

Military geology involves the application of geological science to the decision-making processes that are required by military command. Consequently, the individual geologist needs to be professionally experienced in applied geology and also trained in military staff work and doctrine, in a strategy preferred to that adopted during the 19th century, when attempts were made to train army officers in geology.

The British Army was the first to use geologists in their professional capacity for military operations, during the First World War; geologists have provided advice to commanders in every major operation with which the British Armed Forces have since become involved. Following each major conflict, publications have drawn attention to the valuable contribution made by military geologists. However, financial pressures and the perceived lack of a need for more than a basic preparation for future armed conflict have resulted in few recommendations for increasing the establishment ever being adopted.

The importance of establishing an adequate and relevant database of information is now widely recognised. Geological mapping is able to provide an early indication of the type of ground to be expected during a military campaign, and the trend for its compilation has been towards digital recording in support of the existing paper information. The provision of geological information together with its interpretation and the means of giving advice are now established components of decision support within headquarters at Corps and Division levels. Generally the tasks have to be dealt with in emergency situations, and time is therefore very short by comparison with civilian projects. The primary requirement is a rapid assessment of the ground conditions within the context of the prevailing military situation. For the advice to be useful, it then has to be presented in a manner compatible with accepted military practice and avoid use of technical jargon.

Construction work is required in support of the battle: preparing defences, supporting an advance and consolidating new positions. Interaction of these works with the ground and the supply of natural materials, particularly water, requires characterisation and management sensitive to the contemporary military operations. Local water supplies, even if undamaged, are unlikely to be able to sustain the quantities required by the influx of large numbers of troops. Health risks from poor water, due not only to natural bacteria but also to deliberate contamination (from terrorist sabotage or nuclear, biological or chemical attack), require that suitable water supplies be established and developed early in a campaign.

The close link between the physical character of the battlefield and the underlying geology is fundamental, and gives advantage to the side that best appreciates the nature of the link during both

LECTURE

Geology in war

Summary of lecture presented to the Society on Saturday 15th April 2000 by Prof Mike Rosenbaum, of Nottingham Trent University.

A review of military history reveals two major considerations that have influenced operations ever since large armies were first deployed. The first is the availability of communications allowing movement of troops and equipment. The second is the configuration and state of the ground, so controlling deployment of the opposing armies in battle. It must be remembered that armies cannot win in defence alone, and success requires first class leadership combined with the will to succeed and supported by adequate equipment and men.

the battle and the follow-through. This aspect is expressed not only in terms of troop mobility but also with respect to ground diggability and the maintenance of supply lines and defensive works. Late 20th century actions in the Falkland Islands, the Persian Gulf, Cyprus and mainland Europe explicitly demonstrate how military geology has been used, directly or indirectly, by the British armed forces in more recent years. The trend throughout the century has been of increased mobility during armed conflict, although the scale of operations has varied enormously.

Perhaps the most important geological lesson to have been learned in war has been that the military geologist must have basic data to interpret if he is to provide effective advice. Rapid evaluations, rather than financial strictures, are of the highest priority, and therefore the military geologist needs to be able to operate as an individual, as a consultant and as part of a team, and he must have the data accessible. This requires extensive training in peacetime, in order to establish access to the database and to exercise its retrieval in preparation for times of conflict.

A battlefield environment is not conducive to conventional scientific investigations, yet an accurate interpretation of ground conditions will be required within the generally very short timeframe of an operation. This demands the availability of a geologist who is trained in his science within the military command structure. He must also be a geologist of considerable versatility - for he must have a wide and deep knowledge of his discipline, and must be able to survive and operate under battlefield conditions, and he needs to understand military principles and procedures well enough to make his advice and decisions clearly and immediately relevant to the perceived military aim.

Literature

- Rose, E.P.F. & Rosenbaum, M.S., 1993. British Military Geologists: the formative years to the end of the First World War. *Proceedings of the Geologists' Association*, **104**, 41-49.
- Rose, E.P.F. & Rosenbaum, M.S., 1993. British Military Geologists: through the Second World War to the end of the Cold War. *Proceedings of the Geologists' Association*, **104**, 95-108.
- Rosenbaum, M.S., 1997. Geological training for British Army Officers: A long-lost cause? *Journal of the Institution of Royal Engineers*, **111**, 182-183.
- Rosenbaum, M.S., 1998. Background and recent applications of military geology in the British armed forces. In: Underwood, J.R., Jr., & Guth, P.L. (Eds.), *Military Geology in War and Peace. Geological Society of America Reviews in Engineering Geology*, **XIII**, 125-134.
- Rosenbaum, M.S. & Rose, E.P.F., 2000. Operational roles for military geologists. In: Rose, E.P.F. & Nathanail, C.P. (Eds.), *Geology and Warfare*. Geological Society, London, in press.