

rocket and the limiting case of a rocket with casing which is continuously discarded as the fuel burns. No practical means for achieving this last is suggested. On the other hand, there is no apparent recognition of the various factors influencing the gas velocity in a rocket. Dr. Goddard describes experiments in which a gas velocity approaching 8,000 feet per second was obtained in rockets using smokeless powder of the so-called "infallible" type. This gas velocity was obtained through the use of extremely high pressure. (The pressure is not recorded, but it is stated that the rocket, which had an inside diameter of about 1 inch and a wall 0.46 inch thick, was bulged.) In the subsequent calculation of rocket performance it is assumed that a gas velocity of 7,500 feet per second is obtainable without any recognition of the fact that this might require high-pressure operation. More seriously, the influence of molecular weight on gas velocity is apparently not recognized even in the 1936 paper. For example, it is implied that if a combination of hydrogen and oxygen is used as propellant, an optimum gas velocity would occur at a stoichiometric mixture, whereas it is now well known that optimum gas velocity is obtained with a considerable hydrogen excess.

One historical curiosity that occurs in the 1919 paper is a theory of the nature of the upper atmosphere, credited to A. Wegener:

Wegener . . . concludes that there are four rather distinct regions or spheres of the atmosphere in which certain gases predominate: the troposphere, in which are the clouds; the stratosphere, predominantly nitrogen; the hydrogen sphere; and the geocoronium sphere. This highest sphere appears to consist essentially of an element, "geocoronium," a gas undiscovered at the surface of the earth, having a spectrum which is the single aurora line, 557 μ , and being 0.4 as heavy as hydrogen. The existence of such a gas is in agreement with Nicholson's theory of the atom. . . .

The calculation of the weight of rocket required to reach extreme altitudes must be considered as optimistic even in the light of present knowledge and techniques. These calculations are based on the gas velocity of 7,500 feet per second, which clearly is obtainable, though better than V-2 performance, but also on a ratio of full-to-empty weight of 15, which has not been approached so far. Finally, it is assumed that casing is discarded as the fuel burns, a desideratum which has not been even approximately attained.

The second paper in the book, entitled "Liquid-propellant Rocket Development," describes very briefly progress made up to 1936 in the development of a vertical-firing liquid fuel rocket. Operating motors using liquid oxygen and various liquid hydrocarbons, both pressurized and pumped, were constructed and fired in flight. A gyroscopic stabilization device to control the rockets to a near-vertical path was developed. Unfortunately, no details of these various devices are given in the paper, although some interesting photographs of the tests are included.

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Handbook of South American Indians. Vol. I: *The marginal tribes*; Vol. II: *The Andean civilizations*. Julian H. Steward. (Ed.) (Smithsonian Institution Bureau of American Ethnology Bull. 143.) Washington, D. C.: Government Printing Office, 1946. Pp. xvii + 624; xxxiii + 1035. (Illustrated.) \$2.75; \$4.25.

The books under review are the first two of the five volumes of the long-awaited *Handbook of South American Indians*, sponsored by the Smithsonian Institution and the National Research Council and prepared in cooperation with the U. S. Department of State as a project of the Interdepartmental Committee on Cultural and Scientific Cooperation. In his foreword Dr. Wetmore rightly says: "The present monumental work is ideally suited to carrying out the purpose of the Smithsonian Institution, 'the increase and diffusion of knowledge'. . . ." Certainly no more impressive factual digest of anthropological knowledge covering so large a region has ever appeared. These volumes are also noteworthy as the product of scientific collaboration. Authorship of the various chapters is almost equally distributed between citizens of the United States of North America and citizens of various Latin-American republics. The editor and the committee of the National Research Council are to be congratulated upon securing the cooperation of such a varied and distinguished group of scholars.

The two volumes are organized according to the plan followed by A. L. Kroeber in his *Handbook of the Indians of California* rather than that used by F. W. Hodge in editing the earlier *Handbook of [North] American Indians*; that is, the data are integrated according to certain major topics rather than divided among smaller headings (place and tribal names, ceremonies, individuals, and the like). Both volumes are magnificently illustrated and have bibliographies that in themselves are notable contributions to knowledge. The amount of work that must have gone into planning, seeking, and selecting the drawings and photographs is stupendous, but the results more than justify the effort. Particularly praiseworthy is the reproduction (or redrawing) of illustrations from rare or inaccessible travel books of past centuries. A nice balance is achieved between pictures of landscape, people, and artifacts. The maps are likewise splendid. Contributors follow a standard outline (with some deviations) in treating each people. This outline is set forth as follows by Dr. Steward:

The articles start with an Introduction, which often includes a geographical sketch. Tribal Divisions and History then follow. The history traces the major post-Contact events which have affected the tribe. When local archeology can definitely be linked with the historic tribe, it is included as a background to the history. Otherwise it is treated in a separate article. The next section evaluates the principal anthropological sources. The cultural summaries commence with Subsistence Activities (Farming, Collecting Wild Foods, Hunting, Fishing, and Food Preparation and Storage). Then come Villages and Houses, Dress and Ornaments, and Transportation. Manufactures, which follows, is essentially technological; the functional aspects of material culture are described under other headings appropriate to the use of the objects. This section includes Basketry, Weaving, Ceramics, Bark Cloth, Metallurgy, Weapons, and other types of manufactures. The following section is usually Trade or Economic Organization. Social and Political Organization, which follows, describes the general patterns and structure of the groups. If necessary, special accounts of Warfare and Cannibalism come next. Life Cycle then sketches Birth, Childhood, Puberty rites and initiations, Marriages, and

Death observances. Esthetic and Recreational Activities includes Games, Music, Musical Instruments, Dancing, Narcotics, and Intoxicants. Religion describes beliefs about supernatural powers and beings, and magical and religious rites, functionaries, and structures. It also includes concepts and practices concerning the medicine man or shaman, unless shamanism is sufficiently developed to warrant a separate section. Mythology and Folklore follow. Finally comes Lore and Learning, which includes cosmogony, measurements of weight, time, and space, and other special beliefs or concepts of an essentially nonreligious nature.

