

- LEVIN, I., B. KROMER, H. SCHOCH-FISCHER, M. BRUNS, M. MÜNNICH, D. BERDAU, J.G. VOGEL, K.O. MÜNNICH. 1985. 25 years of tropospheric ^{14}C observations in Central Europe, *Radiocarbon* 27(1): 1–19.
- LONG, A. & R.M. KALIN. 1990. A suggested quality assurance protocol for radiocarbon dating laboratories, *Radiocarbon* 32(3): 329–34.
- MCCORMAC, F.G., M.G.L. BAILLIE & J.R. PILCHER. Forthcoming. Location dependent ^{14}C variations. Proceedings of the 15th International Radiocarbon Conference, *Radiocarbon*.
- MOOK, W.G. 1986. Recommendations/resolutions adopted by the Twelfth International Radiocarbon Conference, *Radiocarbon* 28(2A): 799.
- NIKLAUS, T.R., G. BONANI, M. SIMONIUS, M. SUTER & W. WÖLFLI. 1992. CalIBETH: An interactive computer program for the calibration of radiocarbon dates, *Radiocarbon* 34(3): 483–92.
- PEARSON, G.W. 1987. How to cope with calibration, *Antiquity* 61: 98–103.
- PEARSON, G.W., J.R. PILCHER, M.G.L. BAILLIE, D.M. CORBETT & F. QUA. 1986. High-precision ^{14}C measurement of Irish Oaks to show the natural ^{14}C variations from AD 1840–5210 BC, *Radiocarbon* 28(2B): 911–34.
- PEARSON, G.W. & F. QUA. 1993. High-precision ^{14}C measurement of Irish Oaks to show the natural ^{14}C variations from AD 1840–5000 BC: a correction, *Radiocarbon* 35(1): 105–24.
- PEARSON, G.W. & M. STUIVER. 1986. High-precision calibration of the radiocarbon time scale, 500–2500 BC, *Radiocarbon* 28(2B): 839–62.
1993. High-precision bidecadal calibration of the radiocarbon time scale, 500–2500 BC, *Radiocarbon* 35(1): 25–34.
- REIMER, P. 1994. Radiocarbon calibration news, *INQUA Commission for the Study of the Holocene Newsletter* 11: 21–3.
- ROZANSKI, K. 1991. *Report of the consultants' group meeting on C-14 reference materials for radiocarbon laboratories*. Vienna: International Atomic Energy Agency.
- SCOTT, E.M., D.D. HARKNESS, G.T. COOK, B.F. MILLER, F.H. BEGG & L. HOLTON. Forthcoming. The TIRI project: a status report. Proceedings of the 15th International Radiocarbon Conference, *Radiocarbon*.
- STUIVER, M. & B. BECKER. 1993. High-precision decadal calibration of the radiocarbon time scale, AD 1950–6000 BC, *Radiocarbon* 35(1): 35–66.
- STUIVER, M. & G.W. PEARSON. 1986. High-precision calibration of the radiocarbon time scale, AD 1950–500 BC, *Radiocarbon* 28(2B): 805–38.
1993. High-precision bidecadal calibration of the radiocarbon time scale, AD 1950–500 BC and 2500–6000 BC, *Radiocarbon* 35(1): 1–24.
- STUIVER, M. & P.J. REIMER. 1993. Extended ^{14}C data base and revised CALIB 3.0 ^{14}C age calibration program, *Radiocarbon* 35(1): 215–30.
- Suess, H.E. 1970. Bristlecone-pine calibration at the radiocarbon time-scale 5200 BC to the present, in Olsson, I. (ed.), *Radiocarbon variations and absolute chronology*: 303–12. Stockholm: Almqvist & Wiksell.
- VAN DER PLICHT, H. 1993. The Groningen radiocarbon calibration program, *Radiocarbon* 35(1): 231–8.
- VOGEL, J.C., A.M. FULS, E. VISSAR & B. BECKER. 1993. Pretoria calibration curve for short-lived samples, 1930–3350 BC, *Radiocarbon* 35(1): 73–86.
- WARD, G.K. & S.R. WILSON. 1978. Procedures for comparing and combining radiocarbon age determinations: a critique, *Archaeometry* 20(1): 19–31.

