 DOI: 10.1086/665033

Supplement B from Diemberger, Hastrup, Schaffer, et al., "Communicating Climate Knowledge"

(Current Anthropology, vol. 53, no. 2, p. 226)

Figures

Figure B1. Porong. Tibetan black tents used by the nomads, with Himalaya in the background. Photograph by Hildegard Diemberger.

Figure B2. Sheep herd in Porong. People living in vulnerable environments, like many Tibetan rural communities, have been observing changing climatic patterns long before this was a fashionable topic and have had to cope with the relevant consequences. This reflects what was observed more generally by the editors of *Anthropology and Climate Change* (Crate and Nuttall 2009), who raised questions around anthropological engagement with climate change and the move from knowledge to action. One of the challenges for both scholars and decision makers is that global and local anthropogenic climate change cannot be easily separated. Photograph by Hildegard Diemberger.

Figure B3. Village meeting for the reallocation of pastures in an area that historically used to be under Porong jurisdiction and currently belongs to a different county. A traditional system called *khyusa* (comparable to the *marke* system described by Goldstein and Beall 1990) reckoned the pastures according to herds that could be supported (and, in the case of the *marke* system, the amount that was necessary to produce a measure of butter). This provided the basis for a periodic redistribution of the pastures and guaranteed the flexibility of the system. Tensions may arise when this kind of system is transformed into one based on fixed square measures. Photograph by Hildegard Diemberger.

