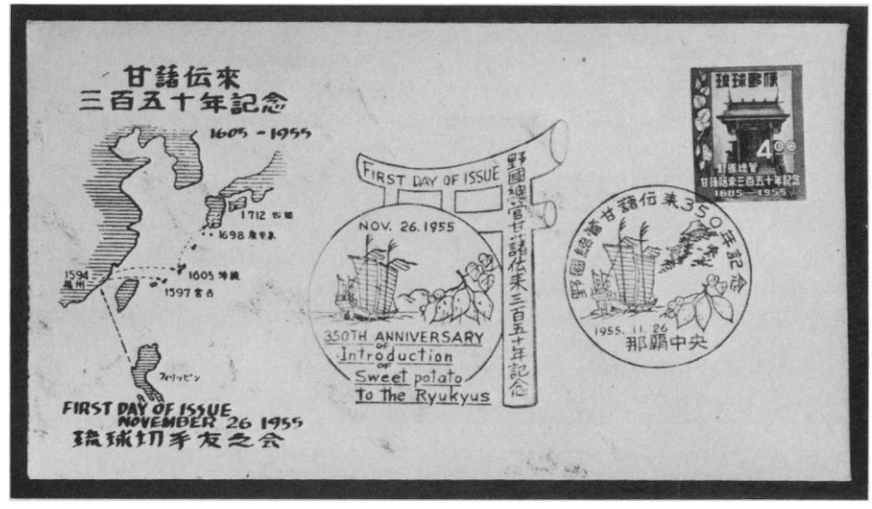
History of a Food Crop

The Sweet Potato and Oceania. An Essay in Ethnobotany. D. E. YEN. Bishop Museum Press, Honolulu, 1974. xvi, 390 pp., illus. $18. Bernice P. Bishop Museum Bulletin 236.



A first-day cover for a postage stamp depicting a shrine built in Naha, Okinawa, to honor the introduction of the sweet potato to the Ryukyu Islands. [From *The Sweet Potato and Oceania*]

Like the Irish potato in Europe, the sweet potato in the Pacific has had a long and fascinating history. Both these New World root crops came to dominate the food economies of Old World regions far removed from their respective centers of origin. But there the similarity ends. Much has been written about the white potato, which thrives under cooler climatic conditions and is familiar throughout the temperate zone. The sweet potato on the other hand, at least as a major starch staple, has been neglected like many other tropical subsistence crops.

In this meticulously researched monograph, Yen helps to redress that imbalance. He explores the complex history of the sweet potato and provides a wide-ranging survey of its botanical variability and of the Oceanic cultural practices associated with it. New and comparative data for those concerned with agronomic adaptation of various tropical root crops, with the development of world food resources, or with the intriguing problems of possible pre-Columbian contact between the New World and Polynesia fill this report. It will serve as a detailed source book on these and related topics as well as a reference work on the species *Ipomoea batatas*. For research on tropical economic systems it contains a wealth of suggestions for the imaginative field investigation of agronomic problems.

With primary support from the Rockefeller Foundation beginning in 1957, Yen was able to study sweet potato variation, and agricultural systems in which that cultigen featured prominently, in more than two dozen subsistence farming communities in different parts of Southeast Asia (including the Philippines), the Ryukyus, New Guinea, Melanesia, and Polynesia (including Easter Island, and several outliers), as well as in western South America. Extensive collections were made and grown at field sites and at the author's original institutional base in New Zealand, where more than 700 clonal specimens were studied. Although Yen began this investigation as a botanist and agronomist, his close collaboration with field anthropologists and tropical farmers led him to an increasingly greater involvement with ethnobotany and the comparison of agricultural systems from both historical and geographic perspectives.