Archaeological aspects of D-Day: Operation Overlord

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The September Editorial (68: 477–9) noticed how the Normandy invasions of D-Day 1944 are, and are not, archaeologically visible. The author of the pioneering book on the pill-box defences of Britain in the Second World War explains what little there is surviving in southern England. Static defences, we see, leave traces in a way a mobile attack does not.

After the Battle of Britain in 1940, 6 June 1944 is the most important date of the Second World War in the history of Europe. Now, half a century later, memories are roused by commemorative exhibits in museums both sides of the Channel. But what of the sites, where many toiled at the preparations for the greatest amphibious operation of all time and soldiers trained for the tough task

in front of them? There is just time to collect the memories from those who took part, but very little for the archaeologist to find and preserve. Wiltshire, Dorset and Hampshire — on the front-line South Coast of England — made an effort to mark D-Day, with an eye on the tourist business, causing people to look at local events of 50 years ago.

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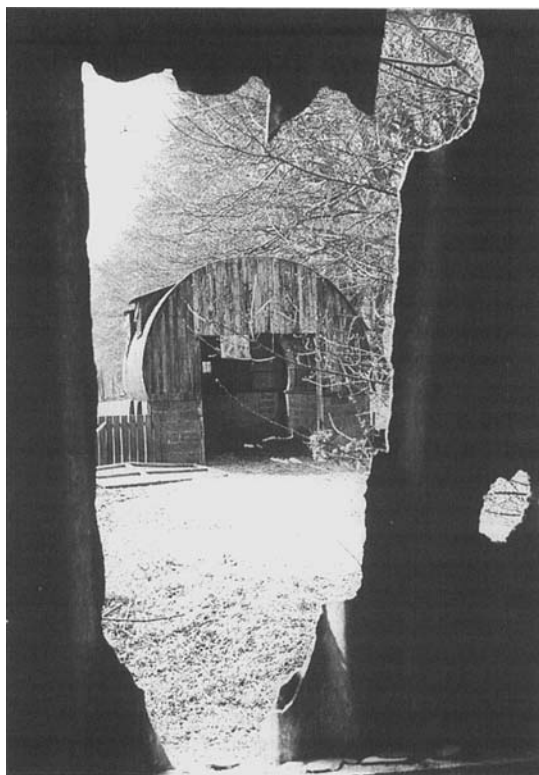


FIGURE 1. *Vehicle service station, Wilton (1960). Now rubble.*

Salisbury Plain was a main training area for troops from the Allies. To launch Operation Overlord, vast quantities of stores of all varieties were necessary, and depots were opened throughout southern England; it is these, together with the dozen of camps to house troops in training, that have left traces on the landscape. After 50 years these have become faint, but at Dinton the RAF Maintenance Unit was extended and large sheds built, which can still be seen from the road. At Lockerley was built the largest supply depot by the US Army, with 14 miles of sidings and dozens of large sheds. After a period of use by the Royal Army Ordnance Corps it closed in the 1950s and now nothing but slight earth disturbance remains. This is true of many camps which consisted of Nissen huts. Post-war the curved corrugated iron buildings were removed for use on other sites by farmers and builders. Concrete bases, paths and roads often remain, and where not covered by earth, give a picture of the extent of war-time development. At Wilton House

near Salisbury, where much of the detail planning for Overlord was carried out and many Nissen huts were built on the estate, *one* did survive for many years, used by the local radio club. Also on the Wilton Estate, at South Hill, the remains of a vehicle service depot is slowly disintegrating (FIGURE 1); the two inspection pits are still to be seen, filled with rubbish, as is the check-out! The petrol filling-station is completely buried further up the hill, but some steps lead to a long-vanished Nissen hut. It was along this avenue of trees that the road was widened to accommodate two rows of parked vehicles under the canopy of the beeches. The road was closed to all but essential users, one of whom told me that there were over 300 vehicles at this one location. There are hut bases in the woods around, but the insignificant cable insulators on the trees give away the area's busy few months of 1944. It is the small traces left that give clues to sites today.

