is the position of the scientific community in the Soviet Union problematic, at least according to the official line, here clearly presented by Gennady Dobrov. In this account the sociology of science consists exclusively of science policy and the techniques of directing resources to science in accordance with the interests of the state. (A body of largely nonempirical writings on the historical sociology of science does exist in the U.S.S.R., but it is not mentioned in Dobrov's survey.)

For many English-speaking readers the most valuable parts of this collection will be found in the chapter on West Germany and Austria (jointly written by Klima and Viehoff) and that on Poland (by Krauze, Kowalewski, and Podgórecki). Both recover for us the richness of Central and Eastern European sociological traditions of the 1920's and 1930's, which were tragically aborted by the war and ensuing events in those countries. Klima and Viehoff point out that the social situation of science has been conceived as a sociological problem in Germany since the 19th century. They attribute this to several historical features of the way in which German scientific activity was organized and situated. Whereas British and American science was rooted in a broadly based middle-class scientistic culture, German science was institutionalized in the early 19th century "from the top." The original impulse for the reform of science in German universities during and after the Napoleonic Wars stemmed from Prussian state-bureaucratic interests in developing an ideological counter to French culture. Thus, in Humboldt's conception the ideal of the scholar as a morally superior individual merged with a vision of education as an agency of national moral improvement. All these lofty ideals formed as a kind of accretion on the professionalized scientific research activity which was the almost accidental consequence of idealistic university reform. Hence, to German minds, the rise of *Grosswissenschaft*, industrial science, and the authoritarian hierarchical structure of late 19th- and early 20th-century universities all appeared as unnatural growths and as social "problems"; they seemed not to accord with traditional ideologies of the life of the scientist and the social role of science. The vigorous German concern of the early 20th century with the social role of the scientist and the place of scientific knowledge in society arose, the authors persuasively argue, from this tension between ideals and actuality.

Thus, the authors perform the valuable function of situating the German sociology-of-science tradition in its concrete historical context, showing how it responded to the practical problems and conflicts surrounding the place of science in the national culture. They also show that certain celebrated contemporary German writings are continuous with the old tradition, and that this continuity is a response to conditions that have not materially changed over the years. In this way, the well-known work of Habermas is linked to the equally well-known writings of Max Weber and to the less celebrated studies of prewar sociologists and social historians such as Franz Borkenau, Henryk Grossman, Helmuth Plessner, and Max Scheler (although Karl Mannheim and Edgar Zilsel are curiously missing from the account). The most valuable of this work was characterized by intense concern with the connection between scientific culture and capitalist society and was groping toward the development of a large-scale sociology of scientific culture when the Nazis intervened. Similarly, in Poland the group around Znaniecki and Ossowski in the "science of science circle" during the 1920's and 1930's was attempting to develop a naturalistic, nonevaluative, and largely materialistic sociology of scientific knowledge. Excerpts from Znaniecki's untranslated 1925 essay "The subject matter and tasks of the science of knowledge" whet the appetite for a complete English version. And the net effect of many of these pre-World War II writings from Germany and Poland is to prompt the heretical suggestion that the future of the sociology of science is to be sought in its neglected past.

When we turn back to American-style sociology of science, we can appreciate it on the same terms as the various European traditions discussed (more or less well) in this book. They are all local products, and they are all shaped by local perceptions and evaluations of science. Books like this encourage speculation (and research) on the reasons why different national cultures perceive science differently and thus study it differently. One can only note that high evaluations of science tend to be associated with sociological enterprises that protect scientific knowledge from scrutiny and that a social environment that accepts the reality of class conflict within it and has a vigorous Marxist intellectual tradition tends to develop a "critical" approach to the social place of science. On these counts America and Europe are separated by more than an ocean, and it is natural that their respective sociologies of science should differ fundamentally. That never the twain shall meet would be a depressing conclusion. Yet trying to impose an intellectual style shaped by one set of conditions onto an alien context seems as doomed an enterprise as attempting to sell Cadillacs to Britons or, for that matter, Minis to Texans.

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Ecological Principles and Antecedents

An Introduction to Population Ecology. G. EVELYN HUTCHINSON. Yale University Press, New Haven, Conn., 1978. xii, 260 pp., illus. $17.50.

Evelyn Hutchinson, a Tyler laureate, is one of the fathers of modern ecology; he has made a unique contribution, both directly and indirectly through his students, to the blending of mathematical insights with those gained from natural history. In this volume he has called on his remarkable grasp of relevant studies; he is as familiar with John Graunt's (1662) work on the bills of mortality of the citizens of London as with McClure and Price's (1976) paper on competition among leafhoppers and equally knowledgeable on all that lies between. The references have been selected without bias regarding temporal or indeed spatial origins: European work, including that from Russia, figures alongside that from the New World.

The frontispiece is of a memorial in an English church dating from 1468, the dedication is in Latin, and the preface is dated "All Hallows Eve, 1976." These herald an approach that continues throughout the volume, the interweaving of the weft of man's historical heritage with the warp of the modern theory of population ecology.

