a hæmorrhagic septicæmia and enlarged glands, and the bacilli that were present in the lesions were much like the plague bacillus. As a matter of fact, however, cultures showed that the organism was allied to the *B. coli*. The *B. myxoides* was isolated from a case of acute hæmorrhagic febrile disease, which had been notified as possibly one of septicæmic plague. The organism morphologically and in staining properties presented a certain resemblance to *Bacillus pestis*, but it was not pathogenic by subcutaneous inoculation to guinea-pigs and rats, and culturally differed from the plague bacillus. The case was actually one of hæmorrhagic small-pox with a secondary or a terminal infection with this microbe. These examples illustrate the care necessary to diagnose plague bacteriologically. Plague in the rat and in other rodents is discussed in chapters v. and vi. Dr. Klein considers that there may be a type of *B. pestis* occurring in the rat which is less virulent than the ordinary human type. The transmission of plague from one animal to another (chapter vii.) Dr. Klein would ascribe principally to infection by the digestive tract and not to fleas, lice, and other insects, though it must be pointed out that the careful work of Tidswell (Report on the second outbreak of plague at Sydney) and of the Indian Plague Commission (*Journal of Hygiene*, vi., 1906, No. 4) support strongly the latter theory.

Chapter viii. discusses the agglutination reaction and its application to plague; on the whole the test is difficult to apply in this disease, but under certain conditions may be of value. The important subject of preventive inoculation is dealt with in the last chapter but one. The subject of the supposed danger of inoculation during the incubation period is first alluded to, and Dr. Klein remarks that with a prophylactic he has devised there is no risk of this sort. No reference, however, is made to Bannerman's statistics

(*Centr. f. Bakt.*, Abt. i., Bd. xxix., p. 873), which seem completely to remove this objection to the use of the Haffkine prophylactic. As the result of his experiments, Dr. Klein says, "I am prepared emphatically to maintain that 10 c.c. of the Haffkine prophylactic is capable of fully protecting a rat against a subsequent lethal dose of living plague culture." Important testimony this to the protective power of the vaccine when India is decimated with plague and the author of the prophylactic treatment is under a cloud in consequence of an unfortunate accident for which we believe he was in no way responsible! Dr. Klein incidentally confirms much of Haffkine's work on the plague prophylactic.

The most interesting portion of this section is that which deals with the preparation of a new form of vaccine material devised by Dr. Klein which consists of an emulsion of the dried organs of a guinea-pig dead of plague. The drying deprives the plague bacilli of their vitality, and it was found that 10-15 milligrams of the dried organ powder sufficed completely to protect a rat against a lethal dose of plague bacilli. The final chapter is devoted to a consideration of the modes for the destruction of the plague bacillus, and much useful information on the action of disinfection and disinfectants on this organism is included.

The book, which lacks an index, is profusely illustrated with a number of excellent plates, and we congratulate Dr. Klein on the amount and importance of the work he has done with reference to plague and the plague bacillus.

R. T. HEWLETT.

MEMOIRS ON MARINE ANIMALS.

- (1) *Anurida*. By A. D. Imms. Pp. viii+99; 7 plates. 1906. Price 4s.
- (2) *Ligia*. By C. Gordon Hewitt. Pp. viii+37; 4 plates. 1907. Price 2s.
- (3) *Antedon*. By Herbert Chadwick. Pp. viii+47; 7 plates. 1907. Price 2s. 6d. (London: Williams and Norgate.)

THESE volumes, which form the thirteenth, fourteenth, and fifteenth of the Liverpool Marine Biological Committee's memoirs, are comprehensive studies, admirably illustrated by lithographic plates, of animals common on our shores and readily accessible to the student. The authors and the editor, Prof. Herdman, are to be congratulated on the production of such excellent aids to the study of types of our British marine animals.

(1) Mr. Imms's memoir is a well-arranged and detailed account of the interesting Collembolan *Anurida maritima*, which is common on the surface of the quiet shore-pools and in the crevices of the rocks near Port Erin and at other localities on the British coast. In the description of the habits of the animal attention is directed to the covering of hairs, which, when the animal is submerged, retains a supply of air which serves for respiration (there being sufficient to last the insect five days), and also renders the body incapable of being wetted. Chapters follow on the external characters, integument and coloration, mouth parts, digestive, circulatory, nervous, excretory and repro-