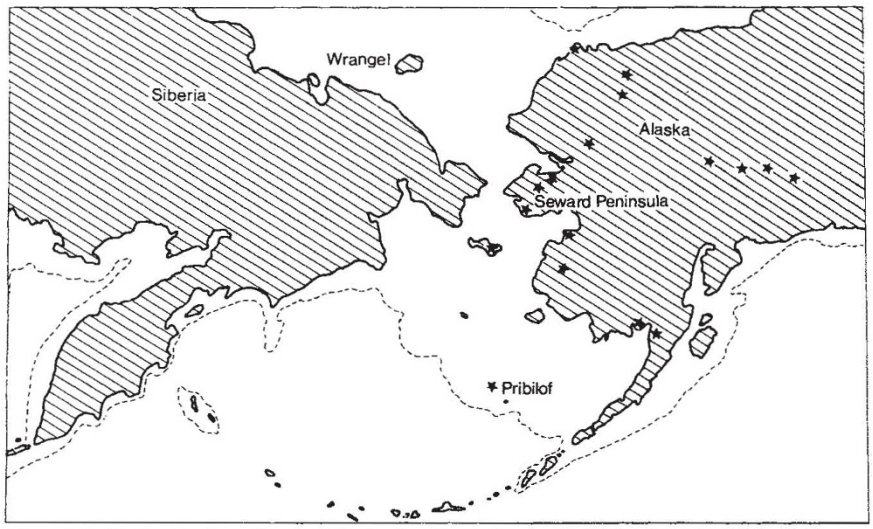

Map of the Bering Strait study area. The broken line indicates the Bering land bridge and asterisks mark the sites of the pollen analyses that have been made. Will they be matched in Siberia?

inated in Siberia, where people are known to have lived as hunters at the forest steppe ecotone over thirty thousand years ago.

The contribution of Shilo and his followers has been to define the geomorphology of north-east Siberia so explicitly that firm environmental limits for the land bridge in full glacial times are established. In eastern Siberia, large rivers flow north and are separated by interfluves that are hundreds of kilometres wide. The surface of the interfluves has a topography of flat hillocks and depressions called *yedoma* and *alasy*. It has been evident for some time that the *alasy* depressions are thermokarst features melted out of a once uniform plain of *yedoma* silt.

For many years, Siberian geologists identified the *yedoma* deposits as alluvium and suggested that there had been huge shallow lakes in which the silt settled. Shilo came to question this view during his many years in Siberia, working on gold placers (as a geomorphologist and as a student of frozen mammoth carcasses), before he became head of the Far-Eastern Science Research Centre in Vladivostok[1]. He argued that the *yedoma* silt was not alluvium, but loess. This hypothesis has been further developed by Boris Yurtsev[2] and S.V. Tomirdiaro[3], who have marshalled the data of palaeobotany, mineralogy and geomorphology until the argument for a loessic origin for the *yedoma* has become compelling. Thus older Russian descriptions of Beringian environments are turned on their heads, with 'dry, cold and windswept' substituted for the 'wet and flooded'; it now seems that the silt was blown over an arctic landscape and frozen into place. The dry, cold time of the loess accompanied the Duvanny Yar (Würm-Wisconsin) glaciation in Siberia. The cutting of *alasy* depressions by thermokarst is now dated, by radiocarbon, to the Holocene.

D.M. Hopkins, the US authority on the Pleistocene geology of Bering Strait[4], who travelled to some of the Siberian sites with Yurtsev in 1981, agrees with the interpretation of the Shilo school. The *yedoma* is comparable to the 'muck' of the Yukon gold placers, and to the thick loess mantle on the central Seward Peninsula[5]. Hopkins also finds evidence for sand, as well as loess, blowing across Alaska, from deep in the interior down to the south land-bridge coast at the Pribilof Islands (see figure).

This view of the land bridge of Duvanny Yar times as dry, cold and barren has also been developed independently from the evidence of pollen in lake sediments. Pollen spectra dated to the land bridge on the Alaskan side represent a tundra that has no exact modern analogue and probably had a less complete vegetation cover than does modern Alaska. The extreme view is that of Ritchie and Cwynar[6], who use the first good pollen influx data to argue that the land-bridge tundra was as sparse as polar desert. Other pollen analysts argue for something like a dry facies of modern tundras but with fewer sedge meadows and almost devoid of dwarf shrubs[7,8]. In any case, pollen data seem quite incompatible with a more productive vegetation, like steppe or grassland. When Yurtsev talks of the 'tundra-steppe' that covered the *yedoma* as it formed, he likens this to the sparse tundra of modern Wrangel Island in the Arctic Ocean, his ideas thus converging with the conclusions of pollen analysts on the Alaskan side[2].

This reconstruction is in direct conflict with the hypothesis that the Duvanny Yar land bridge supported a complex biocoenosis of big game animals and, hence, a considerable production of plants — the so-called 'mammoth steppe'[8-10]. Archaeologists who argue for early peopling of the New World rely on the availability of considerable populations of mammoths and other game as the resource of their first Americans[11,12]. If the Shilo school and the Alaskan pollen analysts interpret the Duvanny Yar ecosystem correctly, it is difficult to see how the necessary population of big game could have been supported. In this event, interest would turn to the late glacial land bridge, when changing climate could have made the southern land-bridge coast more hospitable, just in time for the immediate ancestors of the Clovis culture to supply the first Americans.

As accelerator-dating increasingly brings into question claims of early American sites of human habitation[13], the idea of a frigid barrier of a land bridge, more than 14,000 years ago, becomes even more appealing. But obviously this reconstruction requires further testing and an important test will be found in applying pollen analysis to lake sediments of the Siberian side. With that in mind, the Climate Dynamics and Polar Earth Sciences programmes of the US National Science Foundation have provided funds for a team from the University of Washington and Ohio State University to work with Academician Shilo and his group on raising sediment cores from a series of lakes in Soviet Beringia. The US team will take their rubber boats and Livingstone sampling equipment, closely modelled on the equipment first introduced into palaeoecology for use in Alaskan studies[14]. The two teams plan to use this equipment in Siberia later this year to raise duplicate cores from each lake, and thereafter to conduct pollen and other palaeoecological analyses in parallel.

East and West are divided at the Bering Strait, but we propose to standardize research methods for a final reconstruction of the years when the Strait was abolished and the continents were fused. □

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100 Years Ago

Far-sightedness

IN THE spring of 1837 I was travelling from Rome, northwards, by 'Vetturino,' and from the summit of Apennine on the road between Florence and Bologne, I saw, with astonishment, the whole range of the Swiss Alps, not merely distinguishable but conspicuous. Measured on the map in a direct line the nearest part of the range was distant about 200 miles. The extreme portions, including Mont Blanc, were considerably more. I have no doubt that the atmospheric conditions were unusually favourable. As a peasant, living on the spot, shortly passed, I asked him what mountains they were — to which he immediately answered to my surprise, that they were the mountains of Switzerland.

J. HIPPISLEY

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