
 REVIEWS

Advances in Enzymology, Vol. VIII. Edited by F. F. Nord. (Interscience Publishers Inc., New) York, 1948. Pp. ix+538, Price \$ 8.00.

The eighth volume of this internationally well-known Annual contains critical reviews on ten different topics contributed by authors whose own contributions to their respective fields have been both large and substantial. This happy circumstance imparts to the discussions a "living touch" which is both illuminating and inspiring. The review on the functioning of the cytoplasm by Ludwik Monne deals with the advances made on the structure and the function of the cytoplasm during the last decade. The author has made a valuable contribution towards a clarification of well-established facts and valuable hypotheses. The second article pertains primarily to a discussion of the "two parallel and independent series of investigations, which together have contributed largely to a more modern and objective, although still woefully incomplete, understanding of the actual nature of complement". In the third article, J. P. Greenstein has presented a critical review of a group of comparatively little known but physiologically significant enzymes, the dehydropeptidases. I. L. Chaikoff and C. Enteman in their review on "anti-liver factor of the pancreas" have advanced convincing evidence of an yet unidentified anti-fatty liver factor associated with the pancreas. Alkaloid Biogenesis is the subject of a fascinating discussion by Ray F. Dawson in the light of the recent gene-enzyme-linked syntheses demonstrated by Beadle and Tatum in *Neurospora*. The discussion on the functional rôle of alkaloids in the physiological economy of the plant is suggestive.

Cellulose which is the most abundant organic compound occurring in Nature, has been the subject of numerous investigations directed towards its chemical exploitation. Nord and Vitucci have presented a critical review pertaining to a microbiological approach to this problem. Lignin which is invariably and intimately associated with most of the naturally occurring celluloses has also been considered and the authors have presented experimental evidence to show that an enzymatically formed methylated aromatic compound might serve as an intermediary between carbohydrate degradation and lignification.

Other reviews include Synthesis of Lipids by Kleinzeller, the Biochemistry of Fatty Acid Catabolism by F. L. Breusch, Lipoxidase and the Auto-oxidation of unsaturated Fatty acids by Sune Bergström and Ralph T. Holman and a fascinating contribution by E. Albert Zeller on the Enzymes of Snake Venoms and their Biological Significance.

Editor Nord who is the founder and guiding spirit of this series of volumes, has been successful in securing for this series an international status; the present volume contains 5 articles from the U.S.A., 2 from Sweden, 1 each from Czechoslovakia, Turkey and Switzerland. This is a volume which will commend itself to a wide circle of investigators interested in a critical appraisal of the progress of biological chemistry in its most comprehensive sense.

Chromatography. By Harold G. Cassidy and others. *Annals of the New York Academy of Sciences*, Vol. XLIX. Pp. 141-326, 1948. Price \$ 2.75.

Chromatography, first discovered by Tswett in 1906, has proved itself in recent years to constitute a powerful and extensively applicable analytical tool. With its aid, compounds considered as single entities have shown themselves to be mixtures and have been resolved into their individual constituents. The method has been employed for checking the homogeneity of a compound and for establishing its identity or non-identity with another sample by a mixed chromatogram test (cf. mixed melting point test).

Harold G. Cassidy, the consulting editor, prefacing the bunch of contributions says that "it was felt profitable to examine the state of our knowledge regarding chromatography, and especially to make it possible for workers using one method of adsorption analysis to come together with those using other methods, so that all methods might become more widely known. It was hoped that, through such a meeting, the chromatographic tool might become further sharpened and the realm of its proper use redefined". At the conference, 14 papers have been presented including the introductory and concluding remarks by the consulting editor. The history, scope and methods of chromatography have been presented by Zechmeister, in whose hands

the method attained a substantial stage of development. Henry C. Thomas has presented "a review of pertinent parts of the equilibrium theory" and has given a mathematical treatment of single solute chromatography for the two simplest reasonable mechanisms of adsorption considered as a kinetic process. Stig Claesson has described the experimental set-up for chromatographic adsorption analysis developed by Tiselius and his co-workers. The ingenious and elegant "partition chromatography" developed by Martin and Syngé, using filter paper, has been described by Martin while the starch column chromatography which makes use of the same partition principle is described by Moore and Stein. Paper strips handle only microgram quantities of the material whereas columns handle milligrams.

