

field, though in all examples the implication is given that all multiple meaning problems have been resolved!) The rules for translation outlined in the Panov book and, for that matter, the rules presented elsewhere in the Russian literature do not even begin to explain how the sample translations could have been achieved. Since no other evidence to date supports the hypothesis that the Russians in 1956 were ahead of where the rest of the world is now, it seems reasonable to infer that the translation samples shown probably represent text that was studied beforehand in order to develop rules, the applicability of which was guaranteed by such prior analysis. The foregoing inference may not be justified but, in the absence of a detailed exposition of all rules used, it is difficult to conclude otherwise. (We of course assume that neither the original English text nor the final machine output of Russian text was in any way subjected to human editing.) Any thoughtful scientist will recognize that a sensationally elegant machine translation of a limited and specific body of text can be produced on the basis of prior study of that text by essentially anyone with a small amount of ingenuity plus the ability to program a general purpose computer. The only matter of real interest then lies in the question of the general validity of the rules when applied to text other than that used as a basis for developing the rules.

Chapter 10 of Panov's book contains a few pages of gratifying discussion, much more indicative than is the rest of the book of the depth and nature of the problems of machine translation. It is pointed out that machine translation is not solvable in a formal or mathematical sense, as is, for example, the problem of code breaking. Panov justifiably criticizes Weaver's analogy between machine translation and code breaking and points out briefly a few of the essential and profound differences between the two.

With all its shortcomings, the book by Panov should be of some casual interest to the layman for its presentation of an introductory, though quite superficial, account of the nature of an automatic translation process.

The field of automatic translation still awaits a book which presents the subject adequately and informatively to the scientific community.

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Cochiti. A New Mexico pueblo, past and present. Charles H. Lange. University of Texas Press, Austin, 1960. xxv + 618 pp. Illus. \$10.

The Pueblo Indians of the Rio Grande are visited by thousands of tourists every year and have been known to history ever since their discovery by Coronado in 1540. But Spanish attempts to obliterate their native religion in the process of Christianization led to the erection of a wall of secrecy, and until very recently little has been known of their inner life. Charles Lange's monograph on Cochiti, the first comprehensive account of the culture of a Rio Grande Keresan-speaking pueblo, will therefore be of great interest to all students of the Southwest.

We know from the archeological record that the Keres moved into the Rio Grande region from the west in the 13th century and formed a wedge among the Tanoan-speaking pueblos in the present vicinity of Santa Fe, N.M. In addition to mutual interaction and cultural exchange, all of these pueblos have been subjected to the impact of Spanish and, later, American culture over a period of some 4 centuries. For Cochiti there are only a few accounts from the Spanish period, but within the last century important observations have been made by a number of scholars, including Bandelier, Starr, Goldfrank, Benedict, Parsons, and Boas.

Lange has built his account, in part, on the work of his predecessors, but the bulk of his materials comes from his own researches covering the period 1946-53 and including three summers' residence in the pueblo with his family. He presents a balanced and satisfying integration of modern pueblo life, in the perspective of the last hundred years. On the other hand, comparative discussion is held to a minimum, in part because of the lack of comparable data from many of the eastern pueblos.

The volume is organized in terms of geography, history, resources, economy, political organization, ceremonial organization, and the social system; 44 appendixes cover a wide range of statistical and other data. Of particular interest is Lange's discussion of the political system, including the "progressive" and "conservative" factions, and his detailed account of the ceremonial organization, including the Katsina cult. While Cochiti is the most progressive of the eastern Keresan pueblos, social and cultural change has been gradual enough to make the author hopeful for

the future. But whether the pueblos can maintain a social and ceremonial system, geared to community values, in the face of electric power, farm machinery, modern schooling, and a growing dependence on wage work remains to be seen.

The University of Texas Press has produced a handsome volume that should have a wide appeal. It is also a volume in which the data for the author's conclusions are fully presented. Here we can see the effects of 400 years of contact with Spanish and American cultures and can begin to understand the complexities of social and cultural change in a society with values that are quite different from our own.

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Agriculture and Ecology in Africa. A study of actual and potential development south of the Sahara. John Phillips. Praeger, New York, 1960. 412 pp. Illus. \$13.50.

This book, written by a man with special competence in agriculture, is intended for scholars of other disciplines and for administrators and others concerned with economic development in Africa.

John Phillips' subject, the landscapes of Africa and man's use of them for agriculture, is a complex matter for analysis and one of importance. The vast, essentially rural continent is impoverished. Real levels of living, as measured by per capita food and shelter inputs, are among the world's lowest. Most of the population is dependent on subsistence rather than on cash-crop agriculture. Productivity per acre is low, and land deterioration, a forerunner of further decrease in yields, is widespread. These are the reasons why this and other books on the subject are needed.

African lands have been tilled for some thousands of years by indigenous cultivators of root and grain crops, using systems of shifting cultivation. They have been worked by European land-use techniques for as much as three centuries. Since World War I, European agricultural officers in colonial territories have had widespread influence on land use by Africans. These officers have brought to the task experience and training gained in mid-latitude agriculture. In the mid-20th