Designed to provide a "more substantial basis" for examining the origins, distribution, and cultural use of the sweet potato, this book has resulted in an unusually rich compendium of careful laboratory analyses and perceptive field reports, documentary and archeological evidence, comparative lexical materials, and evaluations of various hypothetical routes of transference and stages of this crop's development. Reviewing his own research and the literature through 1971, Yen confirms the early prehistoric "origin" of the sweet potato as a cultigen in the New World tropics and the tripartite hypothesis regarding its later introductions into the Pacific (by A.D. 500 to Polynesia, in the 15th and 16th centuries as far as the Moluccas via Portuguese voyages around Africa, and to the Philippines and beyond via Spanish voyages across the Pacific from Mexico). Evidence for the widespread pre-European agricultural importance of the sweet potato in Polynesia seems conclusive. Other Oceanic starch staple crops could not be grown over as wide an altitudinal and latitudinal range. Areas in which the sweet potato could be cultivated probably extended along many margins beyond those suitable for the closest Old World analog, the greater yam (*Dioscorea alata*). At high elevations in central New Guinea and in Cordilleran Luzon, for example, this introduced plant became and continues to be the dominant food crop.

For students of tropical agriculture generally, the chapters on the agronomy of the sweet potato and its role in ten contrastive cropping systems will help to fill a large gap in the literature. Despite their economic importance, until very recently the major tropical starch staple root crops—sweet potato, manioc, taro, yam—have received very little detailed attention in print. Yen's relatively full account of the mixed grain-and-rootcrop farming pattern in Bayyu, Bontoc, deserves special attention in this regard.

The book contains useful discussions of possible modes of transmission, vegetative propagation, taxonomic relations, cytology, centers of variability, and the geographic distribution of varieties. Some readers may wish for coverage of Pacific areas that could not be or were not visited, for further discussion of the linguistic evidence, or for an expanded index. Even the most specialized user, however, cannot help but be thankful for this very welcome landmark publication.

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Physical Anthropology

The People of Africa. JEAN HIERNAUX. Scribner, New York, 1975. xiv, 218 pp. + plates. Cloth, $12.50; paper, $4.95. Peoples of the World Series.

This is a monograph about human biological diversity in sub-Saharan Africa. It is the third in a series of brief volumes summarizing human variation within continents, written primarily for students or for professionals in related disciplines. The author has worked for years in Africa, and he is a pioneer in anthropology in the application of computerized methodology to the study of genotypic and morphological differences among populations.

Racial variation in man has always been a topic of great popular and scholarly interest. We want to know why we differ from each other and what it means. In general biology the origin and maintenance of

intraspecific diversity is one of the core areas of inquiry. Yet despite the interest and importance of the subject, scholarly books on race in man are usually aseptic and tedious—even wit and style cannot overcome a crippling absence of scientific insight and a convincing body of experimental evidence. Our fascination with the larger issues—like hereditary differences in cognitive function, or the meaning of phenotypic adaptation for health and well-being—is met by dry concern with the relation between nose form and climate or with the possibility of sexual selection's influencing the evolution of Hottentot buttocks.

Hiernaux's book is a very good one, but it is firmly in this tradition. Roughly the first half is devoted to background of various sorts, the geography of Africa, the hominid fossils, and a brief overview of evolution, population genetics, and the meaning of classification. These are all very good if very general outlines. The evolution is the "new synthesis" of the '50's, which remains codified as the staple "theory" in physical anthropology if not in other fields of biology. Classification is treated simply as a convenient way of arranging chapters.

The second half of the book is a description of the living peoples of Africa. The approach is to regard today's variation as the product of ongoing adaptation to the local physical environment, together with migration and intermixture with different peoples. Whenever possible Upper Pleistocene fossils are discussed for the information they contain on the history of morphological characteristics in a region. This way of understanding and presenting diversity should be preferable to a typological approach, but the lack of adequate evidence for the many postulated microevolutionary phenomena leads to a vague and unsatisfying narrative. An earlier generation of physical anthropologists assumed that they could see in any population a blend of pure strains. This book would see in the morphology of any population a blend of different kinds of selection, some genetic drift, and some admixture. But the one approach is as sterile as the other, since both are arbitrary catalogs of possibilities rather than stringent applications of scientific method.

This book is potentially a useful adjunct to a course on the anthropology of Africa, it is a useful reference, and it is a rich source of ideas and hypotheses, but it is not a convincing model of scientific procedure and understanding.