A review of fractionation of mixtures by foam formation is presented by Shedlovsky, a promising technique which involves the participation of mobile surfaces and one which has hardly been investigated. Applezweig has presented a very useful paper on "Ion-exchange Adsorbents as laboratory tools" and an equally useful contribution has been made by Deitz on "the surface areas of some solid adsorbents of possible use in chromatography". Other contributions include Systematic Quantitative Chromatography by Schroeder, Fractionation and Analysis of Hydrocarbons by Adsorption by Mair, Stereochemistry and Chromatography by Zechmeister and Chromatography in the Streptomycin Problem by Peck.

The volume represents a very stimulating contribution to the subject of chromatography, which is being, at the moment, extensively employed as fruitful method of analysis.

High Molecular Weight Organic Compounds: Frontiers in Chemistry, Vol 7. Edited by R. E. Burk and O. Grummitt. (Interscience Publishers Inc. N.Y.), 1949. Pp. vi + 330, Price 5-50 dollars.

This is a new addition to the now well-known series sponsored by the Western Reserve University. A vast amount of work in recent years has been with synthetic high polymers, with an emphasis that has practically flooded out the work that is still needed and being done on the natural polymers: proteins, cellulose, starches and the pentosans. This tendency is reflected also in the volume under review. Cellulose finds only the briefest reference and only proteins find a place. The other two types are non-existent so far as the current volume goes.

The first two reviews by Dr. Mark give a

lucid account of the work carried out in the Brooklyn Polytechnic on polymerisation in suspension and emulsion as well as the use of osmometric and viscometric methods in polymer investigations. The experimental details presented, as well as the analytic treatment of the different aspects of the problem will be found particularly useful by newcomers to the field. The term Ac_2 in page 80 is obviously a misprint unless Bc_2 in the next line is an error for Bc_2 . The contribution of Dr. Fisher is a highly condensed one on Elastomers and if it is intended for a student certainly requires elaboration. The only contribution in the volume on a natural polymer is that of Dr. Edsall on proteins. We have here a critical account of the different lines of investigation suggestive of further work in the subject in every section in a field which remains "a quest that will call for ingenuity, skill, and imagination of the highest order". Condensation polymers and phenoplasts are dealt with respectively by Drs. Flory and Carswell. These are quite in line with the rest of the volume in providing a useful critical review.

Even though the field of high molecular weight organic compounds is not fully covered, the volume will be a useful addition to a library for advanced students and the price is quite moderate for the contents.

S. V. ANANTAKRISHNAN.

Recent Advances in Analytical Chemistry: Frontiers in Chemistry, Vol. 7. Edited By Burk and Grummitt. (Interscience Publishers Inc., N. Y.), 1949. Pp. viii + 203. Price 4-50 \$.

The volume is the latest addition to the series under the same editorship and the title will be welcomed by those interested in chemical analysis. Seven reviews are presented in the volume and, looking at the title one is surprised to find that Chromatography in which we see a good deal of work done during the last few years finds no place.

The opening review by Kolthoff gives a bird's eye-view of polarography. Two chapters on the use of organic reagents in inorganic analysis follow. The nature of the topics makes cataloguing an essential part of the review but one regrets the absence of critical treatment. The greater part of the first article on the subject deals with material which cannot by any means be termed recent. Nor does one see from the contributions what one might consider an abnormal emphasis on colour reactions using organic reagents that tend to use dispersion agents even where precipitates

are formed, in order to use a colorimetric method of estimation, though this happens to be the case. The use of dithizone in estimations of lead or of anthranilic acid in estimations of zinc find no reference. The contribution is none the less useful in giving indications of procedure for trying out a new reagent in analytical work. Infra-red spectroscopy is becoming increasingly important as an analytical tool and the contribution by Beeck is full of useful information. The longest monograph in the volume is the one on electron microscopy. The actual application to analyses does not find any detailed treatment but this is probably in the nature of the subject. To one not conversant with the intricacies of work in this field, the contribution is an excellent appetiser. Rossini treats the study of hydrocarbons with old tools in "the new dress of greater accuracy, greater precision and greater efficiency" but the reader can get little information useful to him on the details of these changes in experimental technique from the rather poor photographs on pp. 158 and 172. We have, however, some compensation in having useful information, found only in journals not readily available in this country. World War II has brought into the forefront as an analytical tool an instrument that was available in few laboratories before that date, *viz.*, the mass spectrograph. This has played an important part in recent work in the analysis of complex mixtures of gases, and vapours and the concluding article appropriately deals with this topic.

The volume under review is on the whole mixed fare that will nevertheless find a place in the library of any one interested in analytical work.

