Book Reviews

Why Men Leave Home

The Brain Drain. Papers presented at an international conference, Lausanne, Aug. 1967. WALTER ADAMS, Ed. Macmillan, New York; Collier-Macmillan, London, 1968. xiv + 273 pp., illus. $6.95.

Educated men have been migrating across political boundaries for many centuries. Today there is an uneasy feeling in the world that migration of the scale and kind experienced in the last 20 years is upsetting the world's economic balance and that something probably ought to be done about it. If things go on as they are, many believe both Europe and the developing countries will lose a fatal proportion of their key resource, highly educated manpower.

The Brain Drain reproduces papers by 16 economists which they presented and discussed at a small conference of experts in Lausanne in August 1967. The English edition has been published with admirable speed; it will be followed by editions in French and Spanish. Despite some unevenness and weakness in its policy conclusions, this book provides a better perspective on the subject than any other publication that has yet appeared.

There are five dimensions to the brain-drain problem: (i) *the facts*—that is, definition and description of the phenomenon, involving measurement of its size, its occupational and educational structure, its behavior through time, and its distribution through space; (ii) hypotheses about *causal relationships*, suitably disaggregated and specific; (iii) *technical judgments* about the relative weight of the brain drain in explaining Europe's "technological gap" or the problem of economic development; (iv) a *choice of perspective* for making judgments (does one look at the phenomenon primarily from an international economic viewpoint, from a national viewpoint, from the view of individual human rights, or from a perspective involving a compromise among these conflicting perspectives?); and (v) the *morality* of the problem, the relative equities of the claims of different countries and of different classes of people (do the educated have a greater right to migrate than porters and peasants?).

The Brain Drain touches all these aspects of the phenomenon, with considerable wisdom and sophistication. In part one (The Problem), Steven Dedijer reviews high-level migration in the ancient and medieval world (eras marked by repeated unsuccessful efforts to prevent scholars from moving) and Brinley Thomas contrasts 19th-century migration with today's. I suspect Thomas makes too much of the difference between the migration of the educated elite today and the mass migrations of the last century: the skilled laborer and the entrepreneur among the masses were as critical to yesterday's economic growth as the scientist and engineer are today. The excellent opening chapter by Walter Adams emphasizes the need for an analytical framework and lists nine major "push" and "pull" forces that explain most of the movement. But Adams probably expects too much of social research when he asserts that "each of these influences is capable of estimate," in ordinal if not in absolute terms. For years to come policy will be made by judgments reached without benefit of anything but scrappy and impressionistic data. The greatest lack (which none of the authors adequately recognizes) is data on return flows, which in many countries are large and which are sensitive to measures these authors neglect.

The all-important choice of an analytical framework finds two first-rate economists diametrically opposed. Harry Johnson explains, "from a rather narrowly technical theoretical point of view," why world production is likely to be greater under conditions of maximum freedom of migration for educated people. While he argues that international competition for brains may possibly aggravate the short-run growth problem in developing countries, he believes that the brain drain is a "trivial factor" compared with the problem of "increasing the flow of development assistance and the efficiency with which it is applied." Most of Johnson's coauthors think that his international perspective is Olympian and unrealistic. Implicitly or explicitly they embrace the nationalist viewpoint of Don Patinkin, who rejects Johnson's concept of a unitary world welfare function. He argues that thought and policy have to acknowledge the "distribution effects" resulting from the allocation of world manpower resources; this means the adoption of national perspectives and a need for migration controls. (The whole notion of educated manpower as a form of national capital is explored in a characteristically light and lucid chapter by Kenneth Boulding, although he stops short of policy questions.)

The third of the book's six parts offers six case studies from Europe and the less-developed world. A central theme is that the principal causes of the brain drain lie within the losing countries themselves. Apart from repeated disapproval of the restrictive practices of the American Medical Association, the United States is not cast in the role of a devil loose in the world. If countries want to minimize emigration they should concentrate on reducing the negative "push" factors at home. The agenda for action is not for the faint of heart: in much of the world we must reform educational content, choke back the flood of people being allowed into universities (an irresistible inflation of higher education), radically alter the prestige-rankings of occupations, persuade legislatures to give more money to worthwhile R & D activities, suppress excessive nationalism and enlarge regional pooling of resources, and more. The only country that seems immune to the drain is France, and the reason is simple, according to a humorous and pointed piece by Robert Mossé: What Frenchman in his right mind would exchange life in France for life in the United States? There is not much in it so far as money is concerned—and everything else favors France. India presents an altogether different picture, vividly and poignantly summarized by V. M. Dandekar. He is honest, wise, courageous, and gloomy. The best way to revise the status-ranking of occupations, he believes, is to close the door on easy migration, especially for students; only then will "all our talented . . . settle down for serious work at home." This would mean a wholly new approach to foreign education and

training—later, shorter, and more specialized. Several others make the same point.

