suspended by wires from a rigid frame, which is kept in orbital motion by a rotating weight attached underneath. The orbital motion shears the film and sets up a shear gradient in it. Bagnold found in his studies of particle motion in deserts that, under such conditions, forces acting on the particles and at right angles to the gradient—in other words vertical forces—develop, and these are proportional to the particle size but not to the density. The net effect, of course, is that the small dense cassiterite particles come out of suspension and can be collected.

Whether or not this turns out to be how the machine works, the research is bound to lead to a better understanding of the physics of ore separation and better machinery, both of which are certainly needed now that low grade ores are having to be exploited.

ARCHAEOLOGY

Norman Castle at York

from our Archaeology Correspondent

A RECONNAISSANCE excavation at Baile Hill just within the city walls at York, directed by Mr P. V. Addyman, of Southampton University and sponsored by the Royal Archaeological Institute as part of its programme to investigate the origins of the castle in England, has almost certainly identified the hill as the partly denuded motte of one of the two castles built in York by William I in 1068 or 1069. Recently (*Nature*, **219**, 1214; 1968), Dr B. K. Davison's new theory of the origin of the motte and bailey castle was outlined, namely that the design evolved in England after the Norman Conquest, and his prediction that the earliest mottes could well have been built on top of earlier Norman earth ringworks. Both the castles built in York within three years of the Conquest were taken in September 1069 during the Anglo-Danish uprising against William and partially destroyed, but then promptly retaken by William and repaired. One of the castles was continuously occupied and extended throughout the middle ages and remains as York castle; the other, as it turns out, on the Baile Hill site had fallen into disuse by the thirteenth century and the large number of mediaeval arrow heads

found during the excavation suggests that the site was used thereafter chiefly as an archery butt. Because the Baile Hill castle was built immediately after the Conquest and not in use for very long, on the face of things it is probably the best site in England for discovering the layout of the earliest motte and bailey castles and could prove a crucial test of Davison's theory.

The crucial question as far as Dr Davison's theory is concerned is whether the motte was the primary or a secondary Norman structure on Baile Hill. The excavation so far has not provided an unequivocal answer, but it does seem certain that the motte was built before 1100. So far the trench at the base of the motte has been uncovered as well as a flight of steps formed in the clay of the mound, which were so freshly preserved that they were once probably faced with wood. The steps presumably led from the bailey to the summit of the motte and the trench was in all probability bridged by a horizontal wooden bridge. During the excavation of these steps the ground surface on which the motte was raised was revealed. It contained no pottery that can be dated to later than 1100 but plenty of Saxon pottery (Thetford, Stamford and York ware) as well as a fourth century Roman pit. The motte must thus have been built before 1100, but until further excavations at the base of the motte have been made it is impossible to rule out the possibility that there are earlier Norman ringworks on the site. The chances are, however, that the motte is the primary structure.

Excavation of a small area on the summit of the motte revealed a cobbled surface, probably laid when the motte was built, overlain by several feet of earth containing abundant Saxo-Norman pottery and objects of the eleventh and twelfth centuries and traces of the Royalist battery built during the Civil War. The Norman cobbled area did not extend to the head of the flight of stairs, so presumably this area was covered by an entrance building, but the area excavated was too small to reveal any foundations of Norman buildings. The site is, however, sufficiently well preserved to merit further excavations which are planned for next summer. The only problem is that the mediaeval town walls and a modern road about Baile Hill and so excavation for the possible ringwork will be expensive.

New Burdens for Science Research Council

THE last eighteen months have been a trying time for the Science Research Council. First, its budget has not been increased by anywhere near as much as everyone hoped; in 1967-68, the council spent nearly £38.6 million (see Table 1) compared with £34.3 million in the previous financial year. Second, as Professor B. Flowers, the council's chairman, said when he introduced the third annual report on October 10 (HMSO, 7s. 6d.), the council has witnessed its "biggest negative achievement ever". He meant, of course, the British Government's injudicious decision, taken in the face of the council's advice, not to participate in building the CERN 300 GeV accelerator. The 5 GeV accelerator NINA at Daresbury, which was commissioned this year,

is no substitute, and the council, refusing to be reconciled to the CERN decision, has pledged itself to continue to press for a reversal.

The SRC is, however, in agreement with the Government and the Swann Committee over the general policy of increasing preferential support to applied research. This is apparently the council's own view, reached without prompting from the Government or anyone else. At the end of 1967 the SRC started a major review of its general policy, and as a result has decided that although it will continue to support research on a broad front it will concentrate on work likely to yield the most significant scientific advance or to be the basis of social or economic benefit to Britain. This will