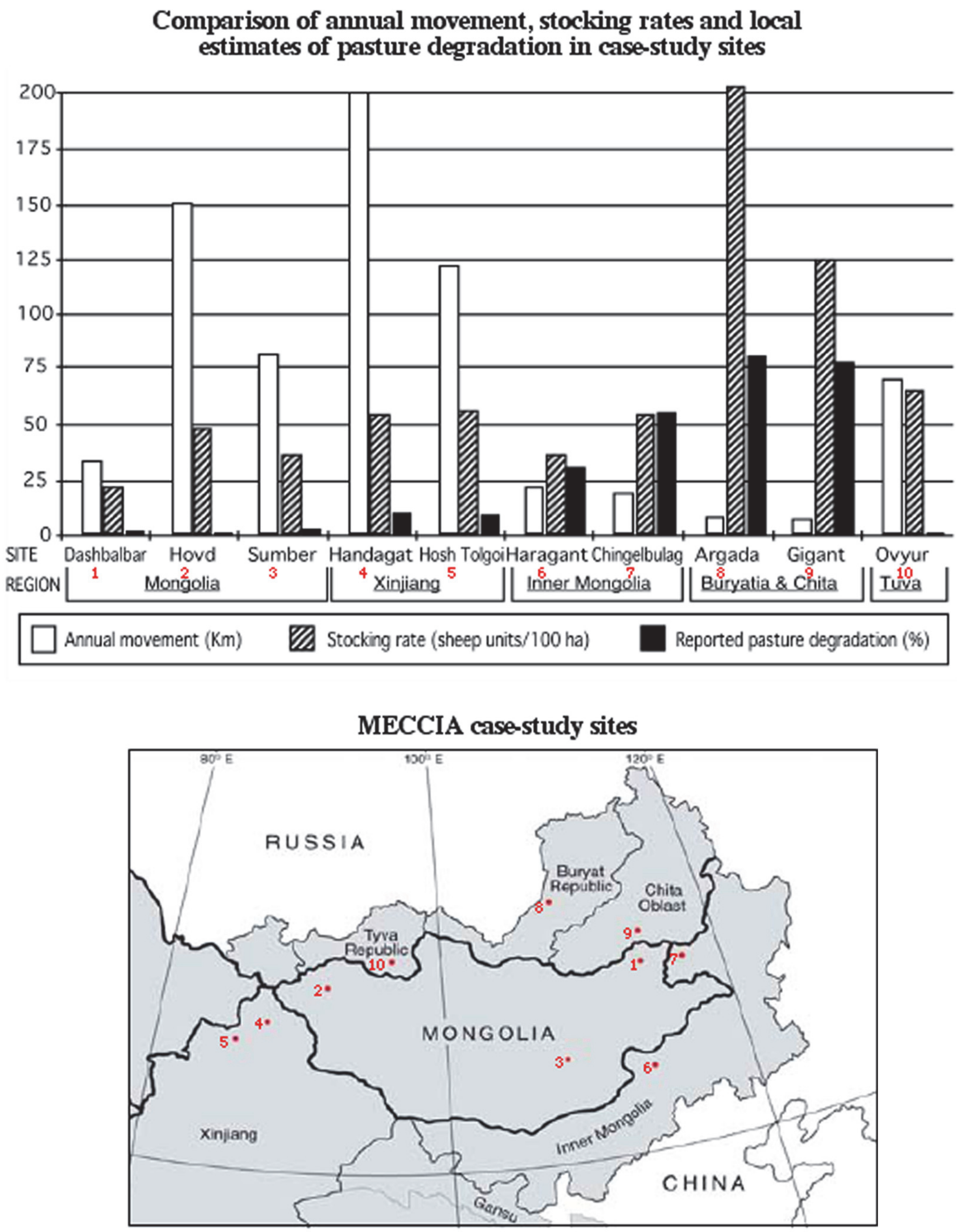

Figure B4. The Cambridge University MacArthur Environmental and Cultural Conservation in Inner Asia (MECCIA) project, funded by the John D. and Catherine T. MacArthur Foundation, made detailed social-anthropological studies in 10 pastoral districts in different parts of Inner Asia (map). Findings suggested that low levels of mobility were more closely correlated with high levels of perceived pasture degradation than with high livestock stocking rates. The bar chart, first published in Sneath (1998), indicates the typical amount of total annual movement carried out by pastoralists in each of the case-study sites, the overall stocking rate of livestock calculated in standard sheep units per hectare, and the levels of perceived pasture degradation. Comparisons between such varied sites are extremely complex, as is the estimation of pasture degradation, so the presented results are suggestive rather than definitive. For fuller discussion, see Humphrey and Sneath (1999). Slide courtesy of David Sneath.