A concluding chapter by Walter Adams and Joel Dirlam proposes an eight-point "agenda for action." Their recommendations may help in getting people's thinking headed in the right direction, but they suffer from an excess of rhetoric and a want of realism. Adams and Dirlam do not accept the oft-made proposal that gaining countries should compensate losing countries for the human capital involved in migration. The most important step the developed countries can take (vis-à-vis the less-developed countries, at least) is to stop their "diversionary concern" about the brain drain, put their priorities right, and raise economic aid to a respectable level. The assumption is that higher aid levels will speed development and that only with development can brain-losing countries generate the absorptive capacity that will provide satisfying employment for their educated elites. Indeed, what popular speech has called the "brain drain" is here correctly identified more as an overflow of unusable graduates from inflated and irrelevant higher educational systems than as a drain of "scarce" resources—at least for most of the less-developed countries. It is only when one moves up close to the problem and looks at migration of the "elite of the elite"—of irreplaceable men—that one sees a drain that hurts. As a result, most of the migration statistics sound alarums on a numbers problem that does not exist and are silent on the real problems of critical individuals and educational reform.

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Space, Past and Future

Rockets, Missiles, and Men in Space. WILLY LEY. Fourth edition. Viking, New York, 1968. xviii + 557 pp., illus. $10.95.

The Promise of Space. ARTHUR C. CLARKE. Harper and Row, New York, 1968. xxii + 325 pp., illus. $8.95.

Well known to many American readers, lay and professional, are the writings of Willy Ley and Arthur C. Clarke. Both of their latest volumes deserve serious attention. Two-dimensional viewpoints appear to dominate today's dialogue concerning science, technology, and public policy. Both Ley and Clarke provide much-needed historical perspective upon the recent past and for considering the future of space exploration and exploitation.

Ley's updated classic is really not, particularly in the light of all that has transpired during the past decade, "a definitive account of the history of space flight," as is blurbed on its dust jacket. But his faithfulness to fact and to careful explanation remains highly recommended. Having gone through 21 printings and four complete revisions since it first appeared as *Rockets* in 1944, Ley's now standard reference has a history of its own. The 1951 edition, *Rockets, Missiles, and Space Travel*, infected scores of American readers with eagerness for the coming space venture. "Space" was then a dirty word except to a handful of physicists interested in the ionosphere, to a few missilemen and their engineering compatriots, to aeromedical men projecting the human pilot to supersonic and near-vacuum flight, and, of course, to the cosmologists. Then came Sputnik.

No one could have predicted the dimensions and pace of the race for the first intercontinental missiles with thermonuclear warheads that began in earnest in 1954. No one could have foreseen the application of rocketry to space as it happened—the modest beginnings as a part of the International Geophysical Year or the dramatic response to the Sputniks in 1957 and the first orbiting of the Earth by the late Cosmonaut Gagarin on 12 April 1961. Effects of these pivotal events were clearly apparent in the first phases of the United States space effort. Lest we forget, this included notably the creation of the National Aeronautics and Space Administration in 1958 to advance nonmilitary efforts, including scientific prestige, and, after 1961, the accelerated program to achieve a manned lunar landing in order to deny politico-technological initiatives to the Soviet Union, peacefully and as soon as possible. Communications, meteorological, navigation, and other satellites useful to man came into being, not to overlook the reconnaisance and impending landing of men on the Moon, the first soundings of Venus and Mars, and quantitative data on the solar environment of the Earth.

How this all came to pass is a complex and important story. To cover in one volume the thousand years of gunpowder rocketry, and man's reflections on his extraterrestrial environment before and after the telescope, Darwin, and the industrial revolution, as well as the achievements of space science and technology the past ten years—this indicates both the severe constraints on and the useful perspective offered by Ley's volume. His tracings from antiquity to the 20th century remain superb, as do his memoirs and study of the European origins of liquid-fuel rocketry leading to the technological jump of the V-2 at Peenemünde (he came to the U.S. in 1935). Ley amplifies his treatise with new uncoverings. One need not look, however, for a comparable detailing of the pioneering labors of the Clark University physicist Robert H. Goddard (who in 1926 first demonstrated a liquid-fuel rocket), or of the Caltech group under Theodore von Kármán. Nor will one find adequate treatment of the highly sensitive ballistic missile development in the U.S. and the U.S.S.R. or of the diverse scientific thrust toward space experimentation aborning in the International Geophysical Year. Ley's updated bibliography (pp. 533–48) is notable, and his 114 pages of appendices are very informative. Ley does succeed in cramming facts and technical explanations into a coherent treatment of the past decade.

Arthur Clarke's writings also have deep roots. His seminal paper "Extraterrestrial relays" (*Wireless World*, Oct. 1945), which he wrote as a recent radarman of the Royal Air Force and as a member of the British Interplanetary Society, well forecast the technical feasibility and utility of communications satellites. His influential *Prelude to Space* (1948), an engaging novel whose hero was a historian, was but one of the first of over a dozen nonfiction space and oceanology volumes, 19 science-fiction volumes, a score of short stories, and, most recently, the script for the Stanley Kubrick film "2001: A Space Odyssey." Clarke's *Exploration of Space* was a Book-of-the-Month-Club selection in 1952, making him a literary compatriot of Ley in spreading the space message to a wider audience before Sputnik.

The Promise of Space, more spritely if less detailed than Ley's book, provides a historical launching pad for its author's stimulating and biased projection of what today's space capabilities and potential could mean for the intellectual and practical affairs of mankind in the future. Clarke's history is brief, accurate, and vivid. Like James E. Webb, he delights in quoting Daniel