Price would count him among the "eminent" men of science—will no longer be the man who actually does science. If this is the case then indeed Big Science does differ in an essential way from Little Science. But it is the words "big" and "little" and not the term "science" which accounts for the difference. Unfortunately, headcounting of the sort that Price provides can shed little light on the reasons for the difference.

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India in the 1960's

Quiet Crisis in India. Economic development and American policy. John P. Lewis. Brookings Institution, Washington, D.C., 1962. xiv + 350 pp. $5.75.

"Nothing could so utterly demolish the effectiveness of United States economic policy toward India as would its commitment to an extreme laissez-faire position." One would wish that this sentence and much more in Lewis's thoughtful, perceptive, and lucid book could be read and taken to heart by all leaders of American opinion. The Clay Committee in its recent recommendations on foreign aid took a stand against assistance to government projects that compete with private enterprise; the chairman in subsequent testimony applied this doctrine to the projected Bokaro steel mill in India. As a result, the image of an America interested less in development than in imposing its own economic dogmas on other countries was again projected to a world only susceptible to Communist charges of American economic and ideological "imperialism."

In this book Lewis first examines the basic strategy of India's development plans and then the issues and techniques of American aid. His analysis is technically competent and illuminating, in language that need not repel a noneconomist. He is particularly successful in highlighting and clarifying such key issues as the pivotal foreign exchange scarcity, the need to mobilize idle manpower and put it to use, the division of investment between public and private sectors and the outlook for domestic and foreign private enterprise, the export problem and its implications for American commercial policy, and the crucial problem of rural development. For professionals in the development field, his most important contribution is chapter 7, "The role of the town in industrial location," in which he notes the grave disadvantages of overgrown metropolitan centers, finds the counter policy of "village-centered" industrial orientation futile, and thoughtfully develops an impressive argument for "town-centered" industrial development.

India launched the first of a series of 5-year development plans in 1951, a few years after independence. The current plan is the third, and 1963 is its middle year. "By all odds the most distinctive feature of the Indian effort," according to Lewis, is "its deep commitment to an orderly, peaceful procedure under which personal rights are respected. . . ." India is attempting an economic revolution, a rise from deepest poverty, within a framework of constitutional, representative government.

Will this effort succeed? The 1960's are the critical years. India must use its own resources to the maximum, and it must also import heavily from abroad during this decade in order to build up the investment in productive power and acquire the momentum that will—hopefully by 1975—enable it to continue progressing, but on a self-supporting basis.

At the same time, India's democratic system faces critical political tests: a successor to an "indispensable" prime minister; the problem of an aging majority party; divisiveness along regional, communal, and factional lines; and on top of everything else the Chinese aggression. Lewis justifiably doubts that, for underdeveloped countries in general, economic progress can assure orderly democratic evolution. But, rightly in my view, he argues that India is a special case. "She already has such a political evolution well established," and the thing she most needs in order to confirm and sustain her commitment to constitutional democracy through the severe trials ahead is "a sustained, clearly perceptible, widely shared surge of material advance." Along with dedicated Indian effort, this will require considerable outside help. America and other countries interested in the fate of freedom in this shrinking world should see that this help is forthcoming. Lewis speaks of "the unique importance" of the Indian experiment in a constitutional mode of economic development. Its fate will strongly influence the course of other Asian and African countries and "should be a primary concern of American foreign policy in the years just ahead."

"The test that India of the nineteen-sixties poses for Americans is whether they have the good judgment to recognize a monumental crisis while it still remains quiet. . . . It will be kept that way only through extraordinary effort, including American effort."

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Lippincott Geography Series

Geography in World Society. A conceptual approach. Alfred H. Meyer and John H. Strietelmeier. Lippincott, Philadelphia, Pa., 1963. xviii + 846 pp. Illus. $8.75.

This is a big book, and one may well question whether 846 pages, 600,000 words, and 4¼ pounds are not too much for an introductory text. Furthermore, it attempts a philosophic analysis of so much of geography, from astronautical man to urban planning, that there is little common focus. The basic organization is an areal interpretation and evaluation of earth realities, largely in regional terms.

"To facilitate the conceptual approach to the consideration of problems . . . all material in this book . . . has been organized on what might be called the 'self-tutorial plan.' The text is constructed, then, to be teachable as well as readable." Hundreds of quotations enrich the text. Each chapter ends with a set of problems entitled "Application of geographic understanding"; the following are illustrative of these problems: "Would it have been possible for the Mississippi River to have carved a valley like the Grand Canyon"; "Why do we produce so little rice in our country?"

The authors begin with two basic questions: "What is man in terms of *ecesis* (earth-habitat relationship)? What is his *ethos* (earth-steward responsibility)?"

The volume has six parts. The first deals with how scholars have developed the "geographic facts of life." The second reviews the basic classification of natural earth phenomena, and the third analyzes the processes by which man appropriates areal resources. Part

four (11 chapters—or 300 pages) is a regional world survey based on climate and vegetation regions; in the fifth section selected nation-states are briefly considered. The final part is devoted to some observations on man's relation to space and time.