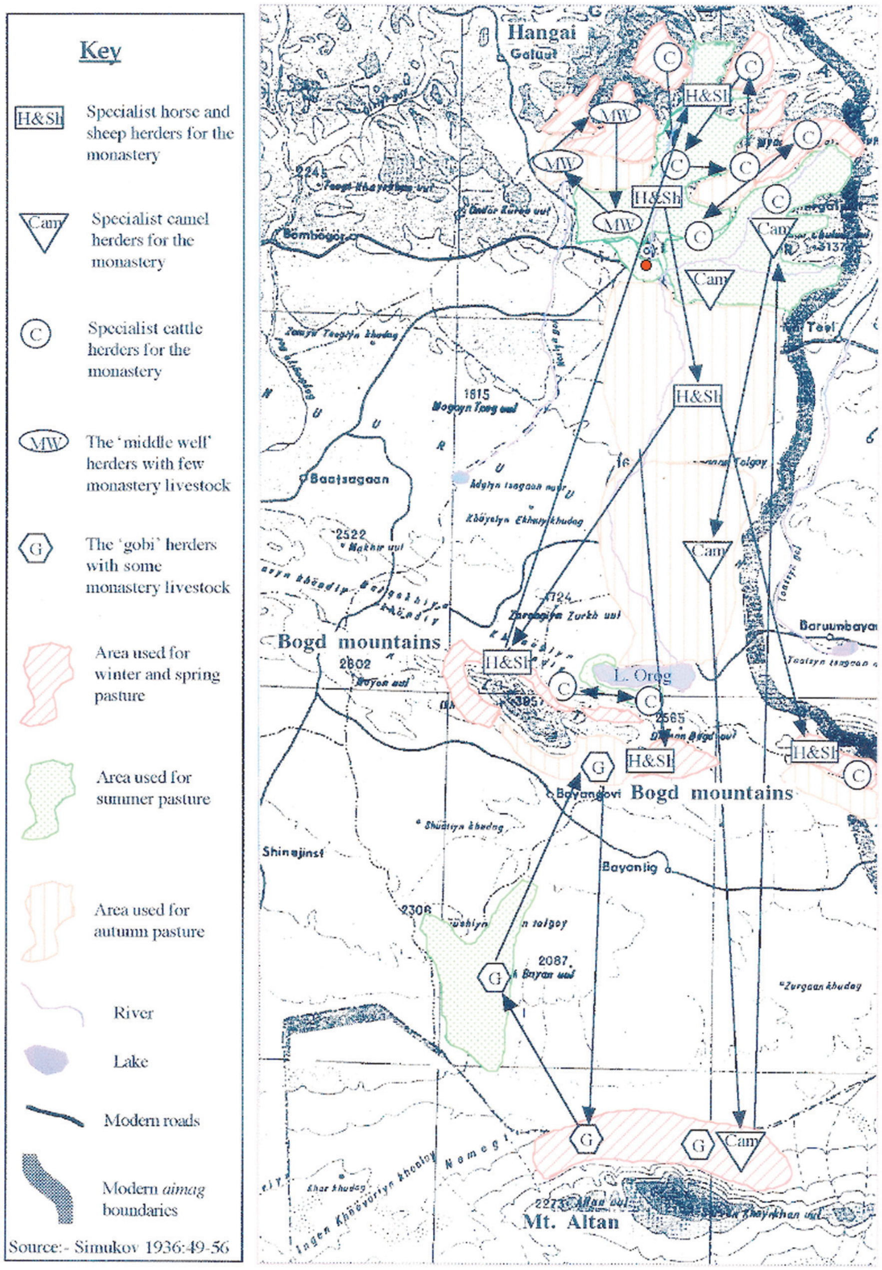

Figure B5. Reconstruction of the pastoral movement systems in a precollective administrative district, Lamyn Gegeen Hoshuu (Bayanzürh Uulyn Hoshuu, now in Bayanhongor Province of Mongolia). This district was administered by a Buddhist monastery and was studied by the Russian geographer A. D. Simukov. This map was based on his description in Simukov (1936). The subjects of the monastery were divided into several categories; three were defined by the specialist herding they did for the monastery: horse and sheep herders, camel herders, and cattle herders. Two further groups were termed "middle-well herders," because they used wells in an intermediate area and herded few monastic livestock, and "Gobi herders," because although they herded substantial numbers of monastic livestock, they generally moved within the Gobi zone of the *hoshuu*. It shows the way in which prerevolutionary district authorities such as monasteries or ruling nobles governed large-scale, districtwide systems of movement, with specialized use of seasonal pastures. The implications of this and other historical studies are discussed in Humphrey and Sneath (1999). Slide courtesy of David Sneath.

