and New Zealand Maoris. Other blood group studies show some curious clusterings between specific breeding populations, for example between Frobisher Bay Eskimos and Naskapi Indians or between Aleuts and East Greenland Eskimos. Do these similarities really reflect the detailed histories of divergence from a single population source and not later admixture, natural selection, or genetic drift? Several of the papers refer to this question tangentially, and one, by Lampl and Blumberg, addresses it directly by a comparative study of blood serum data. In this paper the authors compare the usefulness of a whole range of polymorphic systems for distinguishing between Native American populations and for identifying Asian-American affinities.

Laughlin's thesis also rests on the assumptions that throughout the late Pleistocene and early Holocene the south coast of Beringia maintained a larger human population than interior Beringia and that population pressure was responsible for moving Eskimos northward along the emerging coastline to replace the ill-adapted Indians confined to the receding interior tundra. To support this view Laughlin notes that southwestern Alaska and the Aleutian Islands have been rich in marine resources at least throughout Holocene times, and, using data described in a paper by Harper, that Aleuts have benefitted from this abundance by living longer (and breeding longer) than other American Arctic peoples. Laughlin contrasts this picture of a coastal Eden with a description of the Beringian interior as barren, cold, and dangerous—an area that could support only small groups of short-lived tundra dwellers. But Hopkins, one of the foremost experts on the environments of the Bering Land Bridge, states in another paper that the southern Beringian coast was not nearly so bountiful as Laughlin suggests. Throughout the terminal Pleistocene ice scoured its shores and severely limited the intertidal resources important to sea mammals and human beings. Furthermore, citing research by Dale Guthrie and others, Hopkins also makes a good case that it was the interior of the Land Bridge, not the southern coast, that was especially bountiful for human populations. The Beringian plain may have been covered by a grassy tundra that supported large herds of herbivores rivaling the modern savannas of Africa throughout the late Pleistocene.

Both Laughlin's and Hopkins's interpretations are simply speculative, however, and until we can actually document the relative carrying capacity of the coastal and interior Arctic over time it is futile to invoke population pressure as a force either for initially propelling people into the New World or for establishing the linguistic, cultural, or genetic boundaries of North American peoples that exist in the ethnographic present.

Laughlin's thesis needs to be examined critically also for its implications for the early prehistory of North Americans. It is clear that it is intended to be a model of actual migrations of ethnically identified people. This can be seen not only by his suggestion that the Indians crossed the interior and the Eskimo-Aleuts came across the southern Beringian coast, or that population pressure was the dynamic that sent coastal peoples into the interior, but also by his (and Wolf's) explanation of why Greenland Eskimos and Aleuts share certain blood group antigens: as the end members of a bidirectional migrating population they ended up in refugia where they could preserve more of their original common gene pool than the intermediate members. To accept this last argument, one would also have to accept that the early Eskimo groups who allegedly migrated from southern Beringia to northern Alaska (a linear distance of only about 1500 miles) over a period of 5000 or 6000 years did so without being significantly affected by continued gene flow from a core coastal Eskimo population or by genetic drift (even though they were living in small breeding isolates) or, as they rounded Seward Peninsula, by breeding with Asians, with whom (as the archeology shows) they were in continual contact, or by breeding with the Indians who presumably lived upstream from them along the major Alaskan rivers. These hypothesized emergent Eskimos would have had to retain an extraordinarily strong sense of ethnic identity and strict rules of endogamy excluding all outsiders from their small communities, not just for a few generations but for millennia.

Divested of its detail concerning actual migrations of peoples, Laughlin's general thesis is an adequate account of the history of gene flow across Beringia, given, that is, that the southern Beringian coast was densely populated. It is in fact a specific application of the standard statistical argument describing the results of interbreeding between numerically disparate populations. This large-scale population model is inappropriate, however, as a model of migration or culture history scaled to the level of ethnic group history. As a case in point, by focusing on a model of ethnic group dynamics rather than gene flow, one could make just as strong a case for the in situ evolution of Eskimos from the eastern interior Beringian populations as from coastal Beringians. All that is needed is to shift emphasis to the history of the original peoples living in the eastern Beringian region. Gene flow could proceed as Laughlin suggests, but without any of the Beringian groups—coastal or interior—going anywhere. People need simply have exchanged marriage partners with neighbors—as they in fact have always done—as they continued to live in their traditional homelands. Arguments that interior peoples were too ill-adapted or too land-oriented to learn how to cope with a coastal habitat that evolved over millennia are irrelevant to the gene flow thesis and give too little credit to the adaptability of human culture.

The First Americans presents an excellent discussion of the problems of origins, affinities, and adaptations of New World populations, and Laughlin and Harper have assembled many of the top scholars responsible for the recent research. The papers summarizing this original research make *The First Americans* an excellent reference for anyone interested in population history, and the representation of so many different research strategies and different, occasionally contradictory, findings makes it also unusually satisfying as a textbook.

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Hazard Mitigation in China

Earthquake Engineering and Hazards Reduction in China. A Trip Report of the American Earthquake Engineering and Hazards Reduction Delegation. PAUL C. JENNINGS, Ed. National Academy of Sciences, Washington, D.C., 1980. vi, 190 pp., illus. Paper, $11.50. Committee on Scholarly Communication with the People's Republic of China Report No. 8.