At RAF Old Sarum, taken over during 1944 as a conversion depot to waterproof vehicles for the landings, the hangars were used for a 'SNUG' process which enabled them to be driven ashore from landing-craft. The modifications were made on a production-line basis, with batches being driven through by RAF Servicing Commando units. The trucks were dispersed on and around the airfield, there being over 3000 at the end of May. No trace remains, but there was a large water-tank, with ramps, outside the hangars where vehicles were tested! Local airfields were used for the airborne operations connected with D-Day, but two Advanced Landing Grounds were built to house the extra army support squadrons of RAF Typhoons and Thunderbolts of the USAAF, one at Bisterne and the other at Winkton. Large gaps in hedges for runways and a few pieces of wire-mesh runway, used in the temporary construction, remain in use on local farms. Aircraft hangars for servicing would be of the 'blister' type; two of this pattern still exist at Oatlands Hill, near Stonehenge. Now there is little to recall the hectic days of May and June 1944.

There were camps for soldiers at Downton, Grimsditch, Wylve, Sutton Veny, and in the grounds of many stately homes. Longford Castle was the HQ of the 6th Airborne Division, while Breamore House was Patton's HQ; small units were dotted all over the countryside, manning searchlights and radio-stations and

doing other specialized tasks. Virtually nothing remains of this activity, yet in Bodenham Village Hall a series of badges commemorated the units based in the village. Roads were improved for the heavy traffic to the loading areas, with pavements being lowered on the Salisbury–Downton road, which, as ‘route B’, continued to Cadnam and then Southampton docks. One feature remaining is the series of lay-bys, built to accommodate broken-down vehicles, now used by visitors to the New Forest. At Southampton and Weymouth docks provision was made to load the various types of ships for the crossing, using hards over which vehicles could be driven into the Landing Ship Tanks; it was also from hards that sections of Mulberry Harbour were launched. Part of a ‘chocolate block’ hard can be seen at Stone Point, near Lepe Beach.

Little remains archaeologically in Britain of the World’s Greatest Amphibian Operation, but across the Channel the concrete defences it overcame still stand, although somewhat battered. The German defences, built in concrete, were generally to their standard designs, so that a trip to the Channel Islands will give an idea of the type of fortification the Allies faced on D-Day. The defences in Normandy are now visitor attractions, and near-by museums give a full picture of the events of 1944. In the Channel Islands, the German defences have only suffered scrap-merchants and deterioration from weather, not Allied bombing and gunfire. In Alderney a wide variety of block-houses, radar-stations, gun emplacements, observation-towers and pill-boxes are to be seen in close proximity, while both Guernsey and Jersey have excellent occupation museums, and are taking stock of potential tourist attractions!

Palaeoenvironmental evidence of island colonization: a response

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More on whether evidence of prehistoric environment on the Pacific island of Mangaia does or does not demonstrate an early human presence there.

Kirch & Ellison (1994) argue in the June ANTIQUITY that new palaeoenvironmental research on Mangaia (Cook Islands) seriously challenges the short chronology of East Polynesian prehistory proposed by Spriggs & Anderson (1993). It does not, for reasons I shall discuss following clarification of several points.

Spriggs & Anderson (1993) do not hold the view that a standstill of colonization in West Polynesia was followed by resumed colonization eastward driven by explosive population expansion (Kirch & Ellison 1994: 319). We said the opposite, that ‘East Polynesian colonists presumably outran the push of population growth’ (Spriggs & Anderson 1993: 211, my emphasis), and have argued that case repeatedly. We are not looking for the ‘first colonization site’ as a ‘Holy Grail’, nor do we take a negative position with regard to palynological

evidence (Kirch & Ellison 1994: 318). Actually, we are both currently engaged in palynological projects concerning Pacific prehistory. Lastly, Kirch & Ellison (1994: 318) say there is now evidence of anthropogenic palaeoenvironmental disturbance dated at 1400 b.p. in New Zealand. However, Striewski *et al.* (1994: 22) claim only that the determination suggests disturbance by about 1000 b.p.

The Mangaian case

The Mangaian case is based on analysis of three, out of 24, sediment cores. Two cores (VT6, TM7) show a rapid decline in tree pollen (although *Pandanus*, generally a disturbance indicator, disappears at this time in VT6), an increase in fern, and the first appearance of charcoal at about 2500 b.p. The third core (TIR-1), from the same basin as VT6 and initially

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