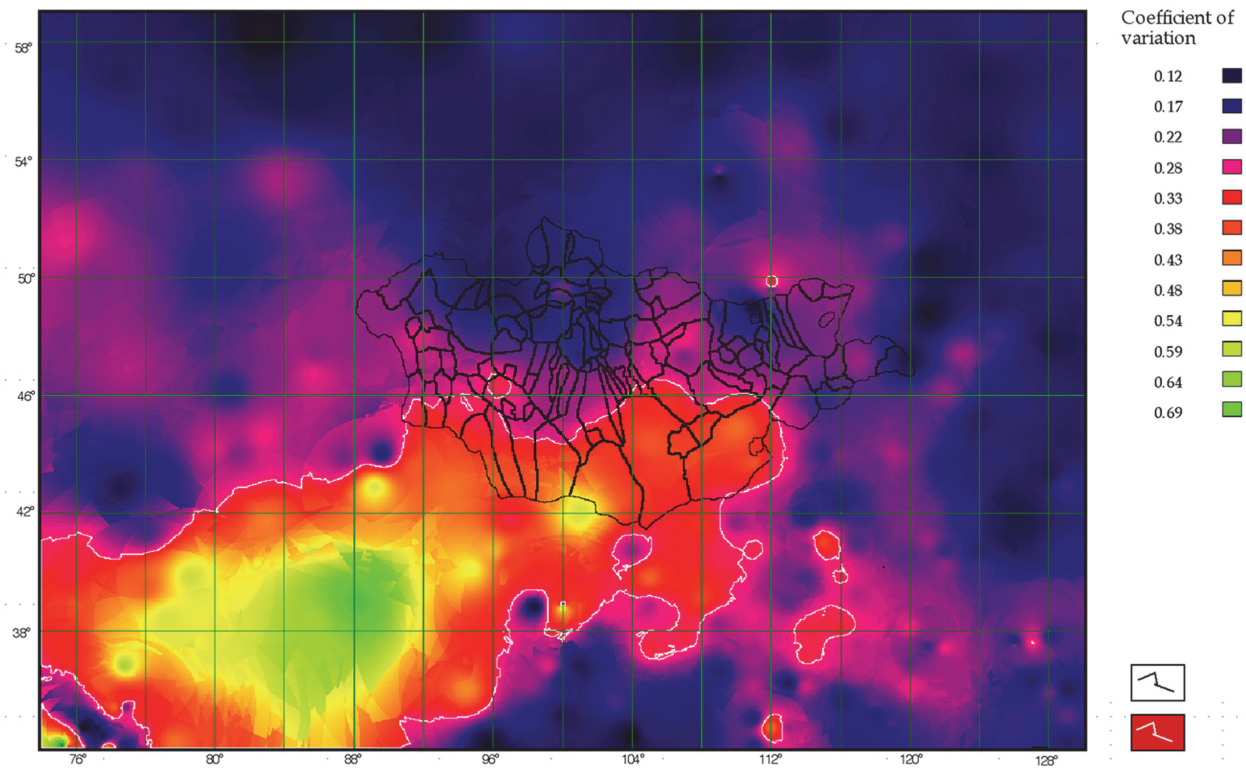

Figure B6. Distribution of interannual variation in precipitation, showing administrative divisions of Bogd Khaan Mongolia, 1918. Black lines indicate district boundaries; the white line indicates boundary where the coefficient of variation (COV) is greater than 0.33. This image was made by the MECCIA (MacArthur Environmental and Cultural Conservation in Inner Asia) project in an attempt to map the variation in annual precipitation in Inner Asia by presenting an estimate of the coefficient of interannual rainfall variation, calculated with precipitation data from meteorological stations throughout the region over four decades and first published by Humphrey and Sneath (1999:271). The "nonequilibrial" model of grazing systems proposed by rangeland ecologists such as Ellis, Coughenour, and Swift (1993) suggested that where the COV of annual precipitation exceeded about 0.3 (30%), the performance of grazing systems cannot be said to vary about an equilibrial norm. The implication of this work is that in such environments, high mobility is likely to be the best way for pastoralists to make use of patchy and variable forage resources. The map superimposes the 1918 administrative boundaries of the Bogd Khaan state of Mongolia, to show the areas within which most pastoral movement was organized at that time. Interestingly, the largest districts (*hoshuu*) tend to be in the regions with the highest levels of estimated variability, suggesting that prerevolutionary pastoral land-use systems were indeed using mobility to manage variability in rangeland resources. It can also be seen that many of the districts take the form of strips that link areas of high and lower variability, and including areas in the different ecological zones that run broadly east to west across the region, thus allowing pastoralists to use mobility to utilize different types of environments. For a fuller discussion, see Humphrey and Sneath (1999). Slide courtesy of David Sneath.

Figure B7. Mount Targo, with clouds on its top, reflects the pattern described by Hans-F Graf. Clouds generated within the local moisture-circulation system may interact with regional weather fronts, inducing precipitation. This is also a powerful mountain god ruling over the land, its inhabitants, and its weather. Photograph by Hildegard Diemberger.

Figure B8. Lake Dangra, next to Mount Targo, is his consort. Dyads of sacred mountains and lakes in the trans-Himalayan region, with their snows and waters, are landscape features that may indicate the well-being of a certain area. Photograph by Hildegard Diemberger.

Figure B9. Mount Takyong in Porong is an emanation of Mount Targo. For the Porong people, Takyong, which has a tiny field of perennial snow, should always have at least some of its snow cover, and its loss would mean disaster. A powerful god, the mountain also works as an indicator of climatic variation. Photograph by Hildegard Diemberger.

Figure B10. Aya priest belonging to an ancient class of ritual specialists involved in the cult of landscape and ancestral deities. Some of the monks and lay priests, as well as community elders, combine their ritual competence with a very profound knowledge of the environment. Photograph by Hildegard Diemberger.

Figure B11. Solar prayer wheel. Photograph by Hildegard Diemberger.

Figure B12. Valley for summer pastures, Chu khol ka area, May 2008. Photo courtesy of Jason Davis.

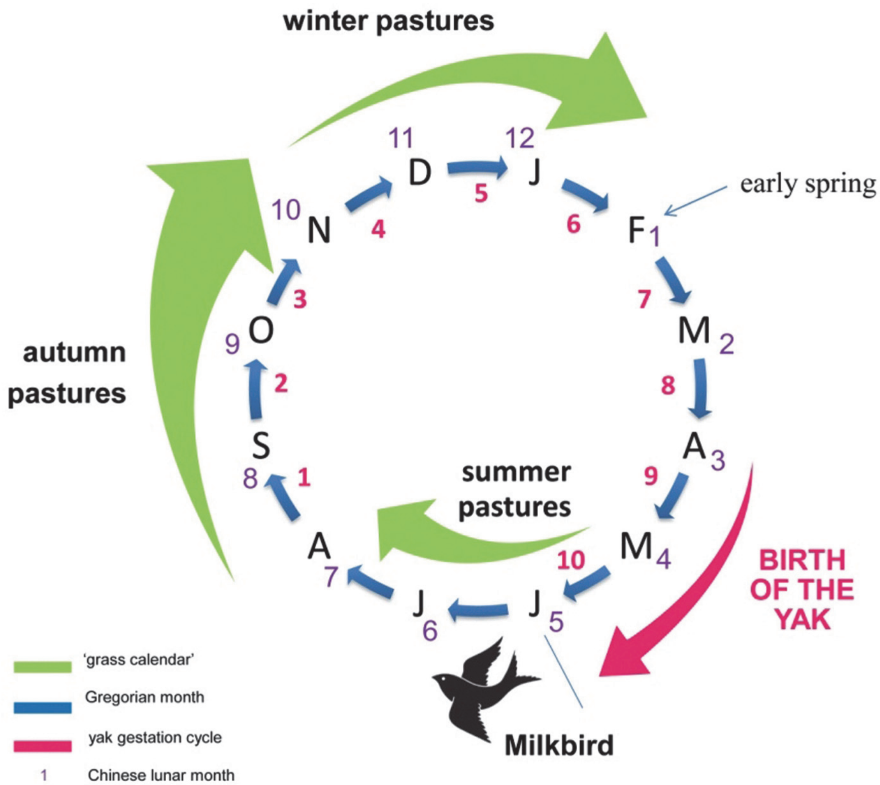

Figure B13. The seasons, the yak gestation cycle, and the "grass calendar." Slide by Jacqueline Hobbs.