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Chemistry of Amino Acids

Peptides 1974. Proceedings of a symposium, Kiryat Anavim, Israel, Apr. 1974. YECHESKEL WOLMAN, Ed. Halsted (Wiley), New York, and Israel Universities Press, Jerusalem, 1975. xx, 434 pp., illus. $32.50.

This volume covers a range of topics in the chemistry and biology of peptides, with special emphasis on synthesis. It includes sections on classical and nonclassical methods of peptide synthesis, photochemistry, analytical control of peptide synthesis, and interactions between peptides and macromolecules.

The paper by Ugi and a large number of collaborators on the four-component condensation method is a particularly interesting and valuable review of 15 years of concentrated effort on this novel approach to peptide synthesis. The objectives, problems, and accomplishments of both the fragment synthesis and fragment coupling modes of this remarkable method are discussed. In addition, two possible extensions of the four-component technique to solid-phase peptide synthesis are proposed. Several other developments in solid-phase synthesis are also discussed in the book. Descriptions of the use of polyamide supports and of two different solid supports for the simultaneous preparation of two peptide analogs are notable, as is the evaluation by Tregear of the products from solid-phase syntheses. New variations on supported syntheses include a solid-phase fragment method, solid-phase synthesis in aqueous media, and liquid-phase peptide synthesis.

Several new reagents, reactions, and side reactions in peptide chemistry are described, including acylphosphonium coupling reagents, the alkali labile β-methylsulfonylethoxycarbonyl group for nitrogen protection, the *t*-butyl group for sulfur protection of cysteine, oxidative modification of threonine and serine peptides leading to isotopically labeled and C^{α}-alkyl derivatives, the use of α,β-unsaturated amino acids in peptide synthesis, the mechanism of the carbodiimide coupling reaction, and a side reaction of dicyclohexylcarbodiimide with histidine.

Total syntheses of naturally occurring biologically active peptides or their analogs are reported for malformin, substance P, motilin, and secretin, and partial syntheses of cytochrome c (residues 67 through 108), human growth hormone (residues 95 through 124), staphylococcal nuclease (residues 36 through 47), ribonuclease (residues 1 through 15), and parathyroid hormone (residues 1 through 34) are also described. These accomplishments indicate the range and complexity of the peptides that can now be prepared and studied. No synthesis of a complete protein is reported. Synthetic depsipeptide- and *N*-methyl- analogs of eledoisin are cleverly used to deduce the interactions of this peptide with its receptor, and an extensive series of synthetic substrates allows the active site of porcine elastase to be mapped.

A round table discussion of the application of high-speed liquid chromatography to amino acid and peptide analysis is particularly timely, but the data presented are of rather limited scope. Similarly the printed papers on photochemistry are much too brief, although they make it clear that this branch of peptide chemistry will be of growing importance.

This book is not a general review of peptide chemistry, but rather a description of what was new in the field in April 1974. It is intended for the specialist but will be of value to those in many peripheral fields. The book has been eagerly awaited and will be read with interest.

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BOOKS RECEIVED

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Fiddler Crabs of the World. Ocypodidae: Genus *Uca*. Jocelyn Crane. Princeton University Press, Princeton, N.J., 1975. xxiv, 738 pp., illus. $75.

Films on Solid Surfaces. The Physics and Chemistry of Physical Adsorption. J. G. Dash. Academic Press, New York, 1975. xii, 274 pp., illus. $26.

Geology of the Sierra Nevada. Mary Hill. Maps by Adrienne E. Morgan. Drawings by Alex Eng and others. University of California Press, Berkeley, 1975. viii, 232 pp. + plates. Paper, $3.25. California Natural History Guides, 37.

Halonium Ions. George A. Olah. Wiley-Interscience, New York, 1975. xvi, 190 pp., illus. $18.50. Reactive Intermediates in Organic Chemistry.

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Infrared Spectra of Surface Compounds. A. V. Kiselev and V. I. Lygin. Translated from the Russian edition (Moscow, 1972) by N. Kaner. D. Slutzkin, Transl. Ed. Halsted (Wiley), New York, and Israel Program for Scientific Translations, Jerusalem, 1975. xii, 384 pp., illus. $37.50.