The economic value of the introduced species is discussed in detail, and the question is raised whether the development of new domestic stock from the native wild African fauna is possible, and under what conditions.

This book is an indispensable reference book and a standard work for the zoologist, the ethnologist, the prehistorian, and the economist. Its style is condensed and does not make for easy reading. The literature is given in footnotes. There are no illustrations.

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Economics and the Social Sciences

Population Growth and Economic Development in Low-Income Countries. A case study of India's prospects. Ansley J. Coale and Edgar M. Hoover. Princeton University Press, Princeton, N.J., 1958. 389 pp. $8.50.

This is the third major study in Asian demography sponsored by the Office of Population Research at Princeton University; the other two are Kingsley Davis' volume, *The Population of India and Pakistan* (1951), which is an indispensable tool for anybody interested in Indian population problems, and Irene Taeuber's study, *The Population of Japan,* which has just appeared.

Contrary to what the title suggests, Coale and Hoover's book is almost exclusively devoted to an examination of the prospects for Indian population growth and the economic implications of different rates of growth over the period 1956 to 1986. Towards the end of the book the results for India are compared and contrasted with prospects in Mexico.

In the absence of reasonably reliable vital statistics, forecasts of population growth in India had hitherto been limited mainly to simple projections of the decennial growth rate shown by recent censuses. The 1951 census commissioner based his discussion of future prospects for population growth and food supply, and his eloquent plea for an active population policy, upon the broad assumption that the Indian population would continue to grow at the annual rate of 1.2 percent at which it grew in the decade 1941 to 1951. The same rate of growth was assumed in the long-term projections given in the second Indian Five-Year Plan. It is one of the great merits of Coale and Hoover's book that it shows the dangerous irrelevance of such mechanical projections.

As a starting point for their projections, the authors had to make independent estimates of the age distribution and the vital rates in 1951. Their method is designed to avoid the distortion arising from the unreliability of age reporting in Indian censuses. Briefly, the method is based on the hypothesis that the level of fertility and over-all growth rates have changed little over the 30 years from 1921 to 1951 and that the structure of the population must therefore approximate closely that of a "stable" population in which the life table is directly given by the age distribution. On this basis, the most likely age distribution, the birth rate, and the age-specific mortality rates for 1951 are determined, and projections (by the component method) are made by 5-year age groups and for 5-year intervals until 1986.

It is assumed that mortality will decline sharply until 1971, at a rate somewhat similar to that at which it has declined in Ceylon. According to detailed estimates by the authors, life expectancy at birth had already increased from around 32 years in 1951 to slightly less than 38 years in 1956. It is assumed that it will increase further, to 50 years by 1976, largely as a result of the eradication of malaria. This assumed trend in mortality is combined with three different assumptions on the course of fertility.

With unchanged fertility, the Indian population would by 1986 be slightly more than double its size in 1956. This projection, based as it is on rather extreme assumptions for both mortality and fertility, may be regarded as the upper limit of the range of conceivable population growth.

At the other extreme, a projection is made on the assumption that fertility rates will decline linearly by 50 percent over the 25 years from 1956 to 1981. This is a tall order, but even so the 1986 population would be 53 percent above that of 1956. Thus, even if there should be a very successful drive to reduce fertility, population would grow at a higher rate than has been observed for any previous period of 30 years.

It is particularly interesting to compare this with the result of the third and last projection, which assumes that the same end result, a 50 percent decline in fertility by 1981, is brought about in the much shorter span of 15 years, beginning in 1966. In this case of a delayed but much sharper decline in fertility, the increase in population from 1956 to 1986 would be 65 percent. In other words, if the beginning of the decline in fertility is delayed, a *more than proportionate* increase in the effectiveness of population control will be necessary in order to keep population down to a given target figure at any future point of time. This is obvious, upon reflection, but it is the kind of obvious truth that needs to be repeated and worked out in dry figures so as to make it clear that postponement in matters of population policy means that far more drastic, painful, and costly measures will have to be taken at a later stage.

The bulk of the volume is devoted to answering the question: "What is the difference in the levels of income per head which would be associated with the high and low fertility trends, respectively?" The reasoning is essentially in terms of the familiar growth model, in which output per head results from assumed values of the savings ratio, the marginal return to investment, and the increase in population. But the authors have refined this simple model in several important and interesting ways.

1) The amount of resources available for purposes other than personal consumption is made to depend upon income per consuming unit rather than upon aggregate income. Hence, under lower fertility a larger share of total output is available for raising output per head.

2) Instead of postulating a marginal rate of investment (or saving), as usually understood, the authors postulate a given share of increments in income to be available for addition to the combined category of public outlays (whether on current or capital account) and private investment. This enables them to make explicit allowance for the fact that the resources that have to be devoted to education and other welfare expenditure depend upon the age composition, which in turn is a function of fertility. With a smaller number of dependents (such as would result from declining fertility), a smaller share of available resources would have to be devoted to welfare expenditure; this would have "a diluted, indirect or delayed effect on output," and more would be available for outlays which "raise aggregate output in a relatively direct and immediate way."

3) Within the category of welfare outlays a further distinction is made between those which are required for the current needs of the existing population and those needed to provide facilities for additional people. For the first category a productive effect of half that of "direct growth" outlays is predicted, and it is assumed that even this reduced effect would be somewhat delayed, by 15 years. The second category of outlays, which becomes the more important as the fertility rate rises, is assumed to have zero growth effect within the horizon of the projections.

4) Finally, it is assumed that the capital-output ratio would increase gradually during the period, from 3.0 to 3.6.