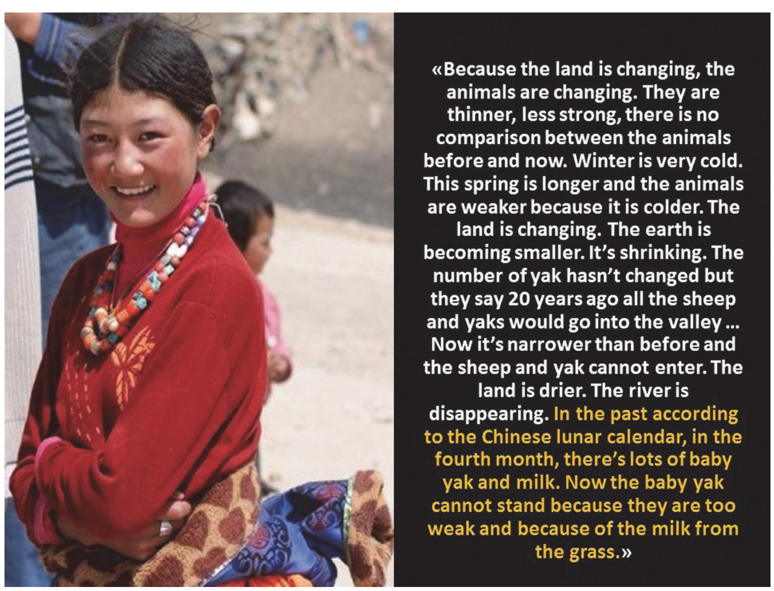

Figure B14. Chu khol ka female nomad on the weakness of the baby yak (Chu khol ka North site 1, Hainan Tibetan Autonomous Prefecture, Xinghai County, Qinghai Province, People's Republic of China, June 22, 2008). Slide by Jacqueline Hobbs.

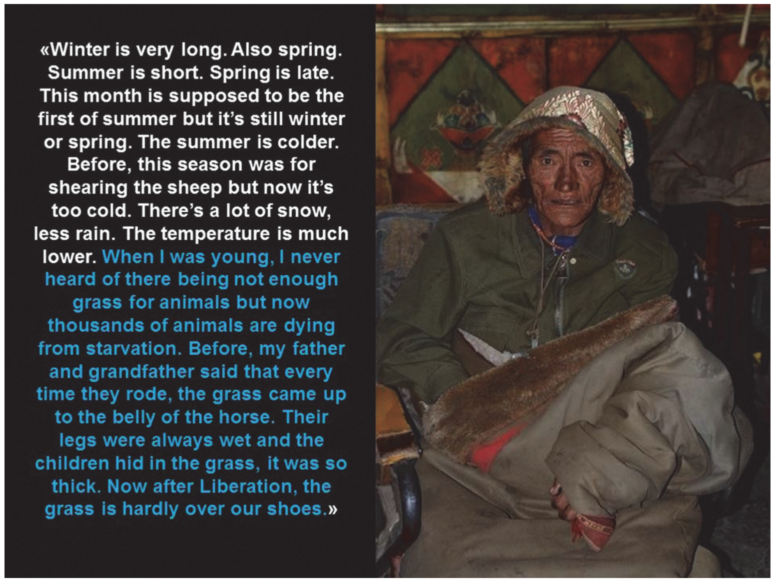

Figure B15. Chu khol ka male nomad on the lack of growth of the grass (Chu khol ka South site 1, Hainan Tibetan Autonomous Prefecture, Xinghai County, Qinghai province, People's Republic of China, May 16, 2008). Slide by Jacqueline Hobbs.

