

evolutionary change in different organs, which is stated to be most pronounced in less specialized forms, is treated next. The bulk of the volume, however, is devoted to the major role in plant evolution attributed by Takhtajian to ontogeny and its modification, and to the related topics of recapitulation and "evolutionary teratology." "In evolution, new characteristics arise as hereditary alterations of organs at the most diverse stages of their morphogenesis, beginning with the formation of primordia and ending with the last developmental phases." This fact, according to the author, refutes Haeckel's famed biogenetic law, which postulates a recapitulation of ancestral *adult* forms. The principle of alteration of ontogenies is applied by Takhtajian to bridge a wide range of apparently profound gaps between major groups of plants and to explain the rise of new developmental lines differing sharply in adult form from their ancestors. At the same time, he cautions that the ontogenetic method must be used cautiously and in conjunction with comparative morphology, lest its potentialities be exaggerated as, for example, he believes they have been by Gregoire, Thompson, and others in denying the foliar nature of carpels. He concludes: "The evolutionary botany of the future will be erected on the basis of a synthesis of morphology and physiology."

If in all this there is very little that is startlingly new to Western students of plant evolution, it is interesting to discover that the climate of opinion is not radically different between East and West.

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Metropolis and Region. Otis Dudley Duncan, W. Richard Scott, Stanley Liberson, Beverly Duncan, Hal H. Winsborough. Published for Resources for the Future, Inc., by Johns Hopkins Press, Baltimore, Md., 1960. xviii + 587 pp. \$8.50.

The program which resulted, among other things, in this hefty volume was initiated by the Social Science Research Committee of the University of Chicago. It was largely carried on at the Population Research and Training Center of that institution, with support from the Ford Foundation and from Resources for the Future, Inc. (which

also sponsored this volume). It is, according to the senior author, virtually a companion to the Resources for the Future study *Regional Economic Growth in the United States* by Harvey S. Perloff and others. Perloff is credited with being "in large measure responsible" for "the ideas which ultimately crystallized in this study."

The authors attempt an integrated treatment of the orientation of metropolitan structure in the United States, a study frankly cross-sectional, one providing a bench mark for dynamic analysis of future change. Its aim is threefold: (i) to review ideas on the nature of the metropolis, (ii) to test these ideas against an outline of the structural characteristics of the metropolitan economy of the United States about 1950, and (iii) to survey the industrial composition and regional relationships of the larger U.S. cities.

In analyzing metropolis structure the authors emphasize location and function. Influenced by Gras, they think of "the metropolis as an industrially developed city, strategically located at a focus of a transportation network." Such concepts are tested with statistical data on the 56 SMA's (SMA: Standard Metropolitan Area) with a population of 300,000 or more in the 1950 census.

Data on manufacturing industries are broken down into categories (i) according to the extent that raw materials are processed or materials already processed are fabricated, (ii) according to whether their output is for final or nonfinal markets.

With the aid of an ingenious diagram (Fig. 15, page 264) that plots commercial against manufacturing activity, the 56 cities are divided into seven categories: national metropolis, regional metropolis, regional capital, submetropolitan (diversified manufacturing with metropolitan functions), diversified manufacturing with few metropolitan functions, specialized manufacturing, and special cases. The authors are less interested in getting each city into a proper pigeonhole than in establishing a typological classification demonstrating how U.S. cities are differentiated in metropolitan functions and regional relationships.

The remaining half of the book is given over to data, discussions, and summaries for 51 of the cities. (The five national metropolises are omitted because their analysis would have overtaxed the available resources.) A detailed "industrial profile" is presented for each. The extent to which each in-

dustrial category has inputs and outputs that are local, regional, or national is discussed in considerable detail and summarized in tabular form. The salient facts for each city are presented in brief summaries. The Denver summary, for example, reads as follows: "Denver appears to be chiefly a commercial and financial SMA performing metropolitan functions for a large portion of the Mountain States. Some processing of resources is carried on—notably meat packing and sugar refining—and inputs appear to arrive from the immediate hinterland (Area B) in the case of sugar beets and from both hinterland and regional areas (B and C) for livestock. Transportation, wholesaling, irrigation, administrative, and educational services appear to be performed for a large but sparsely populated area (Area B) consisting chiefly of Colorado and parts of New Mexico and Wyoming, while financial, military and tourist functions are performed for a regional or national area" (page 380).

Stylistically the book tends toward a dull, polysyllabic, professional mumble. The following sentence is characteristic: "If we are right in thinking that times are ripening for the appearance of such a signal contribution to the theory of metropolitan structure, then our rather eclectic adaptation of a number of perspectives and analytical techniques may be excused as an effort to temporize with competing claims that we cannot adjudicate satisfactorily" (page 19). Resources for the Future should somehow induce a more straightforward expository prose in its reports.

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Birds of Anaktuvuk Pass, Kobuk, and Old Crow. A study in arctic adaptation. United States National Museum, Bulletin 217. Laurence Irving. Smithsonian Institution, Washington, D.C., 1960 (order from Supt. of Documents, GPO, Washington 25). viii + 409 pp. Paper, \$2.

Anaktuvuk Pass, an area of mountain tundra at an elevation of about 2400 feet, is important ornithologically because many species of birds use it in migrating through the formidable Brooks Range to and from the Arctic slope of Alaska. Kobuk, a village in the northwestern interior of Alaska, is on the Kobuk River about 120 miles from