S. V. ANANTAKISHNAN.

Surface Active Agents. By Anthony M. Schwartz and James W. Perry. Interscience Publishers Inc., New York and Interscience Publishers Ltd., London, 1949. Pp. xi + 579 Price \$ 10.00.

This book deals with the achievements of the last three decades in the newly developed field of surface-active agents. The processes for synthesising and manufacturing surface-active agents are systematically described. The physicochemical surface and bulk properties as the gross effects associated with the solutions of surface-active agents have been dealt with. The applications to the different industries such as textiles, cosmetics, pharmaceutical, metal working, paints and lacquers,

leather, paper, etc., are discussed in detail. The treatment is in general comprehensive though a reference to the theory of contact angles, mechanism of wetting action, effects of surface-active agents on acid-base indicators and the work on the spreading of surface-active agents on aqueous surfaces would have rendered it even more complete. An up-to-date alphabetical list of commercial surface-active agents, their nature and uses could have been included with advantage.

The presentation of subject-matter and the get-up are very good. There are hardly any errors of any kind and by way of an exception one may point out that on p. 279 line 32, wherein the words "more" and "less" are to be interchanged in order to get the correct sense. This book contains much useful information and is valuable to the technologists and scientists who wish to get posted with the information in the field of surface-active agents.

K. S. GURURAJA DOSS

Fieldbook of Natural History. By E. Laurence Palmer. Whittlesey House (McGraw Hill Book Co. New York.) 1949. Pp. x + 664 with 2,000 text-illustrations. \$7.00.

This is the fourth publication in the well-known Whittlesey House Field Guide series, addressed to American readers and students of field sciences. The present work by Prof. Palmer aims at providing a ready work of reference on objects of natural history that one encounters in every day life. As stated by the author in his preface it is not a textbook in any science nor a manual for the identification of objects considered in any of the sciences. It is a field guide which persons who take some interest in their natural surroundings could consult and obtain information in a form that is non-technical, condensed and aided by illustrations. Such a work can never be exhaustive as the material has to be restricted in scope; in general, the author has attempted "to choose those things found most commonly in an unmodified or still identifiable form in the field, stream or wood lot, in the grocery or fruit store, or behind the kitchen sink".

The material is arranged in sections dealing with astronomy, the mineral kingdom, and the plant and animal kingdoms. The first two subjects occupy only a small portion of the book but these sections are valuable owing to a series of charts on the astronomical side and numerous monochromes with notes for identification in the pages devoted to minerals.

The plant life is dealt with in about 300 pages, closely following and indicating the taxonomic sequence and with accounts of chosen examples under each natural order. The majority of examples dealt with are from the North American flora but reference may be found to many plants of economic importance not found in America. The animal kingdom is dealt with in the next three hundred pages. The same procedure is followed in both the sections; each topic is illustrated at the top of the page, with the description given below in clear graphic style giving means of identification, distribution, features of structure and natural history, and economic importance. There is also an index which facilitates reference. The value of the work to non-American readers lies in the notes relating to species of economic importance, both plant and animal, distributed all over the world and information on which is not readily available in a single book, but the reader should be prepared to find several omissions of items of special interest to him. One may, however, always turn over the pages of this beautifully printed and profusely illustrated volume with pleasure and profit.

N. K. P.

Rinderpest Vaccines—Their Production and Use in the Field. (Food and Agricultural Organization of the United Nations, Washington, U. S. A., March 1949). Pp. 71. Price One Dollar.

Rinderpest is a widespread disease of cattle in Africa, Asia and Far East, and is responsible for the death of at least 2 million head of cattle with a constant threat of the spread of the disease to regions of the world where it is not prevalent at present. It causes considerable reduction in the world supply of milk and meat, and what is more serious, in the destruction of animals owned by farmers and used primarily for the Agriculture of the land. In spite of the magnitude of this economic loss there was no concerted and uniform measure for the eradication or even mitigation of this scourge. The prophylactic vaccines which are in use are not of uniform standard regarding potency and immunising quality. The method of production of vaccine and its use in the field varied in different countries and there is no absolute proof that the vaccine which was used in the field was of the desired potency in all cases and gave sufficient protection to the herds. In the vaccination against small-pox ever since Jenner's discovery de-

velopment was so rapid that a more or less uniform standard of vaccine lymph was introduced in every country and vaccination programme was enforced by legislation so that considerable reduction was effected in the incidence and severity of small-pox. Similar efforts are necessary in the eradication of this terrible disease of Rinderpest.