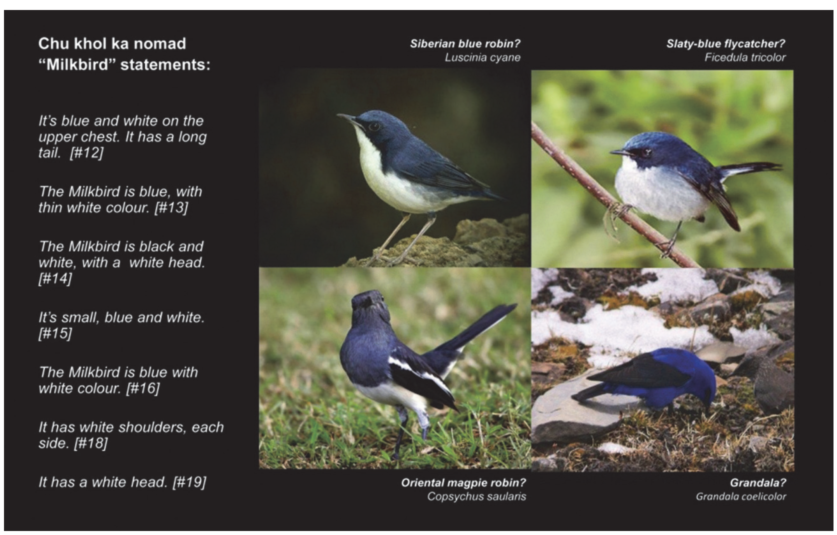

Figure B16. Possibilities for the "milkbird." Slide by Jacqueline Hobbs.

Figure B17. Chu khol ka winter dwelling with yak penned outside, January 2008. Photo courtesy of Jason Davis.

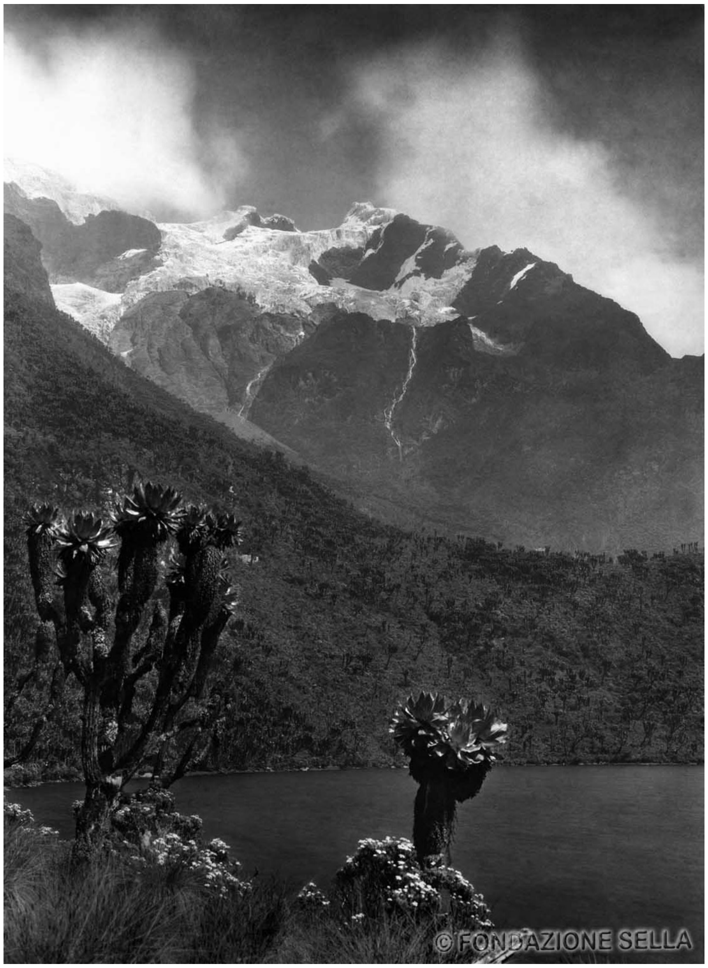

Figure B18. Mount Rwenzori with its glaciers. The images here and in figures B19–B21 have become very important documents in climate research because they show the extent of glaciers 100 years ago. Photograph by Vittorio Sella (Lake Bujuku and Mount Stanley, Rwenzori 1906), courtesy of Fondazione Sella ONLUS.

Figure B19. The summits Alessandra and Margherita of Mount Stanley from the Stanley plain, Ruwenzori, 1906. Photograph by Vittorio Sella, courtesy of Fondazione Sella ONLUS.

Figure B20. The summits Wollaston, Edward, and Semper on Mount Baker, Bujuku Valley, Scott Elliot Col, Vittorio Emanuele Glacier, Summit Margherita, Mount Stanley, Mount Speke, Cavalli Col, summits Umberto and Kraepelin of Mount Emin seen from the Jolanda Summit of Mount Gessi, Ruwenzori, 1906. Photograph by Vittorio Sella, courtesy of Fondazione Sella ONLUS.

Figure B21. Forest above Nakitawa. From the left: Joseph Petigax, S.A.R. (Sua Altezza Reale [His Royal Highness]) Duca degli Abruzzi, and César Ollier, Ruwenzori, 1906. Photograph by Vittorio Sella, courtesy of Fondazione Sella ONLUS.

