products of oil extraction and are presently used for animal nutrition, their direct use as food supplement for human beings in areas of shortage should not be too difficult, or economically prohibitive.

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The American Idea of Mission. Edward McNall Burns. Rutgers University Press, New Brunswick, N.J., 1957. xii + 385 pp. Illus. $9.

America is not alone in possessing a sense of national destiny, but with us this feeling has been especially acute and pervasive. This sense of mission, according to the author, centers around a number of convictions: that America has developed more completely than have other nations the principle of liberty; that we are the greatest exemplar of human equality; that ours is the most democratic of all governments; that we are more imbued with a love of peace than are the quarreling peoples of other parts of the earth; that we can lead the world to greater happiness by the example of a high standard of living.

The author supports his conclusions from the works of a host of political leaders, historians, essayists, and other writers. Among these may be mentioned James Wilson, Madison, Hamilton, Franklin, Calhoun, Lincoln, Theodore Roosevelt, Woodrow Wilson, Harry Truman, Bancroft, Fiske, Beard, Emerson, Edward Everett, Wendell Phillips, Henry George, David Starr Jordan, Albert J. Beveridge, and Walter Lippmann. Despite the differences in the periods in which these men were active and the variety of their respective natures, there runs throughout their utterances a note of optimism, sometimes mystical in tone, about American character and institutions that promises well for the world.

It is inevitable that the historian of our ideals should see discrepancies between the conception we have formed of ourselves and the reality of our attainment—that courts have upheld laws that restricted liberty; that racism has conflicted with the doctrine of human equality; that forms of censorship have denied the freedom that democracy implies; that glorification of victory is not consistent with a hatred of war; that many families with low incomes cannot enjoy the living standards of which we boast. Even our conception of ourselves may be imperfect and, as the author points out, where we credit our superiority to "initiative, independence, aggressiveness, perseverance, industry, frugality, and enterprise," such New Testament qualities as generosity, humanity, tolerance, and justice are seldom included in the boast.

In making clear the weaknesses that have appeared in our estimate of ourselves and of our destiny, the book seems sometimes to undervalue the idealistic element in American thought and action. A nation that threw its weight into winning a great war from which it claimed no material reward, other than some indefinite claims on the island of Yap, may have entered that war in enthusiastic innocence and deceived itself cruelly as to what it was accomplishing. But certainly we had raised ourselves above the common level of victors, and this record of altruism is not cancelled out by recalling what we did to the Indians.

If we admit that our conception of ourselves often has been naive, it has nevertheless been an ideal, and the ideal is the first step toward attainment. This the author may have in mind when he says that our sense of mission runs like a golden thread through most of our history and, "purged of its dross of conceit and illusion . . . remains one of the noblest expressions of idealism that any nation has embraced."

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The Biological Action of Growth Substances. Symposia of the Society for Experimental Biology, No. XI. H. K. Porter, Ed. Academic Press, New York; Cambridge University Press, London, 1957. viii + 344 pp. $9.50.

Symposia on animal hormones—for example, the Annual Laurentian Conference—are frequently held, and symposia on plant hormones take place occasionally. The present symposium differs from others in being almost equally divided between plants and animals. Although it is unfortunately true that the speakers in zoology virtually never refer to work with plants, and vice versa, still the juxtaposition is stimulating to the reader and must have been more so to the participants in the symposium. A few topics are dealt with by both groups. The growth-promoting effects of antibiotics, discussed by J. W. G. Porter for farm animals and touched on for some plants by P. W. Brian, are still not fully explained, although Porter makes a strong case for an antibacterial effect, exerted on Clostridia causing subclinical intestinal infections, which, in the normal animal, would reduce growth below the optimum. The development of tumors from normal tissue, described by A. Braun for plant tissue cultures and by G. Klein and E. Klein for animals, shows marked parallelism between the two kingdoms, for both articles present the change as essentially the development of autonomy, or independence from specific growth stimulators and inhibitors. Braun gives evidence for the activation or unblocking, in crown gall, of systems synthesizing four different growth substances, including auxin and a cell-division factor, while G. Klein and E. Klein envisage two basically different types of mechanism, one depending on the selection of variant cells, the other on modifications caused directly by a factor in the host environment.