In the stress of the post-war food scarcity the F. A. O. of the U. N. has interested itself in the problem to adopt adequate measures of control at international level. The present report is based on the meeting of the F. A. O. in co-operation with the British colonial office at Nairobi. At the meeting held between 28th October to 1st November 1948, 22 countries and territories participated in discussing method of controlling Rinderpest and unanimously adopted certain conclusions in the eradication, vaccines, etc. They considered the merits and defects of various types of vaccination.

- (1) Serum virus simultaneous immunization.
- (2) Inactivated virus-tissue vaccination.
- (3) Goat virus vaccine.
- (4) Lapinized virus-vaccine.
- (5) Avianized virus-vaccine.

This last one was used with great success in China causing less reaction than any other attenuated virus vaccine and no deaths.

Many advantages were claimed in favour of this vaccine although more research was needed on the aspect of occasional difficulty experienced in adapting the virus to egg embryos. This vaccine can be attenuated to any desired point of effectiveness and safety to be used on hypersusceptible animals. Further work is needed to assure uniform keeping quality of the vaccine. The cost of this vaccine is very low. These points are sufficient for extended trial of this vaccine. It is expected that an intense world wide programme of control measures will result in the ultimate mitigation if not eradication of this deadly disease of cattle.

K. P. MENON.

The Physical Chemistry of Process Metallurgy.

The publication No. 4 in the series of discussions of the Faraday Society is a collection of papers read at the discussions held under the auspices of the Faraday Society from 23rd Sept. to 25th Sept. 1948. Distinguished physical chemists and metallurgists took part in the discussion.

The discussions cover three aspects of Process Metallurgy, viz., (1) Metallic solutions, (2) Roasting and Reduction processes, (3) Slags and Refining processes.

The introductory address by Sir Andrew McCance is followed by a paper on "The Physico-Chemical Principles in Process Metallurgy" by Sir Charles F. Goodeve. The author deals with the general principles of physical chemistry and the two important approaches in physical chemistry: the kinetic and the thermodynamic. The kinetic approach which starts with a picture of the intimate molecular mechanism of a chemical change, followed by mathematical deduction to allow comparison with experimental results, has been applied with success to gaseous reactions and perhaps is capable of general application. The thermodynamic approach has the desirable quantitative exactitude. He refers to the possible application in study of slag refining processes deoxidation of steel, etc.

The brilliant introduction is followed by several papers relating to the study of metallic solutions. Some outstanding contributions have been made. The paper on "Activities in liquid metallic solutions" by John Chipman dealing with the concept of activity, the thermodynamic equations involving it and the methods of determining activities, *viz.*, vapour pressure, E. M. F. measurements phase diagrams, chemical equilibrium, is a useful contribution. He introduces the concept of semi-regular solutions and describes its usefulness in metals.

The second paper by J. A. Kitchener and collaborators deals with "The activity of sulphur in liquid iron: the influence of carbon." A thermodynamic treatment of experimental results on the interaction of sulphur with iron is given. The influence of carbon in desulphurisation is studied and the authors conclude that sulphur activity is doubled approximately by saturation of the melt with carbon at 1560° C.

John Lumsden in the paper on "Thermodynamics of lead-zinc alloys" deals with lead-zinc phase diagram activities of Zn in the system. He concludes that the percentage of Pb. in zinc produced at each stage of the distillation is independent of the amount of Pb. present in the charge, provided there is sufficient lead to saturate the gas through the cycle of operations. The temperature and hence the lead content of zinc condensed increases as the distillation proceeds.

R. M. Barrer examines some equilibrium and kinetic aspects of interstitial solid solutions, conditions for formation of such phases in his paper on "Aspects of Gas Metal Equilibrium, interstitial solution and diffusion." An attempt has been made to interpret the hard-

ness and inertness of some of these phases in terms of the theory of metallic bond due to Pauling.

In the next paper on "Kinetics of nitrogen evolution from an iron interstitial alloy" by Charles Goodeve and K. H. Jack, the rates of denitriding of Σ -iron nitride in vacuum, N_2 , CO, and H_2 have been determined with X-ray studies.

Details and important features of construction of molybdenum furnaces are given in the paper on "Notes on the experimental technique of some physico-chemical measurements between 1000-2000° C." by J. A. Kitchener and collaborators.