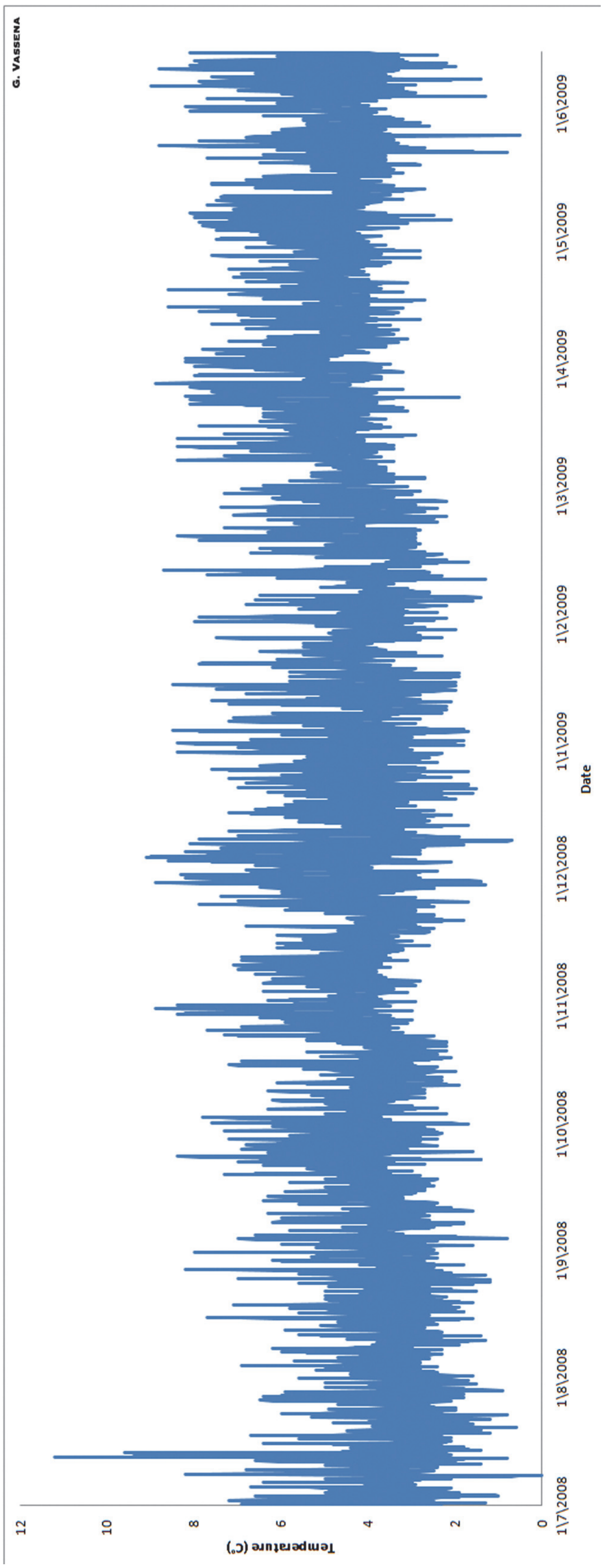

Figure B22. Temperature behavior at Bujuku Weather Station (4,000 m) on Mount Rwenzori from July 1, 2008 to July 1, 2009. It is interesting that the daily temperature variation is larger than the seasonal one, which creates conditions for glaciers and for the high-altitude ecosystems that are very different from those of other parts of the world, such as the Alps. Slide by Giorgio Vassena.

Figure B23. Scientists on the Changri Nup Glacier, Mount Everest area, Himalaya. They survey glaciers and measure their mass balance—the difference between accumulation and ablation (melting and sublimation)—by geodetic methods. By mapping glaciers and comparing measurements at two different points in time, they can determine the mass balance over a span of years. See Smiraglia et al. (2007). Photograph by Giorgio Vassena.

Figure B24. Scientists scanning the glacier of Mount Speke (part of Mount Rwenzori) with a three-dimensional (3D) laser scanner. The 3D laser scanner is a device that realizes a 3D scan of real-world objects or environments to collect data on shape and possibly appearance. The survey consists of a 3D cloud of points, and to each point a color/RGB (red, green, blue) value is added. The collected data can then be used to construct digital 3D models, mesh or point-clouds based. This technique is increasingly used for high-resolution, accurate surveying in geology. See Alippi et al. (2004:36–43; also Diolaiuti et al. 2006). Glacier reduction in this environment follows patterns that are different from that in the Alpine setting and is strongly influenced by cloud coverage. Photograph by Giorgio Vassena.

Figure B25. Excavation at Peacock's Fen during the summer of 1934. The excavation was carried out by Graham Clark and C. W. Phillips (at the base) and by the paleobotanist Sir Albert Seward and Harry Godwin (who stand on the step marking the lower peat). Image provided by Pamela Smith (used in Smith 2009), courtesy of the Museum of Archaeology and Anthropology, University of Cambridge.

