It is a rarity nowadays to come across fossil-rich sediments in Britain dating to the Quaternary period (the last 2.6 million years) that have not been the subject of intense study. An exciting opportunity arose to study one such sequence after I was awarded an Irene Marshall Scholarship for Geography-related research and travel. The sediments I studied filled a once enormous subterranean cave system, known as Westbury Cave, in the Mendip Hills of Somerset in southwest England. Limestone quarrying in the 1960s and 1970s exposed the sediments that had infilled the cave roughly between 1 million and 500 000 years ago. The upper sequence of limestone breccias had already been thoroughly studied in the 1970s and 1980s by a team from the Natural History Museum and has provided a rich palaeontological record for the early Middle Pleistocene with over forty species of mammals, birds, reptiles and amphibians. However, so far comparatively little work has focused on the other major sediment sequence in the cave: the older ‘Siliceous Member’, thought to be a sequence of water-lain sands and gravels. A few fossils have previously been collected from these deposits, including species of bison, giant hyaena, beaver and vole. However,
no detailed description or comprehensive sampling of the sediments of the Siliceous Member has been conducted thus far. Therefore, the aims of my research were to establish: (1) how and when the sediments were deposited in the early history of Westbury cave, (2) where the sediments originated from, (3) which species made up the Early Pleistocene regional fauna of southwest England, and (4) whether any correlations can be drawn from contemporaneous deposits in Britain and North-West Europe.

My motivation behind applying for the scholarship came from a desire to enhance my fieldwork skills and to collect data for my final year dissertation through studying a site of national importance to the geographical and palaeontological understanding of the Early Pleistocene period. Unfortunately as the site is quite a distance from home, I required financial assistance if I were to conduct my dissertation data collection at Westbury Quarry. The scholarship not only provided me with the means to travel to and from Somerset, but also paid for accommodation and meals during my stay, without which the trip would have been impossible. As well as providing essential data for my dissertation, the project has allowed me to develop my organisational skills through planning four weeks of fieldwork, organising field equipment, accommodation, transport and arranging access to the Site of Special Scientific Interest (SSSI) through discussions with the quarry manager and regional Natural England representative. These skills and experiences will no doubt prove useful when planning fieldwork in the future.

For four weeks in June and July 2014, along with the help of many eager assistants, I created a
series of faces in the sediments of the cave in-fill, exposing over 6 metres of the Siliceous Member sediments, which were then systematically studied and sampled to reveal details of their sedimentology and palaeontology. The trip ran very smoothly, with many discoveries of bone fragments and teeth in the field, especially from the gravel units. From a preliminary study of these field finds it is likely that we have unearthed fossil remains of bovids (such as bison), cervids (the deer), leporids (the rabbits and hares) and several rodents. These bones and teeth are now awaiting detailed taxonomic identification, which will provide an idea of which species were living in southwest England in the early Pleistocene and what the environment was like at that time. In addition to these finds made in the field, bulk samples were taken from the gravel units, which will be sieved, graded and sorted in the lab to look for ‘microvertebrate’ remains. In addition, over 50 sediment samples were taken from several clay units in each face, which are being used to help date the sediments by a technique called palaeomagnetic dating.

Despite all these successes, I did encounter several challenges during my research at Westbury. Exposing unconsolidated sands and gravels to the elements meant they became vulnerable, and during a number of intense thunderstorms several of the sediment faces suffered rain damage and erosion. This was potentially a problem, because the unconsolidated gravels were the units yielding the most fossils, and to have the most fossiliferous units washed away down the slope would not have been ideal. To solve this problem large tarpaulin sheets were secured to the sides of the faces, so any rain or hill slope runoff, which could have washed away the sediments, was collected and disposed of further down the slope. Furthermore, as I was working on steep slopes of unconsolidated sands and clays on the side of the quarry, bad weather made it challenging to

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continue working safely and on several occasions we were forced to retreat off the hill slope and down to shelter. Luckily for most of my stay the weather was glorious & perfect for fossil hunting!

As well as conducting primary data collection for my dissertation I also had the opportunity to travel around Somerset visiting several museums to study material from previous collections at Westbury as well as other Quaternary fossils. The University of Bristol Spelaeological Society Museum has a collection of fossils from Westbury, which I was able to study and I helped create a photo catalogue of their collection during a research visit. In addition I visited other museums in the area, including the Wells & Mendip Museum, The Museum of Somerset in Taunton and the Bristol City Museum to see their local collections of Quaternary fossils. I also travelled to a number of famous Quaternary sites, including the Wookey Hole and Cheddar Gorge caves to learn about their history and to see for myself places I have only previously read and learned about in class.

The Irene Marshall Scholarship provided me with the otherwise unattainable opportunity to study a previously poorly understood site in the southwest of England, which will add to the relatively sparse knowledge of Early Pleistocene faunas and environments in Britain. The scholarship also provided me with the opportunity to travel around the local area to study fossils of a similar age and to visit sites of real palaeontological importance. Not only have these experiences furthered my interest in palaeontology and past climates, but they have also allowed me to develop skills in organisation, leadership, planning and teamwork that will undoubtedly prove useful in many areas of later life. I would highly encourage any prospective students with an interest in travel and research to consider applying for the scholarship.