In the last paper in the series on "Elimination of thermal diffusion error in studies of gas metal equilibrium" by Minu Dastur and John Chipman, the errors are said to be eliminated by the use of pre-heating or inert gas.

The series is followed by a general discussion.

The second section contains eleven papers. The important paper is on "The general survey of roasting and reduction processes" by C. W. Dannatt and H. J. T. Ellingham. Charts giving standard free energy of formation ($-\Delta G^\circ$) of oxides and sulphides: variation with temperature will be useful according to the authors in the study of mechanisms and rate of reaction in extraction processes.

An examination of some properties of the diagrams of complex equilibria constructed by plotting of inverse of the absolute temperature as abscissa and log. of equilibrium oxygen pressures as ordinate has been made by Pourbaix and collaborator in "Graphical study of metallurgical equilibrium".

The use of voltaic cells of the Daniell type with molten salts has been discussed in the paper on "Studies in the thermodynamics of metallurgical reduction processes by electrochemical methods" by B. A. Rose and collaborators.

The next paper on "The primary reactions in roasting and reduction processes" by Anderson summarises some evidence derived from studies of semi-conduction in oxide and sulphide systems.

Peretti discusses the use of X-ray methods of study and cylindrical briquettes in the paper titled "A new method for studying the mechanism of roasting reactions". The same author deals with the defects of bottom blow converter in "An analysis of the converting of copper matte."

S. E. Woods examines the possibility of "The reduction of oxides of iron as a diffusion-controlled reaction" in his paper.

Pure metal crystallites cannot start dissociation of CO but it requires the presence of an interface like Ni-NiO or Fe-Fe₃C or the prior formation of carbon nuclei. This is explained with precise measurements by A. Juliard and collaborators in "Kinetic study of the disassociation of CO accompanying the reduction of metallic oxides".

L. M. Pidgeon discusses the reduction of dolomite by ferro-silicon at 1100—1200 C in his paper on "The vapour pressure of Mg in the thermal reduction of MgO by ferro silicon". The vapour pressure of Mg has been found to be much higher than was usually accepted. CaF₂ catalyses but has no effect on the equilibrium vapour pressure.

The last two papers are by Gross and collaborators, the first titled "Some equilibria involving Al monohalides" the second "The reduction of ZnS by Fe".

The series is followed by a general discussion.

In the third series there are seven papers. The interesting paper by Richardson on "The constitution of thermodynamic of liquid slags," covers the present state of knowledge of the structure and thermodynamic theory of solutions and the methods of determination of the activities from liquid immiscibility and from melting point diagrams. Solidification curves of binary silicate systems are plotted. These curves together with data on the stability of silicates and some potentiometric determinations give an idea of the change of activities.

The ionic mechanism of conduction process in the systems is substantiated in the paper on "Electrical conductivity of silicate melts: the systems containing Ca, Mn, and Al," by J. O. M. Bockris and collaborators.

The concept of molecular species is examined in relation to the properties of non-stoichiometric phases and in relation to the use of law of mass action in steel making equilibria, by G. M. Willis in his paper on "The constitution of phases at high temperature in relation to their thermodynamic properties".

In the paper on "Equilibrium relationships in systems containing iron oxide and their bearing on the problem of the constitution of liquid open hearth slags" P. Murray and J. White consider the above two aspects of the constitution of slags.

That the carbon content of the bath is the factor which has the greatest influence upon the oxygen content during the refining period and Mn has no influence, are the conclusions mentioned by Fornander in his paper "The behavior of oxygen in liquid steels during the refining period in the basic open hearth furnace".

The last paper on "The physical chemistry of sulphur removal in steel making" by Carter deals with role of different oxides present in free state in desulphurisation. The author concludes that their ability is the same. If in a combined state the ability is diminished. Mn in the metal can have no effect on the final equilibrium distribution except in so far as it may increase the activity of sulphur in the metal phase.

A general discussion follows this series.

The publication is a valuable addition to any Metallurgical library.

J. B.

Organic Reagents used in Gravimetric and Volumetric Analysis. By John F. Flagg. (Interscience Publishers Inc. New York), 1948. Pp. xiv + 299.

The book under review is a welcome addition to the existing books on chemical analysis and fills a definite gap in the literature on inorganic quantitative analysis, though some aspects of the subject have been covered by other books also.

The book has been divided into two sections, the first part deals with the theoretical aspects of the subject and gives a short resume of the organic chemistry involved in the use of organic reagents. The physical and chemical properties of the compounds with which the analyst deals have been discussed. The section concludes with a chapter on special techniques that are required in analysis with organic reagents. The second section is devoted to a detailed discussion of the various important organic precipitants and gives a sufficiently complete picture of the behaviour, use and further scope of the reagents.