Volume I begins with an introduction by the editor, outlining the scope of the work and sketching its background. Part 1 is devoted to the Indians of southern South America, introduced by a general sketch on "The Southern Hunters" by John M. Cooper. There follow two excellent sections on "The Archeology of Patagonia" by Junius Bird and "The Archeology of the Greater Pampa" by Gordon R. Willey. The ethnography of various tribes and groups is then presented by Cooper, Bird, Frau, Lothrop, and Serrano. Parts 2 and 3 are similarly given over to the Indians of the Gran Chaco and eastern Brazil, respectively. The general level is high enough to make any singling out of particular authors somewhat invidious. The reviewer, however, was especially struck by the deep learning and sound judgment revealed in Father Cooper's several contributions and by that unrivaled sense of firsthand intuitive familiarity with the phenomena conveyed by Dr. Métraux's articles (including, of course, those that he authored jointly with that distinguished South American ethnologist, the late Curt Nimuendajú).

In Volume II Wendell Bennett leads off with an admirably succinct and simple introduction to the Andean Highlands in general. This broad panorama, which surveys the general setting, cultural origins, population, and the environment and cultural trends of the central, southern, and northern regions, helps enormously toward orienting the nonspecialist reader on the more detailed treatments that follow and gives a measure of integration and coherence to the whole book. The remaining three parts of this volume are regionally organized (the Central Andes, the Southern Andes, the Northern Andes). Notable throughout are the skillful blending of archeological, historical, and ethnographical knowledge and the attention given to post-Conquest cultures. Dr. Kubler's chapter on Inca or Quechua culture under Spanish influence is a high-water mark in this respect. Larco Hoyle's reconstruction of the culture patterns of the North Coast of Peru in pre-Spanish times is an outstanding example of how the thoughtful and sympathetic archeologist, really steeped in rich materials, can do ethnology. The first-rate chapters on "The Contemporary Quechua" and "The Aymara" by Mishkin and Tschopik show how much we stand to learn from investigation of living cultures by modern anthropological methods, as opposed to work (however learned and scrupulous) upon literary sources.

The editing is, on the whole, superb. All the editors¹ merit the highest praise. In a work where the complications invite inconsistency and error, very few faults at the mechanical level were noticed. The bibliographies

¹The editor warmly acknowledges the help given by Drs. Métraux and Bennett in planning and editing these first two volumes.

seem extraordinarily complete, although a paper by Henry on the personality of the Kaingang (*Character & Pers.*, 1936, 5, 113-123) and one by Schachtel, Henry, and Henry on "Rorschach analysis of Pilaga Indian children" (*Amer. J. Orthopsychiat.*, 1942, 12, 679-712) are not cited. Since this was a venture in hemispheric cooperation, the reviewer ventures to ask if it would not have been better to leave the articles by South Americans in the original languages. These volumes, after all, appeal to the scholar rather than to the general reader, and any scholar in the South American field ought surely to be able to read Spanish and Portuguese. As they stand, South American scientists are expected to read everything in English.

Readers who may be disappointed by a relative neglect of physical anthropology and of those aspects of linguistics that do not bear directly upon problems of history and of classification will be glad to learn that these matters are to be covered more fully in Volume V of the *Handbook*. Archeology, history, and ethnography are given as much space as one could possibly expect in a handbook series. However, a disproportionate emphasis is given to "material culture" and subsistence activities in general. Even in the treatment of other aspects of culture the selection is somewhat conventional. Because Tylor and other great 19th-century anthropologists became interested in the disposal of the navel cord, this detail is carefully documented, but other facts (e.g. characteristic motor habits of mothers in handling infants) which recent research has shown to be of at least equal importance are almost ignored. It must be admitted, however, that this is due in part to deficiencies in the literature. But the *tendency* in these volumes is still to "give ten pages to the description of how pots are made and two lines to nursing practices." Indeed, only Tschopik and Mishkin even approximate an adequate handling of the data needed by students in the field of culture and personality.

For those who are willing to take "the facts" and let the concepts go, these books deserve criticism only as to relatively minor details. Those who think that *explicit* theory is an indispensable part of any major integrative publication will have certain reservations, however highly they value the intensive investigation and intelligent synthesis that the *Handbook* exemplifies. Nor will they be satisfied with the rejoinder that "this is description and descriptive studies of high standard must precede 'theorizing.'" For any system of descriptive categories involves much *implicit* theory. (Note the selectivity involved in the emphasis on subsistence, navel cord as opposed to masturbation taboos, and the like.) Because the theory remains unstated, it is bad theory, since it is not accessible to the same open examination invited by the weighing of the "factual" evidence. Anthropologists will still swallow a theoretical camel while straining at an evidential gnat.

In any event, the succeeding volumes of the *Handbook* will be eagerly awaited.

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