P. W. Brian discusses the causes of overgrowth in plant diseases, comparing in particular the actions of auxin and gibberellin; he shows proper caution in ascribing the observed overgrowth to specific factors, in the absence of rigid proof, but he makes a common mistake when he compares the ability of pathogens to produce galls with their ability to form auxin in pure culture. It is of course the ability to form auxin in the host tissue that is critical, since culture media may not duplicate the nutrition supplied by the host tissue. Gregory and Veale's paper on "Apical dominance in plants" (inhibition of lateral buds by the terminal) exemplifies the bankruptcy of ideas that has beset this subject in recent years; having chosen a plant in which the influence of the terminal bud —that is, the hormonal factor—is evidently weak, these authors conclude that the main determinant for lateral bud growth is nutrition, especially nitrogen supply. It is not surprising that if growth is not being strongly inhibited it will be limited by some nutritive factor. The effect of auxin in inhibiting lateral bud growth they ascribe to its interference with the formation of provascular strands, in spite of the fact that several workers (Camus and Wetmore, with tissue cultures, and Jacobs, with whole plants) have shown that auxin strongly promotes this process. A much more satisfying approach to the old problem of apical dominance develops from the work on the interrelations between auxin and kinetin in tissue culture, discussed by F. Skoog and C. O. Miller. Indeed, recent work in my laboratory demonstrates that applied kinetin can largely offset typical lateral bud inhibition exerted by the terminal bud, while the similar inhibition exerted by externally applied auxin can be overcome completely.

Two papers, by J. D. Biggers and coworkers and by E. Wolff, respectively, are largely concerned with the complex nutritive requirements of animal tissue cultures, and a useful compilation of data is included. Two others, by L. Brauner and A. R. Schrank, deal with tropisms in plants, the former with the light gradient necessary for phototropism and the latter with bioelectrical aspects both of tropisms and of curvatures caused by auxin. A thoughtful and analytical treatment of the problems involved in

the local formation of new tissue in the adult mammal, such as liver regeneration, is contributed by M. Abercrombie.

The mode of action of growth substances and hormones at the molecular level is curiously neglected in this volume, although action at higher levels is often introduced. Thus, B. L. Baker and E. C. Pliske lay stress on the regulation of enzyme secretion by the pituitary through its action on the zymogenic cells. P. J. Randle, in discussing the pituitary growth hormone, draws attention to its protein anabolic action and its insulin-like hypoglycemic effect and summarizes the evidence that the former may be mediated by way of insulin itself. It is remarkable, however, that, as A. Jost and L. Picon show, the fetus of rat or rabbit can develop at nearly normal rates in the complete absence of pituitary hormones, either from their own or from maternal sources. Perhaps insulin or some other nonpituitary hormone plays a controlling part here. V. B. Wigglesworth discusses the action of growth hormones in insects and is inclined to ascribe the action both of the juvenile hormone and of ecdysone to their "regulation of permeability relations within the cells," whereby enzymes and coenzymes or substrates can be brought together. H. Burström, in a discussion of root growth, visualizes auxin as acting directly on the cell wall of the root; on the one hand it increases plastic stretching but, on the other, it inhibits the subsequent active laying down of wall material and thus inhibits elongation as a whole. Lastly, F. Skoog and C. O. Miller conclude that there is now a gradual blurring of the distinctions between "hormones, metabolites, and structural units," as these "grade into each other in integrated biosynthetic systems which function in all types of growth."

As with most symposia, the treatment is extensive but not systematic, and the book has no index. But this is a thought-provoking collection.

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Purity Control by Thermal Analysis. Proceedings of the International Symposium on Purity Control by Thermal Analysis, Amsterdam, 1957. M. W. Smit, Ed. Elsevier, Amsterdam, 1957 (order from Van Nostrand, Princeton, N.J.). xii + 182 pp.

This is a collection of papers presented at an international symposium held in Amsterdam in April 1957, under the sponsorship of the International Union of Pure and Applied Chemistry, acting through its Commission on Physico-Chemical Data and Standards. The same material, exclusive of the seven-page digest of oral discussion, also appeared in *Anal. Chim. Acta* **17**, No. 1 (1957).

Quantitative application of the freezing (melting) temperature of a substance, and especially of the variation in this temperature as a function of the relative amounts in the solid and liquid phases, is a relatively new technique for evaluating the purity of chemical substances. From its beginnings, a little more than twenty years ago, the procedure has enjoyed increasing acceptance and has attained considerable industrial importance. With its increasing use has come also an increasing awareness of the possibility of errors in measurements and of the limitations of understanding of the phenomena involved.