Geography in World Society is the outgrowth of 35 years of teaching experience by the authors; as such it represents the point of view and procedure developed in their classes. The book is almost autobiographical, for it traces the changing ideas of geography over recent decades and includes photographs of many of the leaders. Many sections become quite philosophical, or "conceptual"—a word which appears frequently in the text but which is missing from the index. The graduate student will find much to discuss, but the treatment seems too heavy and wordy for freshmen. The volume represents a tremendous amount of work, with many ideas of value, but I doubt that it will become a widely used text.

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Psychology

Monozygotic Twins. Brought up apart and brought up together. An investigation into the genetic and environmental causes of variation in personality. James Shields. Oxford University Press, New York, 1962. x + 264 pp. Illus. $11.50.

The study of twins can be regarded as a method of observing the outcome of a controlled experiment set up by nature. In this connection monozygotic twins have attracted special attention. Three American investigators, H. H. Newman (a biologist), F. N. Freeman (a psychologist), and K. J. Holzinger (a statistician) published a monograph [*Twins*, University of Chicago Press (1937)] based upon unique case material, 19 monozygotic twin pairs who had been brought up separately. These investigators developed a new method of expressing numerically intrapair similarities, which has been especially helpful in shedding light on the influences of environment on intellectual development. Monozygotic pairs brought up separately were compared with pairs, both monozygotic and dizygotic, brought up together.

James Shields, a British psychiatrist, got in touch with and secured the cooperation of two groups of twins, each composed of 44 monozygotic pairs; twins in one group, the S-group, had been separated early in life and those in the control group, the C-group, had been brought up together. The pairs in each of the groups were selected from 5000 twins who responded to an appeal Shields made on television. An elaborate procedure for establishing the zygosity of the twins was set up, the so-called similarity method. However, despite its usefulness, the number of times the twins in a pair were mistaken for one another was not employed as a criterion of zygosity. Monozygotic twins are incorrectly identified about 80 percent of the time by teachers and 25 percent of the time by parents.

The study is focused mainly on intrapair comparisons of intelligence and various personality traits, with special regard for the importance of certain environmental factors, such as social class and pattern of upbringing.

Shields had to overcome great administrative difficulties in collecting his data. He is well aware of the intricacies and sources of error in twin research. On the average, twins are one quarter of a standard deviation inferior to single-borns in intellectual achievements; this restricts the scope of the generalizations that can be based on findings derived from twin populations. Self-selection may be responsible for the surprising finding that intrapair similarities are of the same magnitude in the C-group as in the S-group. The sex factor may be another source of error, since we know that dizygotic twins of the same sex tend to be much more similar, at least in cognitive achievement, than twins of unlike sex. Finally, the wide age range may have introduced an uncontrolled factor that could have blurred the general picture, especially in the assessment of intellectual differences within pairs. Some previous studies suggest that there is a higher incidence of left-handedness among both monozygotic and dizygotic twins, and this has been explained by asymmetry reversal. Shields seems to accept this finding. But surveys of complete age groups of Swedish conscripts have failed to disclose any difference between twins and single-borns with respect to incidence of left-handedness or any differences between monozygotic and dizygotic twins with respect to concordance of handedness.

An extensive and valuable case history description, based upon clinical interviews, is given. Painstaking procedures are set up in order to establish the effect of early separation. New facets of the complicated interaction of genetic and environmental factors are given.

The author arrives at two general conclusions "for the truth of which there seems to be good support." (i) "Family environments can vary quite a lot without obscuring basic similarity in a pair of genetically identical twins." (ii) "Even monozygotic twins brought up together can differ quite widely." The validity of these statements depends in part on the importance of the sources of error indicated above. In any case, the study makes significant contributions to our knowledge in this field.

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Newtonian Literature

Isaac Newton, Historian. Frank E. Manuel. Harvard University Press, Cambridge, Mass., 1963. xii + 328 pp. Illus. $7.50.

Manuel's study of Newton's historical writings, a unique addition to the corpus of Newtonian literature, is most welcome. Manuel is the first scholar to examine these papers who has been equipped to understand them in their context. He demonstrates that Newton proposed a radical foreshortening of ancient history; by pruning several centuries from the annals of Egypt, Assyria, and Greece, Newton sought to establish the leadership of the Hebrews in the development of civilization. An even more radical procedure underlay his conclusions. By a tenuous argument Newton claimed to locate the equinoxial points on the eve of the Trojan war; since he knew the rate of precession, he was then able to fix the date of the Trojan war and from that date the rest of ancient history. If the topic sounds remote to the 20th century, Newton's work was, as Manuel reveals, the object of acrimonious debate for more than 50 years following its publication. Even though the method and the system did not, in the end, prove to be contributions to historical knowledge, as the author freely acknowledges, a clear understanding of them reveals the considerable scope of Newton's erudition and adds a new di-