There are six formal chapters. The first, entitled "M. Verhulst," gives an account of the development of the logistic up to and including Gilpin and Ayala's generalized equation. The second is concerned with mortality and the third with natality. Chapter 4, charmingly and realistically entitled "Living together in theory and practice," reviews competition theory and, happily correcting the bias toward animals in the studies

undertaken, extensively utilizes botanical examples. Semantic conflicts have sometimes surrounded the concept of "niche." The fifth chapter shows how the concept had two origins (Johnson and Grinnell on the one hand and Elton on the other) and how, as is typical for an ecological concept, its definition has evolved with our understanding, to which Hutchinson has himself contributed so much. Finally, in "How is living nature put together?" some aspects of community ecology are somewhat sparsely surveyed: from Elton's food cycles to Levins's loop analysis, then oscillations (foxes and lemmings and so on), then diversity, and so to R. M. May's clarification of diversity and stability, all in 21 diagram-packed pages. The book concludes with a brief but powerful and timely rebuttal, entitled "Aria de capo and quodlibet," of extreme logical positivism as applied to biology and an appendix, "Ratiocinator infantium or the modicum of infinitesimal calculus required for ecological principles."

This splendid book is, as the author tells us in his preface, suitable for beginners in ecology. Its wealth of graphs, histograms, and similar displays of quantitative data will greatly aid understanding, and it is to be hoped that they will also train students to consider the "form" of their data before they punch them into a computer. It is important to remember how many scientific advances have arisen from the consideration of experiments that went wrong; if the data from an ecological study are fully displayed the investigator may realize that the nonsignificance, with respect to the pattern that was sought, is due to another pattern that was not being tested for and may be new. Such insights may easily be lost now that pocket calculators, not to mention full-sized computers, allow one to go straight from the raw data to the outcome of a significance test.

Frederick Frost Blackman, F.R.S. (1886–1947), and Sir Arthur G. Tansley, F.R.S. (1871–1955). Tansley (right) "introduced the word 'ecosystem,' founded and long edited the *New Phytologist* (the title comes from Sir Thomas Browne) and was important for his part in establishing the *Journal of Ecology* . . .; his works on British vegetation are classical." Blackman, "who became Tansley's brother-in-law, is best known for his work on photosynthesis. Both men had immense influence as teachers." [Caricature by D. G. Lillie, National Portrait Gallery, London; reproduced in *An Introduction to Population Ecology*]

The preface also indicates that the course on which the book is based was found useful by the "occasional historian, economist, or sociologist." The weft of social history will indeed fascinate many and will surely delight the arts scholar. Much of this information is provided in footnotes: some are very lengthy, and one even extends from p. 105 to p. 108, filling the intervening pages completely. As these footnotes are set in small type they probably contain nearly half as many words as the main text itself. This book within the book is packed with interesting recondite information. Its perusal does, however, rather disturb one's concentration on the main text. Persons mentioned in the footnotes are included in the general text, which therefore contains such surprising entries for an ecology text as "Flahaut, Comte de," "Hortense, Queen," and "Mussolini, B." These are quoted merely to illustrate their varied nature and not to decry their inclusion, which is vital if the associated information is ever to be relocated, for other key words from the footnotes are seldom indexed: though the Ku Klux Klan has an entry, the American Institute of Family Relations (p. 155) has not.

The theme of the weft is historical, and it is the temporal dimension that pervades the ecological warp: spatial aspects, such as dispersal or migration, the third pathway of population change, do not gain a mention. This omission is unfortunate, but it is a small fault and perhaps a reflection of the book's global quality. It is the first textbook I have seen in which the author has firmly embraced *r* and *K* selection throughout, and I believe that the manner in which Hutchinson has been able to use the concept in so many places demonstrates its power; but perhaps I have a bias.

This well-written work is a book and a half, not only about facts, but about

people and their ideas. It is, like its author, unique and should be read by all: poets and politicians to find out what ecology is about, tyro ecologists to grasp the fundamentals, and practicing ecologists to be reminded of the people and the ideas that have gone before.

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A Mesoamerican Capital

Monte Albán. Settlement Patterns at the Ancient Zapotec Capital. RICHARD E. BLANTON with contributions by William O. Autry, Jr., Stephen A. Kowalewski, Carl Kuttruff, Elsa Redwood, and Charles Spencer. Academic Press, New York, 1978. xxvi, 454 pp., illus. + loose map. $24.50. Studies in Archeology.

Over the past 20 years a prime activity of specialists in Mesoamerican archeology has been settlement pattern analysis of major Mesoamerican centers. These have included such Lowland Maya sites as Dzibilchaltun, Tulúm, Tancah, Mayapán, Tikal, Copán, Coba, Altar de Sacrificios, Quirigua, Becán, and Seibal; the Highland Maya site of Kaminaljuyú; and the Central Mexican sites of Xochicalco, Teotihuacán, Cholula, and Tula. The present study deals with the great Zapotec site of Monte Albán in Oaxaca, which was the center of a large state from 600 B.C. to A.D. 900.