The Amsterdam symposium was designed to bring together for discussion as many as possible of the scientists actively concerned and to invite a number of them to present formal papers. The volume contains 16 papers and a brief digest of oral discussion. Four of the authors are from Great Britain, seven are from the United States, three are from the Netherlands, one is from Germany, one is from Poland. The papers cover a wide range of experimental methods, both thermometric and calorimetric, for constructing freezing and melting curves. Three deal with instrumentation. Taken together these papers constitute the most authoritative source of information available on the cryometric evaluation of purity.

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Flora Hawaiiensis. Book 5, *The New Illustrated Flora of the Hawaiian Islands.* Otto Degener. The author, Waialua, Oahu, Hawaii, 1957. $5.

In this fifth part of a loose-leaf flora are 217 sheets and a temporary index, with page indications to show where each sheet fits into the complete work, publication of which began in 1946. As in previous sections, the size of the type is varied from page to page, to fit the material to the space allotted and give prominence to the fine line drawings of each species.

The "Flora" of the title refers only to tracheophytes, but the author gives family identifications and keys to genera and species, technical descriptions of individual varieties, and a wealth of delightful information as well as data on distribution. The current "book" includes, among others, *Monstera deliciosa,* the banana family, *Casuarina equisetifolia,* ramie, sandalwood, a Hawaiian sundew (possibly introduced by Pacific golden plovers), a long key to local members of the pea family, papaya, and frangipani. Many of the introduced species have developed racial differences, but the conflict between ancient and recent additions to the islands' plant life is evident throughout the descriptions.

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New Books

Principles of Chemistry. Donald C. Gregg. Allyn and Bacon, Boston, 1958. 620 pp. $6.50.

An Introduction to the Dynamics of Airplanes. H. Norman Abramson. Ronald, New York, 1958. 233 pp. $4.50.

Physique Electronique des Gaz et des Solides. Michel Bayet. Masson, Paris, 1958. 246 pp. F. 4900.

Obok. A study of social structure in Eurasia. Viking Publ. in Anthropology, 25. Elizabeth E. Bacon. Wenner-Gren Foundation for Anthropological Research, New York, 1958 (order from Executive Secretary, American Anthropological Assoc.). 250 pp. Paper, $4.

A Dictionary of Mountaineering. Definitions, names, and terms and their explanations, used by English-speaking mountaineers particularly in Britain and on the continent. R. G. Collomb. Philosophical Library, New York, 1958. 175 pp. $6.

Fat Consumption and Coronary Disease. The evolutionary answer to this problem. T. L. Cleave. Philosophical Library, New York, 1957. 40 pp. $2.50.

The Growth of Logical Thinking from Childhood to Adolescence. An essay on the construction of formal operational structures. Barbel Inhelder and Jean Piaget. Translated by Anne Parsons and Stanley Milgram. Basic Books, New York, 1958. 382 pp. $6.75.

Agricola on Metals. Bern Dibner. Burndy Library, Norwalk, Conn., 1958. 128 pp.

Pharmacology in Medicine. A collaborative textbook. Victor A. Drill, Ed. McGraw-Hill, New York, ed. 2, 1958. 1284 pp. $19.50.

Of Stars and Men. The human response to an expanding universe. Harlow Shapley. Beacon Press, Boston, 1958. 164 pp. $3.50.

Nuclear Structure. Leonard Eisenbud and Eugene P. Wigner. Princeton Univ. Press, Princeton, N.J., 1958. 135 pp. $4.

The Relation of Psychiatry to Pharmacology. Abraham Wikler. Williams & Wilkins (for American Soc. for Pharmacology and Experimental Therapeutics), Baltimore, Md., 1957. 330 pp. $4.

Proceedings of the Second International Congress of Surface Activity. vol. I, *Gas/Liquid and Liquid/Liquid Interface,* 521 pp.; vol. II, *Solid/Gas Interface,* 348 pp.; vol. III, *Electron Phenomena and Solid/Liquid Interface,* 621 pp.; vol. IV, *Solid/Liquid Interface (Washings, Etc.) and Cell/Water Interface,* 352 pp. J. H. Schulman, Ed. Academic Press, New York; Butterworths, London, 1957. $50 per set.

Dynamics of Behavior. Robert S. Woodworth. Holt, New York, 1958. 413 pp. $5.