The book describes mainly the macro-methods of analysis, and a reasonably complete bibliography of the micro-methods has also been included.

A glance at the various organic reagents will reveal that most of them are of the type that form chelate complexes. A book like the present one will invoke considerable interest in the minds of organic chemists to test other similar compounds or to synthesise substances

which may ultimately prove to be more useful in analysis.

The appendix embodying the (i) table XXX presenting the drying temperatures and conversion factors of the precipitates formed of the inorganic elements with the organic reagents, and (ii) table XXXI indicating the various organic reagents used for each element, makes the book very handy and convenient for immediate reference.

The general get-up of the book is good and the present volume will undoubtedly find a place in all the modern libraries.

P. C. GUHA.

Human Ancestry from a Genetical Point of View. By Professor R. Ruggles Gates. (Cambridge, Mass. Harvard University Press; London: Oxford University Press, 1948). Pp. xvi+422, 27 Plates. 42s. net.

Fossil evidence for the ancestry of Man was scanty in the days of Darwin, but the publication of his *Descent of Man* in 1871 was followed everywhere by vigorous search for the so-called missing links. The number of discoveries throwing light on human ancestry has been indeed large during the last seven decades, but in several cases the material was either too fragmentary or the stratigraphic information too flimsy. Interpretational difficulties due to personal equation have also been great. If, for example, in a discussion of the status of the Piltdown woman's brain, Keith could regard it as "comparable to modern man" and Elliot Smith, on the other hand could put it down as "the most primitive and most simian brain", common sense tells us that several of our seemingly learned writings on human evolution are in the pre-logical mode. Very large segments of the world including those which, on theoretical grounds, should be regarded as areas of characterisation of early Hominids, have not been properly searched for bone relics. Taxonomic studies on living Man have also not produced satisfactory results to clear the existing confusion. We do not yet know enough of human genetics, human biochemistry, etc., to be in a position for any one authoritatively to analyse and say what primary races or species of man constitute the highly mixed geographical groups of any part of the world. It is under these circumstances that Prof. Ruggles Gates has ventured on the present review of the problems from his own special angle.

The main thesis of the book is that the concept of Linnaeus that all living types of man belong to one species should be "repudiated"

and instead of regarding them as sub-species, the main races such as the Caucasian, Mongolian, Australian, Negroid and Bushmen should be elevated to the rank of species. These species sprang from three different stems, in three different parts of the world, but since all the three sprang from a common primitive miocene stock they have been undergoing parallel evolution. In other words, the very large number of points of similarity between the different "species" of man is due to parallel evolution over a long period and the points of difference due to new mutations. In "splitting" the species *Homo sapiens*, Gates seems to be simplifying problems too much; he overlooks the many difficulties which confront the practical worker in the field. As matters stand at present, the diagnosis of human subspecies is indeed difficult and confused, but if these subspecies, on the suggestion of Gates, are to be elevated as species, it should be possible to give clearer criteria for them than for mere varieties. No helpful suggestions are given on this important question. The subjective feelings of Gates on this culturally vital, but scientifically not so important, question of human races are countered by the views of others, equally competent, among whom is included Darwin.

The valuable part of the book is the discussion of the palæontological data concerning man. No important discovery till 1946 has been left out. At p. 56 is given a scheme of primate evolution which summarises the author's views. *H. caucasius*, *H. africanus*, Hottentot, and Bushman evolved from *H. capensis* (Boskop), which in its turn came from *Africanthropus* (Neanderthal); *Sinanthropus* gave rise to *H. mongoloideus* including variety *americanus*; and *Pithecanthropus* gave rise to *H. australicus*. This scheme is quite different from those given by Clark and Weidenreich and in places less convincing, but as Hooton says in his Foreword, "So I would not urge upon the reader of this useful book, *Human Ancestry*, that he accept its contents as eternal verities".

There are a few misprints, Riedschoten (p. 154), Aijappan (p. 356). At p. 153, Eickstedt is quoted with approval ignoring the criticism of Dr. Guha. At p. 133 there is a statement to the effect that the Nordics are the only people who combine dolicocephaly with hypsicephaly, but the reviewer's work on the Nayadis summarised at p. 357 shows that these two characters are combined in that tribe.

A. AIYAPPAN