In *Monte Albán: Settlement Patterns at the Ancient Zapotec Capital*, Richard Blanton presents a detailed reconstruction of the origin, growth, and ultimate decay of this major pre-Columbian urban center. Owing to its "unique" location atop a steep-sided mountain some 400 meters above the valley floor, to the paucity of evidence indicating extensive craft specialization, and to the presumed lack of prime arable land in the immediate vicinity of the site, Monte Albán is viewed by Blanton as a disembedded capital, founded as a locus of regional decision-making by a confederacy of autonomous societies residing in the Valley of Oaxaca, in response to some external threat, ostensibly from populations in surrounding valleys. Monte Albán, then, is situated in a neutral place, the population resident at the site being supported by taxation from league members. It gradually grows in size, reaching a demographic and areal peak by Period IIIb times. Internally the site is divided into 15 barrios. Fourteen of these contain small civic–ceremonial–high-status-residential complexes. The structures surrounding the main plaza, on the other hand, house the principal ruler of Monte Albán and his dependents. Iconographic themes at the site, especially during later periods, are primarily militaristic in nature, implying continued competitive pressures from outside the Valley of Oaxaca. Teotihuacán, itself the political seat of an expansionist empire, is considered the most likely source of these pressures. With the collapse of Teotihuacán around A.D. 750, the disembedded administrative function of Monte Albán no longer has political value, and as a direct result Monte Albán is largely abandoned.

Major problems occur throughout Blanton's reconstruction. First, it is by no means clear how small polities neighboring the Valley of Oaxaca could exert sufficient muscle to effect the level of nucleation manifest at Monte Albán during the early history of the city. Likewise, how is the more local threat replaced by the more distant one from Teotihuacán? Blanton's thesis requires perfect timing indeed. Moreover, it seems extremely unlikely that Teotihuacán ever had the manpower to engage in long-term wars of conquest. Whatever control Teotihuacán exercised beyond the Basin of Mexico was almost certainly economic, not political. Finally, one might raise the question how, if the center was founded by a group of autonomous polities, roughly comparable in size and power, one of them evolved into the dominant polity, as is suggested by the presence of a central palace many times larger than any other residence on the site.

By far the most serious problem is Blanton's use of the concept of "disembedded capital." The utility of the concept hinges on two factors that Blanton sees as differentiating Monte Albán from Teotihuacán: namely the limited amount of first-class agricultural land in the immediate vicinity of the site and the relatively small amount of craft specialization found within it. Regarding the first, Monte Albán is situated at the convergence of the valley's three major arms, and Kirkby's study of present land use indicates that this area today is a major source of agricultural production. If this is the case today, why cannot it be assumed that ample prime cultivable land existed in the vicinity in the past? The specific hilltop location of Monte Albán, as Blanton suggests, can be attributed to a competitive political atmosphere. Its general location, however, strongly implies that subsistence requirements were a major consideration in its positioning. Therefore one need not argue that Monte Albán "was a special-function community, located in such a way as to avoid 'distortion' of the region's existing central place hierarchy" (pp. 105–106).

In our opinion a better argument would be that a polity controlling the nearby alluvial plain, because of a demographic advantage, was successful in competition with lesser polities in the valley and unified the valley politically and economically.

Of greater concern is the apparent difference in the level of craft specialty activities. By Blanton's own admission roughly 10 to 13 percent of the total population of the Period IIIb to IV community was involved in craft activity. This contrasts with the 25 to 35 percent figure suggested by Millon and associates for Middle Horizon Teotihuacán. At first glance this difference appears significant; in reality it is not, at least as far as regional consumption needs are concerned. At Teotihuacán, roughly four-fifths of all craft activity was devoted to obsidian working. Recent studies indicate that obsidian working is a high-output craft but that domestic consumption levels were extremely low—somewhere in the vicinity of 20 tools per nuclear family per year. What this means is that the vast majority of all obsidian tools produced at Teotihuacán were channeled into the international market, as other items doubtless also were. When the number of specialists involved in foreign production is subtracted from Millon's figures, the level of craft specialization at Teotihuacán is remarkably close to the figures suggested for Monte Albán. The major difference, in consequence, is that Teotihuacán was the center of a vast commercial market, a role made possible by the localized nature of the obsidian source deposits. Monte Albán was not, in contrast, because the Valley of Oaxaca contained few if any resources whose natural distribution was so sharply circumscribed.

On close inspection, therefore, the disembedded-capital concept has limited utility. Both Monte Albán and Teotihuacán were located near large areas of prime cultivable land, implying that a large proportion of the inhabitants of both communities were resident farmers, and the two centers displayed similar levels of craft specialty production to meet local needs. The key differences that Blanton offers as significant turn out to be inconsequential in the final analysis. Indeed, the sequences of growth and decay are very comparable, suggesting that similar processes were operative in affecting developments at the two centers.