The projections rendered by this model show that on the basis of the low-fertility assumption, income per consumer in 1986 would be around 40 percent higher than the figure based on the

assumption of unchanged fertility. The increases in income in relation to 1956 income are also shown, but the authors are the first to point out that these figures have little significance, if any. They emphatically disclaim any intention of forecasting national income 30 years ahead; they are interested solely in the relative difference between the results under conditions of high and low fertility. In order to test the significance of this differential, the estimates of the parameters are varied within fairly wide limits. While these variations of course give widely differing rates of growth of national income, the relative difference between the high- and low-fertility variants remains remarkably stable, at around 40 percent. This differential would, if anything, be a minimum, since no allowance has been made for the feedback effect of higher consumption improving the vigor and efficiency of the labor force independently of investment or other development outlays. The authors discuss this factor (page 261) but refrain from introducing it explicitly in the model, since any prediction of the extent of this effect would have to be based on pure guesswork.

It would be strange if a couple of mistakes could not be pointed out in a volume which marshals such a vast amount of empirical material. We are told on page 86 that over the last century the proportion of the Indian people engaged primarily in agriculture has increased from about 50 to 70 percent. This is probably due to a misinterpretation of the occupational classification of the 1872 census. It is indeed difficult to imagine what could have been the activities of the "nonagricultural" half of the population a century ago when only 7 to 8 percent of the population were living in towns. On page 116 the Indian agriculturist is said to be "occupied for only about three months in the year, and many of the landless labourers even less than that." Here the authors can perhaps be excused, for vast exaggerations of the amount of rural unemployment abound in Indian economic literature. On page 194, housing is estimated to account for no more than 15 percent of the "monetized" fixed investment. Twice that figure would be nearer the truth. This mistake is of some importance in the further calculations, for the (allegedly) very low share of housing (which has a particularly high capital-output ratio) is cited by the authors in arguments favoring the assumption of a rather low over-all capital-output ratio for India.

However, these are only petty slips in a book which is very comprehensive and full of original and stimulating ideas. No doubt it will prove to be a highly influential book. It does not preach or plead in matters of population policy, but nevertheless—or perhaps therefore—it cannot fail to serve as an eye opener. In fact, it has been serving that purpose since 1956, when a preliminary draft was given wide circulation among Indian economists and demographers.

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The Evolution of Culture. The development of civilization to the fall of Rome. Leslie A. White. McGraw-Hill, New York, 1959. xi + 378 pp. Illus. $7.50.

Leslie White, a veteran social anthropologist at the University of Michigan, has set himself the monumental task of writing the social history of man in three volumes. This, the first, has 278 pages on primitive culture and 89 pages on the agricultural revolution and its consequences, carrying the story to the fall of Rome. Volume 2 will be on the fuel revolution and its consequences. Volume 3 will be a review of the current scene and a prediction for the next hundred years.

In volume 1 White expounds the theories that he has been forging over a lifetime: The 19th-century exponents of cultural evolution—Tylor, Morgan, Spencer, and others, who followed close in Darwin's wake—were right; Franz Boas, who, according to White, poisoned a generation of anthropologists against these titans, was dead wrong; and he, Leslie White, alone, unaided, and defiant, has been able to revive, refine, and restate the older concepts in terms of modern science.

He traces the origins of human society from a primate background, calling the acquisition of speech a primate revolution. Following Morgan, he divides social systems into two categories—primitive and civil. Primitive society is based on kinship and lacks classes and property in the modern sense. Civil society arose after the agricultural revolution, and "all civil societies are composed of two major classes, a small, dominant, ruling class and a large subordinate class of slaves, serfs, peasants, or proletariat" (page 219). In primitive society happiness was for everyone; in civil society, only for the privileged few. In primitive society economic organization is a function of social structure; in civil society the reverse is true.

In a review of this length it is impossible to point out details. Some of White's deductions, such as that on the origin of incest, seem original and plausible, but there are also weaknesses. For example, he divorces culture from the individual as completely as some psychologists remove the mind from the nervous system, and he proposes to ignore the biological element in the formation of cultures. If every primitive man cooperated as thoroughly as White maintains, there would have been no biological evolution.

What strikes me most is not the content of the book but the tone—the angry vacuum in which it seems to have been written. He quotes many 20th-century anthropologists, but almost always only to refute them; he has kind words only for Cora DuBois and G. P. Murdoch. Others who are not "Boasites" and who have also been engaged in studying the evolution of culture he ignores completely. Perhaps silence is meant for a compliment. Anyhow, it will be interesting to see what happened in the fuel revolution, and to find out what the future holds for us.

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Motivation. A systematic reinterpretation. Dalbir Bindra. Ronald Press, New York, 1959. vii + 361 pp. Illus. $5.50.

In a field as formless and ill-defined as the psychology of motivation, it would be hard to write a textbook without at the same time introducing categories and principles designed to impose sense and order where these are now lacking, and thus assuming the responsibilities of a monograph. The present book is no exception, and its dual role is acknowledged in its title and subtitle.

The content of the book has to do with the activities of "eating, drinking, approaching, escaping, attacking, exploring, copulating, maternal care of the young, and the like," largely at the infrahuman level. These activities are called "motivational phenomena," and are seen as raising two questions: How are responses patterned into goal-directed action? And what variables determine the latencies, frequencies, amplitudes, and other quantitative properties of the behavior? Bindra believes that no physiological or psychological processes exist that are unique to motivation, and such concepts as motive, drive, need, and incentive are dispensed with or are given secondary status. In their place, to account for patterning, is a concept of reinforcement strongly resembling Skinner's concept, together with a Hebbian emphasis upon the significance of early experience. Quantitative variations in behavior are dealt with as functions of habit strength, sensory cues, level of arousal, and blood chemistry. The ade-