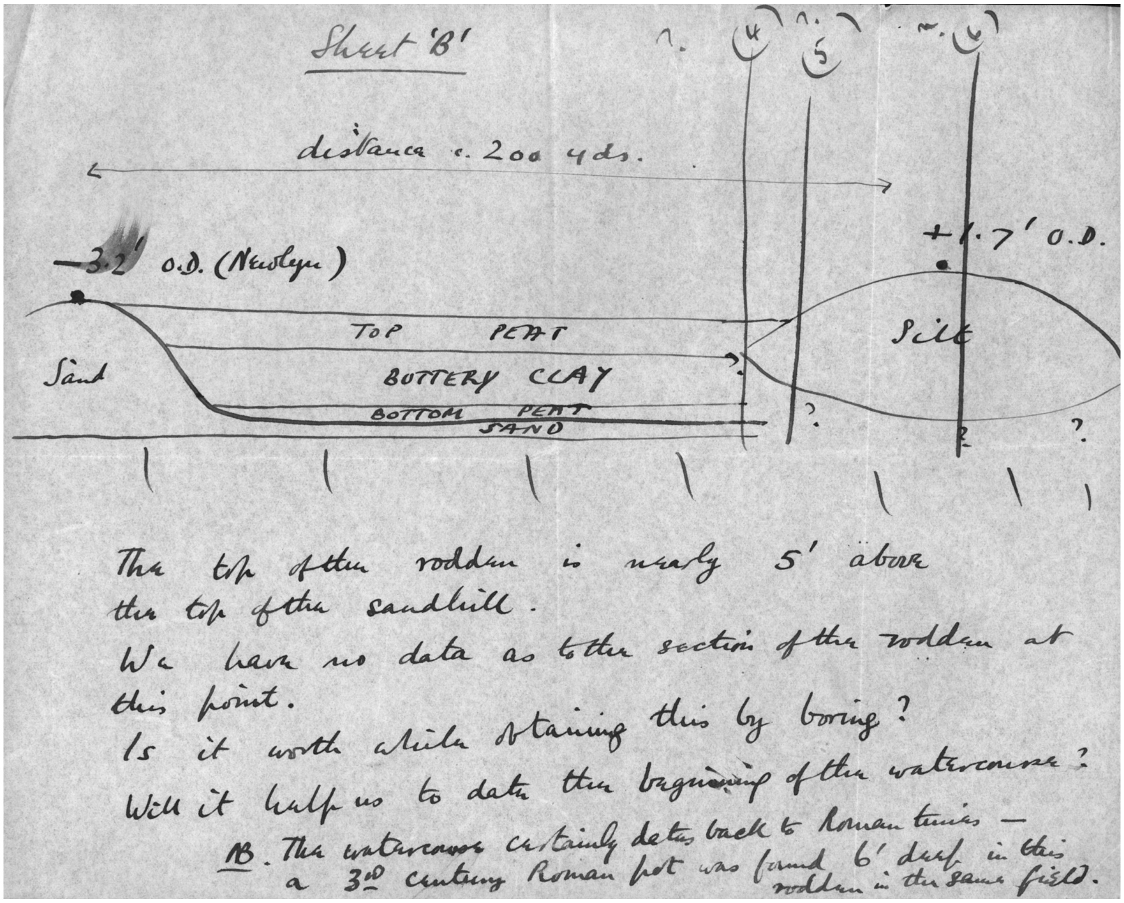

Figure B26. Grahame Clark’s diagram of the Plantation Farm stratigraphy. Image provided by Pamela Smith (used in Smith 2009), courtesy of David Norman and Roderic Long of University of Cambridge Sedgwick Museum of Geology. This archaeological stratigraphy is part of a conversation about “digging into the soil” that includes a variety of Fenland voices, including William Henry, who offered the following stratigraphy based on his experience as a ditch digger: “On top, the soil is about 15″ thick: then ther’s a layer o’ peat, usually about 2′ or 3′, though it may be a lot more. Next comes the layer o’ ‘buttery clay’, usually about three feet. After that there’s a layer o’ the peculiar peat known to us as ‘bear’s muck,’ on account of it being so difficult to work. It ’ould stick to all your tools, and the only way to deal with it were to use a wooden scoop called a ‘sluff’ (or slough—I don’t know). The bear’s muck varies in thickness, but there’s always a screed of it, no matter how thin, atween the two clays, the hard blue clay and the buttery clay. This screed may be as little as an inch in some places, but it’s allus there: and it’s in this bear’s muck as the nuts and acorns lay” (Marshall 1967:113).

Figure B27. Bog oak at Woodwalton Fen (image courtesy of Rodney Burton). The extraction of bog oak poses considerable logistical difficulties for farmers (Bloom 1944).

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