This is a report written by a team composed of nine earthquake engineers, one seismologist, one geologist, and one China specialist after its three-week visit to the People's Republic of China in July and August 1978. The book deals mainly with earthquake engineering research and practice in China, but it also includes rather comprehensive reports on the Tangshan (M = 7.8) earthquake of July 1976 and the Sungpan (M = 7.2) earthquake of August 1976. The Tangshan

earthquake was not predicted and resulted in major damage and casualties; the Sungpan earthquake was predicted and resulted in slight damage, partly because it occurred in a sparsely populated area.

The delegation arrived in China four months after the convening of the National Science Conference of China, where the importance of science and technology were reaffirmed after ten years of unrest during which politics was placed ahead of everything else. In describing the organization of earthquake engineering research in China (chapter 2), the report depicts a state of change, with the laboratories that were destroyed and the university programs that were discontinued during the Cultural Revolution being restored or reorganized and institutes being assigned to new administrative units in answer to new demands or political realities. The chief agency of earthquake engineering research, the Institute of Engineering Mechanics in Harbin, for example, was moved out of the Academy of Sciences and placed under the State Seismological Bureau; its laboratories were subdivided and expanded. Recent visitors to China have found that changes are still going on; politics in science is being further de-emphasized, and some laboratories are now in operation with both Chinese and foreign instruments and apparatus.

Earthquake engineers in China have had to deal with the realities of earthquakes more than perhaps any of their colleagues elsewhere in the world. Beginning with the Xingtai (southwest of Beijing) earthquake, there were more than ten potentially or actually very damaging earthquakes in China during the period 1966–1976. In the seismically active and densely populated regions of China, many of the buildings either were constructed in a time when little was known about the seismicity of the area or were not constructed suitably to reduce the hazards of an earthquake, owing to a lack of funds, building materials, or building technology. Adequate construction was further hampered during 1966–1976 by the refusal of construction workers to accept the criticism of an engineering supervisor. In view of what is known about the past seismicity of many regions in China and the performance of old buildings in earthquakes, the questions facing engineers concern how the new building codes should be formulated and how some of the older buildings in seismically active areas could be shored up. The answers of course have to take into account the severe limitation of funds and the urgent demand for new construction. The report illustrates these points well and provides details of current building practices, some of which would certainly cause consternation to engineers in other parts of the world.

The report on the Tangshan earthquake is the most comprehensive one available in English. This earthquake, according to recently available official figures, resulted in casualties of about 200,000 (at the time the report was written the figure was rumored to be anywhere from 650,000 to 800,000). A devastating 85 percent of the multistory buildings in the region were either severely damaged or destroyed. Historically the region has not been particularly seismic, and it had been assigned a maximum intensity of VI. In fact, because of the presence of thick sediments in the region, the existence of faults was questioned even after the earthquake; although the faults had been mapped in coal mines, they were not linked to neotectonics. Tangshan is now open to foreigners, although much of the evidence of the earthquake has of course been erased during construction. The report contains some clear photos, provided by the Chinese hosts, of the aftereffects of the event. However, together with the writers of the report, this reviewer hopes that Chinese engineers and scientists will compile and publish a complete account of the Tangshan event, for such a report would assist us in alleviating such disasters in the future.

A 12-story apartment building under construction in Beijing (Peking). "Buildings in Peking are designed by the Peking Institute of Architectural Design for an earthquake of intensity VIII on the Chinese scale." This and a similar project visited "seemed to typify new apartment construction in Peking." It "has precast exterior walls, precast floors with topping, cast-in-place concrete shear walls, and brick partitions." With the construction procedures used, "it takes approximately 2 months to finish the concrete construction and about six months for total building completion." [From *Earthquake Engineering and Hazards Reduction in China*]

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Glaciology

Symposium on Glacier Beds. The Ice-Rock Interface. Ottawa, Aug. 1978. International Glaciological Society, Cambridge, England, 1979. 446 pp., illus. Paper, £25. Journal of Glaciology, Vol. 23, No. 89.

The symposium of which this book is the proceedings brought together glaciologists, who study the mechanisms of ice flow, and glacial geologists and geomorphologists, who observe the effects of past ice movements on the landscape. Discussions covered the nature of the ice-rock interface, physical and chemical processes at the interface, erosion and deposition, subglacial hydrology, glacier sliding, properties of basal ice, and conditions at the base of ice-age ice sheets.

The volume contains 26 complete papers plus 29 abstracts. Three are review papers; one deals with erosion processes (Boulton), and the other two present the views of the two main protagonists in the long-standing debate about glacier-sliding mechanisms (Lliboutry and Weertman). Other reviews, of observations of the glacier bed and sliding in tunnels (Vivian) and boreholes (Kamb *et al.*) unfortunately appear only as abstracts. Discussions of each presentation plus a 20-page general discussion are particularly valuable features of the book.

Questioning of accepted ideas is a feature of the book. Boulton, for example, presents the striking observation that 90 percent of the basal movement of an Icelandic glacier occurred not at the ice-bed interface but by deformation in subglacial till, and Kamb and his colleagues found a layer of "active subsole drift" between ice and bedrock. These observations show that the basic assumption in all present theories of glacier sliding, namely that there is a sharp interface between clear ice and an undeformable bed, is unrealistic.

The discussions reveal wide dif-